IntelligentAg

WIRELESS BLOCKAGE AND FLOW MONITOR (WBFM) INSTALLATION MANUAL

Document revision 1.9

Wireless Blockage and Flow Monitor Installation Manual

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Record of Revision			
Revision Number	**Change Description**	**Revision Date**	**Inserted By**
1.0	Initial release	10/27/2011	CJW
1.1	Modified Downloading the Wireless Blockage Monitor app section. Added About the inclusion of the iPad with the Wireless Blockage Monitor system and To sign out of a default App Store account instructions within that section	12/13/2011	CJW
1.2	Updated several graphics where appropriate. Added reversing port order instructions. Miscellaneous grammatical edits	3/29/2013	CJW
1.3	Changed all instances of product name from “Wireless Blockage Monitor” to “Wireless Blockage and Flow Monitor.” Added Appendix with instructions for wiring work switch directly to an existing switch. Added metric measurement equivalents	7/31/2013	CJW
1.4	Added instructions for installing 1.5 inch flow sensors to the Installing Flow Sensors section. Added part numbers that are applicable to the addition of the 1.5 inch flow sensor	9/5/2013	CJW
1.5	Updated several part numbers and correct an incorrect part description. Revised “Installing 1.5-inch sensors on 1-inch final run hose” instructions. Added drawing showing how to install 1.5-inch sensors on 1-inch hose. Revised drawing showing to install 1.5-inch sensors on 1.25-inch hose.	9/16/2013	CJW
1.6	Added diagrams for installing wiring harnesses on 12, 16, and 20 manifold air seeders.	3/13/2014	CJW
1.7	Added information about/picture of installation of access point suction cup mount. Inserted information about/picture of alternate sensor installation. Updated 12, 16, 20 manifold wiring diagrams/descriptions to include a 27’ intermediary harness. Broke down some kits into individual parts in section 1.2. Shortened sensor install instructions. Miscellaneous copy edits.	11/18/2014	AAL

1.8	Added Appendix C with information about using the system with a Gateway and virtual terminal. Reordered the tasks.	3/10/2015	CJW
1.9	Updated new adapter part numbers and kit changes. Updated configuration instructions to reflect app updates.	8/19/2015	AAL

Related Documentation

Document Number	Document Title
600890-000015	Wireless Blockage and Flow Monitoring Operator's Guide
600820-000012	Wireless Blockage and Flow Monitor Troubleshooting Guide

Glossary

Abbreviation	Term	Definition
	Access Point	In the Wireless Blockage and Flow Monitor, the access point is the equipment that broadcasts the local wireless network's signal.
App	Software application	A computer program, especially one designed for a mobile device.
BIT	Built-in-Test	A mechanism built in to the Wireless Blockage and Flow Monitor that allows that equipment to test itself for, and alert the operator of, any possible problems.
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 Wi-Fi connection.
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 if the ECU is receiving power and functioning properly.
Wi-Fi	Wireless Fidelity	A local area network that uses high frequency radio signals to transmit and receive data over short distances.
	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 signals that the implement is out of the ground, the audio alarm that would normally alert the operator to blockage of flow in the equipment's run will automatically be silenced.

1 Introduction

1.1 How to use this manual

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

- Section 2 of the manual includes instructions for installing all of the components of the WBFM in the order they should be installed.
    - Each subsection within Section 2 includes instructions for one procedure of the installation. In addition to the installation instructions for the procedure, the subsections include a short introduction about the component being installed, the parts and tools needed for that procedure, steps you must complete prior to performing the procedure, and other related procedures.
- Appendix A of this document includes diagrams with instructions for how to install wiring harnesses for various implement configurations.
- Appendix B and C of this document include wiring directly to an existing switch to control the work switch, and installing the WBFM for use with a Virtual Terminal.

NOTE: For instructions to use the WBFM after installation, refer to the Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015). This document is accessible via the WBFM app's Information ⓘ screen.

1.2 Wireless Blockage and Flow Monitor parts list

The following components are required for installation of the WBFM. The quantity of each component that is needed for installation will vary based on your implement configuration, as noted in the "Quantity Needed" column.

Kit Name	Part Number	Quantity Needed
U-bolts with Saddle Clamp Options (for ECU mounting bracket) Diameter of manifold tower determines size of U-bolt needed	2" diameter U-bolt: 352013-000006 2.5" diameter U-bolt: 352013-000007 3" diameter U-bolt: 352013-000008 4" diameter U-bolt: 352013-000009	2 per manifold
Tractor Kit (See Table 10)	153025-000037	1 per system
ECU Kit (See Table 11)	153025-000038	1 per manifold
Intermediary Harness Kit (See Table 13)	153025-000034 (10 ft/ 3 m harness) or 153025-000018 (27 ft/ 8.2 m harness)	Refer to Appendix A
Deutsch Sealing Plug	153560-000015	2 per system
iPad	Not included with WBFM	1 per system

Table 1: Kit list for installation

Part Name	Part Number	Quantity included per Kit
1.25 inch (3.2 cm) Hose Clamp	352013-000005	4
1.25 inch (3.2 cm) Adapter Hose	351060-000008	2
1.25 inch (3.2 cm) Sensor Assembly	153570-000015	1

Table 2: 1.25 inch Sensor – 1 inch Hose

Part Name	Part Number	Quantity included per Kit
1.25 inch (3.2 cm) Hose Clamp	352013-000005	2
1.25 inch (3.2 cm) Adapter Hose	351060-000008	1
1.25 inch (3.2 cm) Sensor Assembly	153570-000015	1

Table 3: 1.25 inch – 1.25 inch Hose Sensor

Part Name	Part Number	Quantity included per Kit
1.5 inch (3.8 cm) Hose Clamp	352013-000010	2
2 inch (5.1 cm) Hose Clamp	356060-000025	2
1.5 inch (3.8 cm) to 7/8 inch (2.5 cm) Hose Adapter	353070-000029	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 4: 1.5 inch Sensor – 7/8 inch Hose

Part Name	Part Number	Quantity included per Kit
1.5 inch (3.8 cm) Hose Clamp	352013-000010	2
2 inch (5.1 cm) Hose Clamp	356060-000025	2
1.5 inch (3.8 cm) to 15/16 inch (2.4 cm) Hose Adapter	353070-000031	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 5: 1.5 inch Sensor – 15/16 inch Hose

Part Name	Part Number	Quantity included per Kit
1.5 inch (3.8 cm) Hose Clamp	352013-000010	2
2 inch (5.1 cm) Hose Clamp	356060-000025	2
1.5 inch (3.8 cm) to 1 inch (2.5 cm) Hose Adapter	353070-000022	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 6: 1.5 inch Sensor – 1 inch Hose

Part Name	Part Number	Quantity included per Kit
2 inch (5.1 cm) Hose Clamp	356060-000025	4
1.5 inch (3.8 cm) to 1 1/8 inch (2.9 cm) Hose Adapter	353070-000030	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 7: 1.5 inch Sensor – 1 1/8 inch Hose

Part Name	Part Number	Quantity included per Kit
2 inch (5.1 cm) Hose Clamp	356060-000025	4
1.5 inch (3.8) to 1.25 inch (3.2 cm) Hose Adapter	353070-000032	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 8: 1.5 inch Sensor – 1.25 inch Hose

Part Name	Part Number	Quantity included per Kit
1.5 inch (3.8 cm) Hose Clamp	352013-000010	2
1.5 inch (3.8 cm) Sensor Assembly	153570-000016	1

Table 9: 1.5 inch Sensor - 1.5 inch Hose

Part Name	Part Number	Quantity included per Kit
Access Point	150570-000002	1
Access Point Power Cable	355020-000031	1
USB charger (for iPad)	254040-000001	1
iPad Air mount	356070-000004	1
Tablet mount arm	352004-000003	1
Rail attachment for Tablet mount	352004-000004	1
Wire Guide	355005-000004	6
Alcohol Wipes	359060-000003	2
Oil-resistant cork/ rubber gasket (included with the Access Point)	351521-000004	2
¼" 20 Steel Locknut	352011-000040	4
Work switch Bracket	351050-000016	1
Work switch	153560-000014	1
Ceramic Work switch Magnet	359035-000001	1
¼" Steel Washer	352012-000024	4
¼" 20x¾" Steel Bolt	352010-000084	2
Cable Tie	355032-000004	100
3 Way DTM Splitter	355030-000002	2
27 ft (8.2 m) Intermediary Harness	355020-000019	1
22 ft (6.7 m) ECU Harness – Work Switch	355020-000018	1
Tractor harness	355020-000021	1
Ball Mount with Long Arm & 2/Diamond Bases	352004-000005	1
Suction Cup Base with Twist Lock	352004-000006	2

Table 10: Tractor Kit

Part Name	Part Number	Quantity included per Kit
Wireless Blockage and Flow Monitor ECU	150505-000012	1
ECU Mounting Bracket	351050-000012	1
ECU Bracket Shield	351050-000015	2
¼" 20 Steel Locknut	352011-000040	6
¼" Steel Washer	352012-000024	6
Hairpin Cotter Pin	352015-000012	4

Table 11: ECU Kit Subcomponents

Part Name	Part Number	Quantity included per Kit
7 ft (2.1 m) ECU Harness or 22 ft (6.7 m) ECU Harness	355020-000017 or 355020-000020	Refer to Appendix A

Table 12: Harnesses

Part Name	Part Number	Quantity included per kit
3 Way DTM Splitter	355030-000002	1
10 ft (3 m) Intermediary Harness or 27 ft (8.2 m) Intermediary Harness	355020-000016 or 355020-000019	1

Table 13: Intermediary Harness Kit Subcomponents

1.3 Tools Required

You will need the following tools to install the WBFM:

- Standard wrench and socket sets
- Pliers
- Measuring tape (only if installing 1.5-inch flow sensors)
- Cutting tool, such as a box cutter or shears (only if installing 1.5-inch flow sensors)
- Cordless drill and/or flathead screwdriver (optional)
- Paint pen or other permanent marking tool (optional)

2 Installation Instructions

2.1 Overview Checklist

The WBFM installation is accomplished in the following steps:

- ☐ 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 Wireless Blockage and Flow Monitor app.
- ☐ Configure the Wireless Blockage and Flow Monitor app.
- ☐ Configure the work switch.

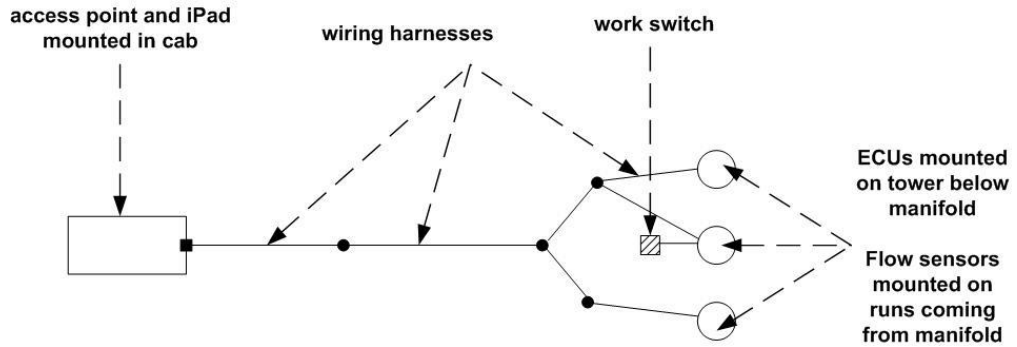


Figure 1: Installation location overview

The wiring harness in this figure 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	150505-000001	1/manifold	ECU kit
ECU Mounting Bracket	351050-000012	1/manifold	ECU kit
¼" 20 Steel Locknut	352011-000040	4/manifold	ECU kit
¼" Steel Washer	352012-000024	4/manifold	ECU kit
U-bolts with Saddle Clamp Options (for ECU mounting bracket) Size of manifold determines size of U-bolt needed	2" diameter U-bolt: 352013-000006 2.5" diameter U-bolt: 352013-000007 3" diameter U-bolt: 352013-000008 4" diameter U-bolt: 352013-000009	2/manifold	U-bolts with Saddle Clamp (not packaged with a kit due to variance in size)

Table 14: Parts needed to install the ECU

Tools needed

- Standard socket set

Number of times procedure performed

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: Intelligent Ag strongly recommends installing the ECUs in alphanumeric order based on the ECU's serial number to simplify the configuration step in the Wireless Blockage and Flow Monitor app. The serial number can be found on the label on the front of the ECU.

Installing the ECU mounting bracket

1. Remove the nuts and saddle clamp from the ends of two u-bolts (352013-00006, 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 are going through the top two holes of the ECU mounting bracket, as seen in the top circle in Figure 3.
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 3.
6. Replace the saddle clamp and nuts onto the second u-bolt.

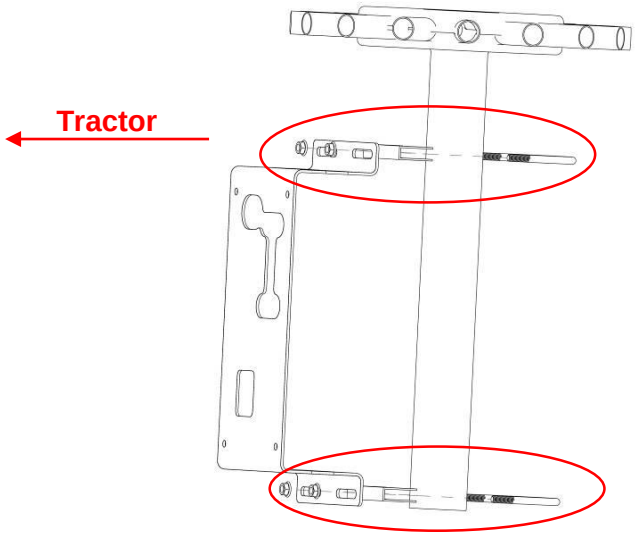


Figure 3: Mounting an ECU bracket to the implement tower

Installing ECUs

1. Place and hold the ECU assembly (150505-000001) onto the front of ECU mounting bracket (351050-000012).

   NOTE: Do not remove the locknuts that are currently on the ECU assembly.

2. Secure the ECU assembly to the mounting bracket by placing four ¼" 20 steel locknuts (352011-000040) and four ¼" steel washers (352012-000024) to the back of the existing bolts on the ECU.
3. Plug the four pin, gray and orange connector of the ECU harness into the white, four-pin receptacle located on the back of the ECU. Refer to Section 2.5 for ECU harness instructions.

Figure 4**: ECU installed on an implement tower**

2.3 Installing flow sensors

About flow sensors
Flow sensors directly connect to the implement's final runs. They are able to 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 Wireless Blockage and Flow 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 size of the flow sensor and adapters you purchase will depend on the diameter of the final run hoses on your implement and your blockage and flow monitoring preferences.

The 1.25-inch (3.2 cm) flow sensors can usually be installed on 1.25-inch diameter final run hose without any adapters. The 1.25-inch flow sensors can also be installed on 1-inch diameter final run hoses, but with adapters. Follow the installation instructions given in "Installing 1.25-inch flow sensors" later in this section if you are using 1.25-inch flow sensors.

Figure 5: 1.25-inch flow sensors installed on a manifold

Figure 6: 1.25-inch flow sensors installed on a manifold (alternate installation)

Larger 1.5 inch (3.8 cm) flow sensors are also available from Intelligent Ag. The 1.5-inch flow sensors can be installed on 1.5-inch diameter final run hose without any adapters. The 1.5-inch flow sensors can also be installed on 7/8 inch, 15/16-inch, 1-inch, 1 1/8-inch, and 1.25-inch diameter final run hoses, but with adapters. Follow the installation instructions given in "Installing 1.5-inch flow sensors" later in this section if you are using 1.5-inch flow sensors.

Figure 7: 1.5-inch flow sensors installed on a manifold

Tools needed

- 5/16 inch socket, 5/16 inch nut driver on a cordless drill, or a flathead screwdriver
- Measuring tape (1.5-inch flow sensors only)
- Cutting tool, such as a box cutter or shears

Number of times procedure performed
Once per run

Installation location
Install flow sensors at the beginning of every run of the implement, next to the manifold.

Installing 1.25-inch flow sensors

1. Attach adapters to the flow sensor, if needed, as shown in Figure 8. Secure using hose clamps.
2. Detach the final run hose from the manifold.
3. Slide the sensor assembly onto the manifold. If it does not fit, cut a 2 inch piece of the final hose run and attach it to the manifold. Attach the sensor to the 2 inch hose piece.
4. Slide the remaining final run hose piece onto the bottom of the flow sensor or bottom adapter and secure using hose clamps.

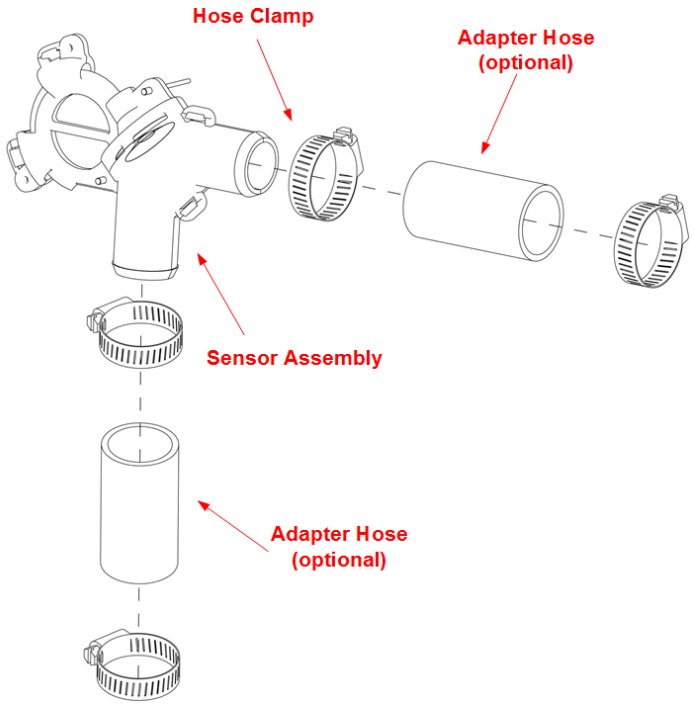


Figure 8: 1.25-inch flow sensors installed on a manifold

Installing 1.5-inch flow sensors

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

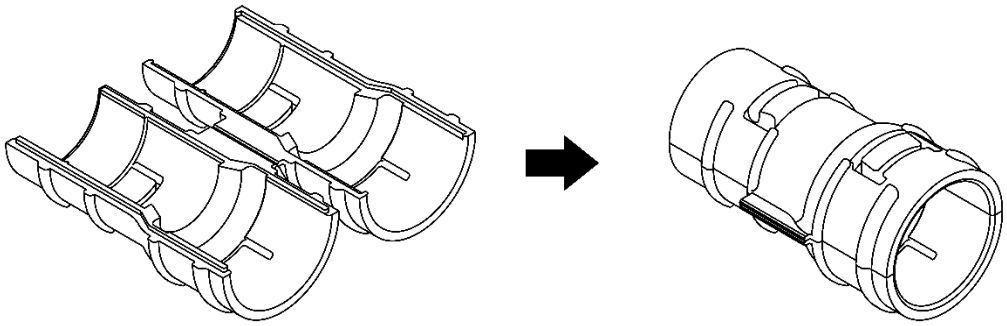


Figure 9: Preparing the adapters

2. Place adapters on the sensor as shown in Figure 10 and secure using hose clamps.
3. Detach the final run hose from the manifold and cut it to 8 inches (20.32 cm). Reattach the 8” hose piece to the manifold.
4. Place the top adapter on the 8 inch (20.32 cm) hose piece and secure using a hose clamp. Try to keep the sensor mounted in a vertical position.

   NOTE: The arrows printed near the top opening of the sensor assembly represent the flow of material and should point away from the manifold.

5. Slide the remaining final hose piece onto the lower adapter and secure using a hose clamp.

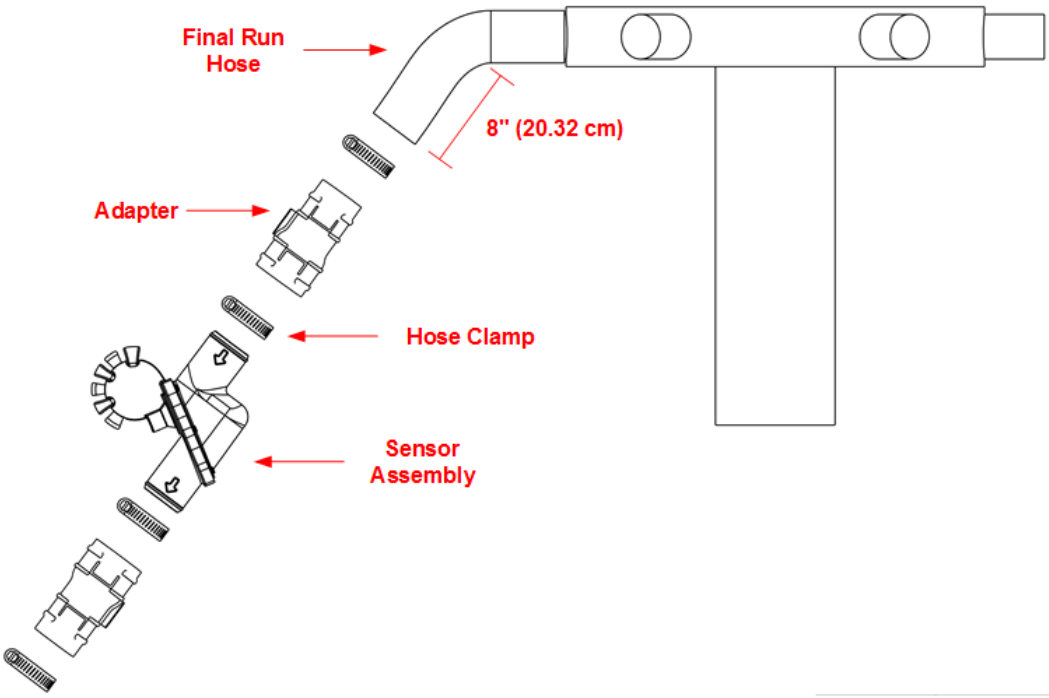


Figure 10: 1.5-inch flow sensors installed on a manifold

2.4 Connecting flow sensors to the ECU and installing ECU shield brackets

About connecting flow sensors to the ECU
Flow sensors must be connected to the ECU for flow measurements to be communicated to the WBFM app.

About ECU shield brackets
ECU shields help to prevent flow sensor tubes from becoming disconnected from ECU ports during operation, transportation, or storage of the implement. ECU shield brackets should not be installed until after the flow sensors have been connected to the ECU.

Part Name	Part Number	Quantity needed	Contained within
ECU Bracket Shield	351050-000015	2/manifold	ECU kit
Hairpin Cotter Pin	352015-000012	4/manifold	ECU kit
ECU Mounting Bracket	351050-000012	1/manifold	ECU kit

Table 15: Parts needed to connect flow sensors to the ECU

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

Number of times procedure performed
Once per manifold

Installation location
Install a flow sensor on each run of the implement. Connect the tubes of the flow sensors to ECU ports. The ECUs are installed on the implement tower, directly underneath the manifold.

Connecting flow sensors to the ECU
1. Remove the caps from the ECU ports you will be using. Leave the caps on the unused connectors to prevent foreign material from entering the ECU.

   EXAMPLE: If the manifold contains 16 runs, remove caps from ports 1 through 16 and leave the caps on ports 17 through 24.

2. Remove and discard the cap at the end of the flow sensor tube of the run that is immediately left of the manifold post (when facing the tractor). This run is labeled “1” in Figure 11).
3. Run that flow sensor tube through the hole on the top of the ECU mounting bracket (351050-000012).
4. Attach the flow sensor tube to the port labeled “1” on the ECU.

   CAUTION: Ensure that the flow sensor tube is not kinked, especially where the tube comes through the top of the ECU bracket and where the tube is secured to the ECU. If

a flow sensor tube becomes kinked, the ECU will be unable to receive any blockage measurement readings from that run.

5. **Optional:** Mark the number of the port the flow sensor hose 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 Wireless Blockage and Flow Monitor app will display the number of the ECU port that that run is attached to. Marking the number of the port the flow sensor is attached to will allow you to easily identify a blocked run during troubleshooting.

6. Continue removing the caps from the ends of the flow sensor tubes, 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 11.

   NOTE: If you connect ports in the reverse order, you must perform the steps in the "Reversing the port display direction" instructions given in Section 2.11.

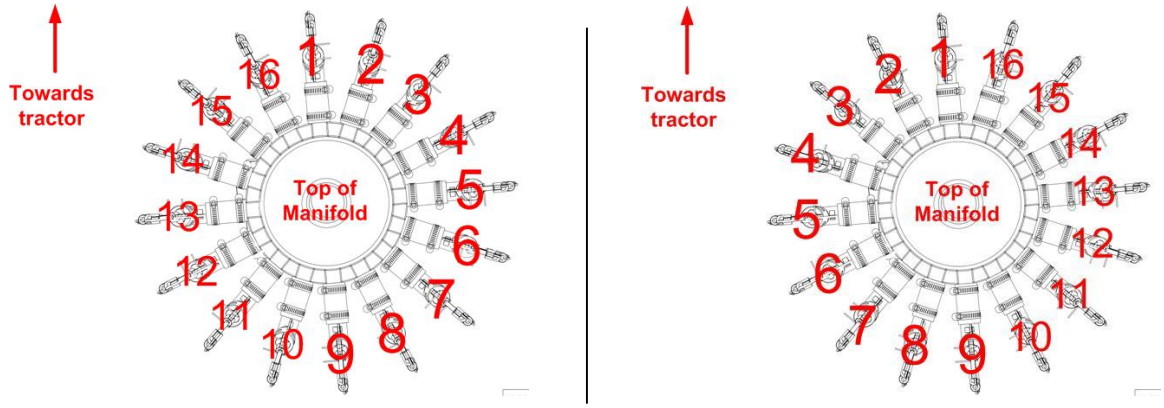


Figure 11: Order to connect flow sensors to ECU
Default order on left (clockwise), Reverse order on right (counterclockwise)

Installing ECU shields

1. Press an ECU bracket shield (351050-000015) into each side of the ECU mounting bracket (351050-000012).
2. Secure the ECU bracket shield to the mounting bracket with two cotter pins (352015-000012), one on the top of the bracket and one on the bottom of the bracket.
3. Using pliers, bend the cotter pins down.

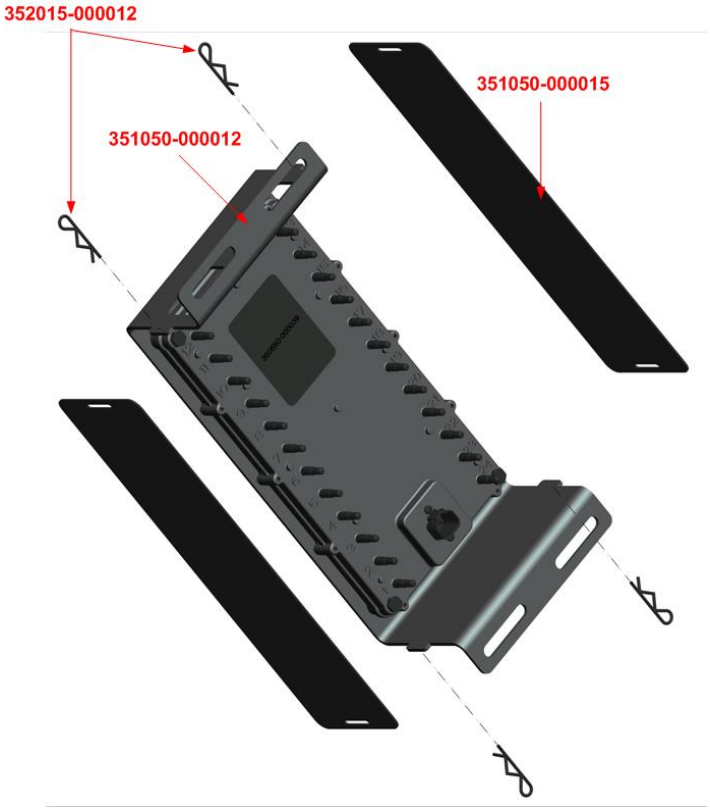


Figure 12**: Installing the ECU shields**

2.5 Installing the wiring harnesses

About the wiring harnesses
The wiring harness provides 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.

Installing a wiring harness when an air cart is between the tractor and implement
If an air cart is connected between the tractor and the implement, an extra intermediary harness is needed. If using this setup, run the intermediary harness that is directly connected to the tractor harness along the side of the air cart and secure the harness to the hydraulic line of the air cart. Insert a Deutsch sealing plug assembly (153560-000015) into the unused receptacle of the three-way splitter to prevent foreign materials from entering the three-way splitter. From the end of this intermediary harness, resume the wiring harness setup described in the following subsections.

Part Name	Part Number	Quantity needed	Contained within
Tractor harness	355020-0000021	One	Tractor kit
10 ft (3 m) Intermediary Harness	355020-000016	See Appendix A	Intermediary Harness kit
27 ft (8.2 m) Intermediary Harness	355020-000019	See Appendix A. If you have an air cart between the tractor and implement, an additional intermediary harness is required.	Tractor kit
7 ft (2.1 m) ECU Harness	355020-000017	See Appendix A	Sold individually
22 ft (6.7 m) ECU Harness	355020-000020	See Appendix A	Sold individually
22 ft (6.7 m) ECU Harness – Work switch	355020-000018	One	Tractor kit
Cable Tie	355032-000004	Approximately 100	Tractor kit
Deutsch Sealing Plug	153560-000015	Varies depending on implement configuration	Deutsch Sealing Plug

Table 16: Parts needed for installing the wiring harness system

Tools needed

- Pliers (optional)

Number of times procedure performed

- Tractor harness installation procedure: once per WBFM system
- 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 per system

Installation location

Intelligent Ag recommends installing the wiring harness on top of an existing wiring harness 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 the wiring harness becoming pinched during operation or transportation of the implement.

Connecting a tractor harness to a tractor

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

   NOTE: If you are unsure of the outlet's location, consult your tractor's owner's manual.

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

2. Extend the tractor harness until it reaches the hitch of the implement.

   NOTE: If the tractor harness does not need to be fully extended to reach the implement hitch, coil the extra length of the harness around a hydraulic line or electrical wire.

3. Secure the tractor harness to the tractor and/or implement using cable ties (355032-000004).

Connecting an intermediary harness to a tractor harness

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

NOTE: If an air cart is attached between the tractor and the implement, skip to the "Connecting an intermediary harness to a tractor harness when an air cart is in-between" instructions given below.

1. Connect the black end of the intermediary harness (355020-000019) into the three-way splitter at the end of the tractor harness.

   NOTE: If only one intermediary harness will be connected to the tractor harness, insert a Deutsch sealing plug assembly (153560-000015) into the remaining receptacle of the three-way splitter to prevent foreign material from entering the three-way splitter. Refer to the figures in Appendix A to determine the number of intermediary harnesses you will be connecting to the tractor harness.

2. Extend the intermediary harness over the implement. Use the figures in Appendix A to help guide the placement of the intermediary harness.

   NOTE: If the intermediary harness does not need to be fully extended to reach where it must connect, coil the extra length of the harness around a hydraulic line or electrical wire.

3. Secure the intermediary harness to the implement using cable ties (355032-000004).

Connecting an intermediary harness to a tractor harness when an air cart is in-between

NOTE: This step only needs to be performed if an air cart is attached between the tractor and the implement.

1. Connect the black end of the intermediary harness (355020-000019) into the three-way splitter at the end of the tractor harness.
2. Insert a Deutsch sealing plug assembly (153560-000015) into the remaining receptacle of the three-way splitter to prevent foreign material from entering the three-way splitter.
3. Extend the intermediary harness along the air cart's hydraulic lines to the implement's hitch.

   NOTE: If the intermediary harness does not need to be fully extended to reach the implement's hitch, coil the extra length of the harness around a hydraulic line or electrical wire.

4. Secure the intermediary harness to the hydraulic lines using cable ties (355032-00004).

Connecting an intermediary harness to an intermediary harness
NOTE: This step does not have to be performed if your implement has less than five manifolds.

NOTE: A maximum of two intermediary harnesses can be connected to the end of another intermediary harness.

1. Connect the black end of the intermediary harness (355020-000019) into the three-way splitter at the end of the already installed intermediary harness.

   NOTE: If only one wiring harness (intermediary, ECU, or Work Switch ECU) will be connected to the three-way splitter of the intermediary harness, insert a Deutsch sealing plug assembly (153560-000015) into the remaining receptacle of the three-way splitter to prevent foreign material from entering the three-way splitter. Refer to the figures in Appendix A to determine the number of harnesses that will be connected to the three-way-splitter.

2. Extend the intermediary harness over the implement. Use the figures in Appendix A to help guide the placement of the intermediary harness.

   NOTE: If the intermediary harness does not need to be fully extended to reach where it must connect, coil the extra length of the harness around a hydraulic line or electrical wire.

3. Secure the intermediary harness to the hitch using cable ties (355032-000004).

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 connector at the end of the ECU harness (355020-000020 or 355020-000017) to a three-way splitter of an intermediary harness (355020-000019 or 355020-000016).

   NOTE: If only one wiring harness (intermediary, ECU, or Work Switch ECU) will be connected to the three-way splitter of the intermediary harness, insert a Deutsch sealing plug (153560-000015) into the remaining receptacle of the three-way splitter to prevent foreign material from entering the three-way splitter. Refer to the figures in Appendix A to determine if two wiring harnesses will be connected to the intermediary harness's three-way splitter.

2. Extend the ECU harness so that it reaches an implement tower. Use the figures in Appendix A to help guide the placement of the ECU harness.

   NOTE: If the ECU harness does not need to be fully extended to reach the ECU, coil the extra length of the harness around a hydraulic line or electrical wire.

3. Secure the ECU harness to the implement using cable ties (355032-000004).

   NOTE: The orange and gray four pin connector at the end of the ECU harness will be connected to a receptacle on an ECU after the ECUs are installed.

Connecting a Work Switch ECU harness to an intermediary harness and the work switch
NOTE: Only perform these instructions after you have installed the work switch. Refer to Section 2.6 for instructions for how to install the work switch. You should also determine which ECU will be the "Work Switch ECU." The Work Switch ECU is the ECU closest to the work switch. Typically, the work switch is installed near or in the middle of the implement.

1. Follow Steps 1 and 2 of the “Connecting an ECU harness to an intermediary harness” instructions given above, but using the ECU Harness – Work Switch (355020-000018) instead of a standard ECU Harness (355020-000020 or 355020-000017).
2. Connect the two pin, gray connector at the end of the ECU Harness – Work Switch to the two pin, gray receptacle at the end of the Work Switch assembly (153560-000014). Instructions for installing the work switch were given in Section 2.6.
3. Secure the ECU Harness – Work Switch to the implement using cable ties (355032-00004).

   NOTE: The orange and gray four pin connector at the end of the Work Switch ECU harness will be connected to a receptacle on the Work Switch ECU after the ECUs are installed.

2.6 Installing the work switch

About the work switch
The work switch signals the Wireless Blockage and Flow 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 senses the implement is out of the ground.

NOTE: When the implement is out of the ground, the Wireless Blockage and Flow Monitor app might display that all runs are blocked (as 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 operation.

Figure 13: Wireless Blockage and Flow Monitor work switch assembly

NOTE: An alternative to the following work switch installation procedures is given in Appendix B of this document. This alternative step describes how to wire directly to an existing mechanical or electrical switch on your tractor or implement to control the WBFM work switch. Be advised, however, that this alternative method is considered a nonstandard installation and requires knowledge of basic electrical safety and wiring procedures.

About work switch methods
Implement work switches use 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.

- **Reversed 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 Sections 2.10 and 2.11 for more information on configuring the work switch.

Part Name	Part Number	Quantity needed	Contained within
Ceramic Work Switch Magnet	359035-000001	1	Tractor kit
¼" 20x¾" Steel Bolt	352010-000084	2	Tractor ECU kit
¼" Steel Washer	352012-000024	4	Tractor ECU kit
¼" 20 Steel Locknut	352011-000040	2	Tractor ECU kit
Work Switch Bracket	351050-000016	1	Tractor ECU kit
Work Switch Assembly	153560-000014	1	Tractor ECU kit

Table 17: Parts needed to install work switch

Tools needed

- Standard wrench set

Number of times procedure is performed
Once per WBFM system

Installation Location
It is often easiest to install the work switch 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, determine the location of the hydraulic cylinders that are used to lift the implement in and out of the ground at the end of rows. Find a location on the hydraulic cylinder where you can mount the work switch and magnet so that they will be moved apart when the implement is out of the ground.

Installing the work switch

1. Slide a ¼" steel washer (352012-000024) onto the end of each ¼" 20 x ¾" steel bolt (352010-000084). Insert the bolts into the work switch bracket (351050-000016). The washer should rest against the bolt head and the work switch bracket.
2. Install the work switch bracket onto the existing work switch bracket. If the implement does not have an existing work switch, find a location on the hydraulic cylinder where you can mount the work switch and magnet so that they will be moved apart when the implement is out of the ground.

3. To secure the work switch bracket to the existing bracket or implement, thread in this order: one steel washer and one ¼" 20 steel locknut (352011-000040) onto the ends of each bolt. If an existing work switch was not present, you might need to drill into the implement frame for the work switch bracket bolts or zip-tie the work switch bracket onto the hydraulic cylinder.
4. Remove the front locknut from the work switch assembly (153560-000014) and insert it into the work switch bracket
5. Place the ceramic work switch magnet (359035-000001) onto the implement's frame, near the implement's existing work switch magnet, if one exists.
6. Replace the locknut onto the work switch assembly.
7. Adjust the locknuts on the work switch assembly so that the work switch is within a few inches of the work switch magnet when the work switch is engaged. Figure 14 illustrates this step. Refer to "Adjusting the length of the work switch bracket" for specific detail on this step.

   CAUTION: The work switch may be able to detect the magnet up to four inches away. Consider your implement's range of motion to ensure that the switch and magnet do not make contact.

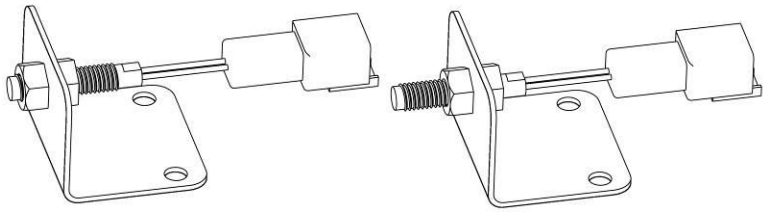


Figure 14: Adjusting the work switch length

To achieve the correct distance between the work switch and the magnet, you must adjust the length that the work switch protrudes from the work switch bracket. The left image in Figure 14 shows the work switch with a short length extending from the work switch bracket. The right image in Figure 14 shows a longer length extending from the work switch bracket.

Figure 15: A work switch installed on an implement where no bracket previously existed

In the figure above, the implement is out of the ground and the hydraulic cylinder is moved apart

Adjusting the length of the work switch bracket

1. Remove the nut from the work switch bolt that is in front of the work switch bracket.
2. Screw the remaining nut on the work switch into the correct position (further from or closer to the bracket).
3. Adjust the work switch bolt until it is the correct distance from the work switch magnet. The work switch should be a few inches from the magnet, and should not touch it.
4. Replace the nut that was removed in Step 1 so that the work switch is secured to the bracket.

2.7 Installing the access point

About the access point

The access point allows the Wireless Blockage and Flow Monitor app to communicate with the ECUs. The access point must be powered on for the Wireless Blockage and Flow Monitor app to communicate any run blockages to the operator. Depending on how your tractor's cigarette lighter operates (if the cigarette lighter only powers on devices when the tractor is on), this might require your tractor key to be in the "on" position for the access point to transmit.

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.

Figure 16: Wireless Blockage and Flow Monitor Access Point

Part Name	Part Number	Quantity needed	Contained within
Access Point	150570-000002	1	Tractor kit
Access Point Power Cable	355020-000031	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
iPad	Not included with the WBFM	1	Not included with the WBFM

Table 18: Parts needed to install access point

NOTE: Two 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
None

Number of times procedure is performed
Once per WBFM system

Installation location
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. If these options are not available, 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. The front of the access point says "TP-LINK."

Installing the access point
1. Remove the cover from the back of the access point assembly (150570-000002) by pushing the tab up and sliding the cover off.
2. Connect the access point power cable (355020-000031) to the port labeled "LAN" on the back of the access point assembly and connect the other end of the cable to the cigarette lighter receptacle.

Figure 17: Access Point LAN connection

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.

3. Replace the access point's back cover by sliding the cover on and pushing the tab down. The power cable should rest in the notches between the access point assembly and the cover.

Mounting using the suction cup window mount kit

Assemble the access point window mount kit, as shown in Figure 18, and mount to a tractor cab window.

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

Figure 18: 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. Figure 19 shows the location of the curved feet of the access point assembly.

2. Secure the access point to the tractor cab's mounting bar (or another rigid surface in the cab) using the cable ties that are included with the packaging of the access point assembly, or with the cable ties (355032-000004) included in the Tractor kit.

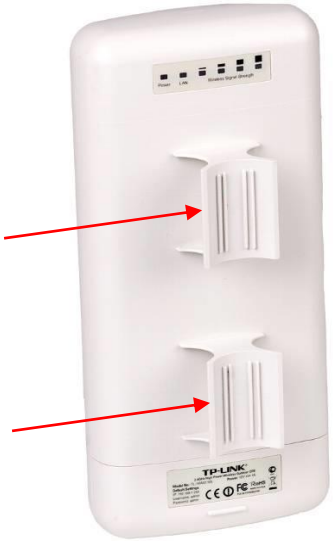


Figure 19: Apply the gaskets to the feet of the access point

Installing wiring guides

NOTE: The following steps are optional steps that describe how to install the wire guides. Wire guides can be used to help secure the access point power cable to a place in the tractor cab, such as the dash. Installing the wire guides for the access point power cable reduces the chance of the cable becoming tangled or accidently becoming 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 on 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, power on the iPad, and 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** in the top left corner of the screen.
4. Ensure 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 IASBlockage 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 access point is powered on, which is

indicated by green LEDs on the back of the unit. If the network still does not appear, contact your dealer for assistance.

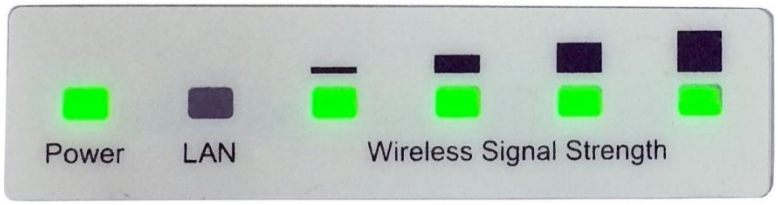


Figure 20: Access Point LEDs

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 Intelligent Ag 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 Wireless Blockage and Flow 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
iPad Air Mount	356070-000004	1	Tractor kit
Tablet Mount Arm	352004-000003	1	Tractor kit
Rail attachment for Tablet mount	352004-000004	1	Tractor kit
USB charger (for iPad)	154005-000002	1	Tractor kit
Wire guide (optional)	355005-000004	Varies (6 included with kit)	Tractor kit
Alcohol Wipes (optional)	359060-000003	1	Tractor kit
iPad	Not included with the WBFM	1	Not included with the WBFM

Table 19: Parts needed to install the iPad mounting bracket

Tools needed
- 7/16 inch socket

Number of times procedure is performed
Once per WBFM system

Installation location

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

Installing the iPad mounting bracket

1. Insert the ball of the tablet mount arm into the back of the iPad mount (356070-000004).
2. Connect the rail attachment for tablet mount (352004-000004) to the bottom of the mount arm.
3. Connect the rail attachment to the tractor's mounting bar, or other desired installation location.
4. Plug the USB charger (254040-000001) into the tractor's cigarette lighter receptacle.
5. Plug the iPad charging cord into the USB charger and into the iPad.

   NOTE: You may leave the iPad connected to the charger.

   NOTE: Steps 6 through 8 are optional steps that describe how to install the wire guides. Wire guides may be used to help secure the iPad charger cord to a place in the tractor cab, such as the dash. Installing the wire guides for the iPad charging cord reduces the chance of the cord becoming tangled or accidently becoming unplugged.

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

2.9 Downloading the Wireless Blockage and Flow Monitor app

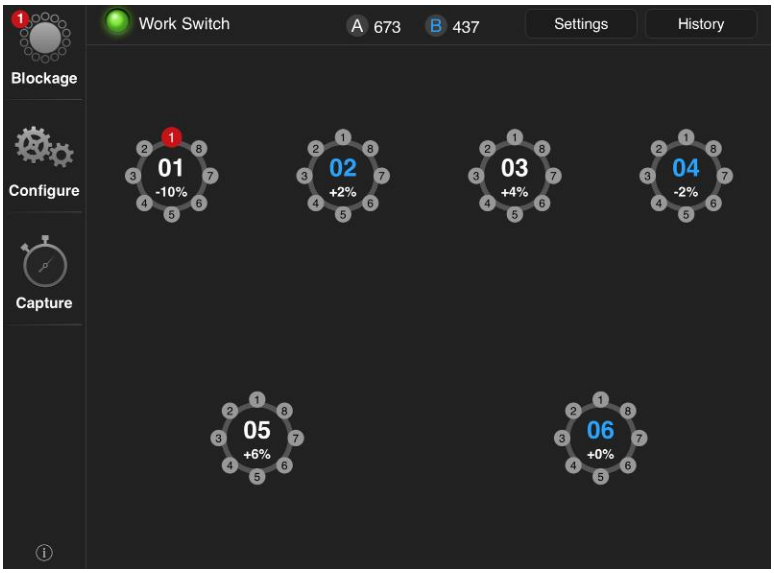


Figure 21: The Wireless Blockage and Flow Monitor app

About the Wireless Blockage and Flow Monitor app

The Wireless Blockage and Flow Monitor app is a free software application (app) that can be downloaded onto your iPad® for free from the App Store℠. The Wireless Blockage and Flow 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 20: Parts needed to download Wireless Blockage and Flow Monitor app

Tools needed

None

Number of times procedure is performed

Each step only needs to be performed once. If you have received an iPad that already contains the Wireless Blockage and Flow Monitor app, you do not need to perform the following steps.

About Apple IDs

An Apple ID is required for downloading items such as apps from the App Store or songs from iTunes. 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 Wireless Blockage and Flow 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 Wireless Blockage and Flow 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 Wireless Blockage and Flow Monitor app

1. Connect the iPad to a Wi-Fi network.

   NOTE: The WBFM access point does not provide access to the internet, so you must be connected to a different network connection, such as a Wi-Fi network in your home.

2. Tap the **App Store** icon from the iPad's home screen.
3. Tap the **Search** field in the top right corner of the App Store screen. An on-screen keyboard will appear.
4. Type *wireless blockage monitor* in the search field and tap the **Search** button.
5. Tap the Intelligent Ag app when it appears in your search results.
6. Tap the **Get** button and tap **Install**. A progress bar will appear over the app's icon while it is downloading.

   NOTE: You may be prompted to enter your Apple ID and password in this step.

2.10 Configuring the Wireless Blockage and Flow Monitor

About configuring the Wireless Blockage and Flow Monitor
The Wireless Blockage and Flow Monitor app detects the newly installed ECUs during configuration. The WBFM must be configured after installation and after configuration of the runs have changed, such as when switching from using all runs for seeding to monitoring only every other run.

The WBFM can be configured for two different basic set-ups: in a standard system set-up or in a nonstandard system set-up. The WBFM is in a nonstandard system set-up if any of the following statements are true about the configuration of the system on your implement:

- **Splitting:** Runs contained on the same manifold are connected to two ECUs. For example, if 18 runs of a 36 run manifold are connected to one ECU and the remaining 18 are connected 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. Joining is possible on implements with manifolds that are very close together, or when the total of two manifolds' runs is 24 or less.
- **Multiple products (dual shooting):** More than one product type is being simultaneously run through the implement via different air streams (separate runs). If two product types are being run via different air streams and the WBFM is not notified, it can incorrectly display run blockages.

  NOTE: If two product types are being mixed and run through the *same* air stream (single shoot), the statement above does not apply.

If none of the above statements are true, the WBFM is in a standard system set-up.

Follow the "Configuring a standard system set-up" instructions given later in this section if your system is in a **standard** set-up.

Follow the "Configuring a nonstandard system set-up" instructions given later in this section if your system is in a **nonstandard** system set-up**.**

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

Table 21: Parts needed to configure the Wireless Blockage and Flow Monitor

Tools needed
None

Number of times procedure performed
Once per WBFM system

Auto-configuring a standard system set-up

1. Power on the ECUs and the access point.
2. Connect the iPad to the *IASBlockage* wireless network.
3. Tap the Wireless Blockage and Flow Monitor icon on your iPad's Home screen to open the app.
4. Tap the **Configure** icon on Blockage screen.
5. Tap **Auto-Configure**.
6. Input the number of ECUs you are configuring.

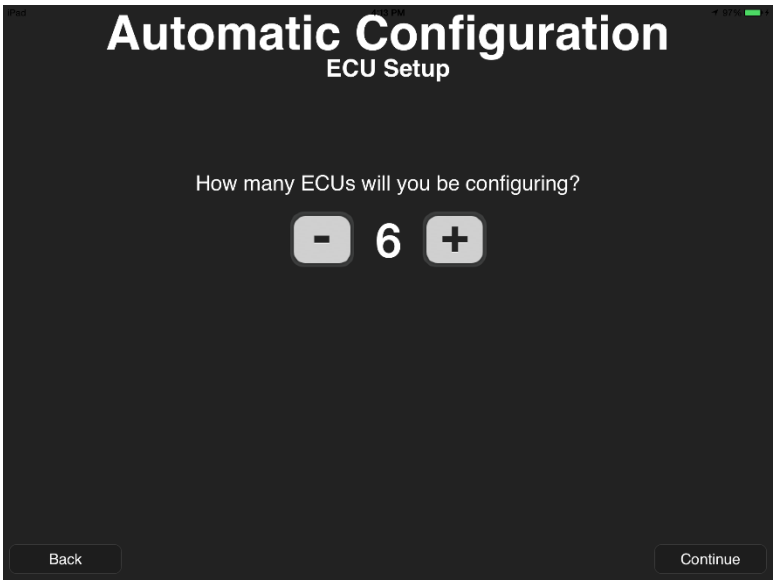


Figure 22: Automatic Configuration – ECU Configuration (standard set-up)

7. Tap **Done** to continue to the Automatic Configuration – Installation Summary screen. If the number of ECUs found matches the number you input on the previous screen, you will auto-advance to the Automatic Configuration – Setup screen, shown in Figure 25.

   NOTE: If the number shown on the screen is different than the number of ECUs installed on the system, the ECUs are unable to communicate with the Wireless Blockage and Flow Monitor app. Ensure that all ECUs are powered on and correctly installed. If you are unable to determine why the WBFM cannot detect the ECU, contact your dealer for assistance.

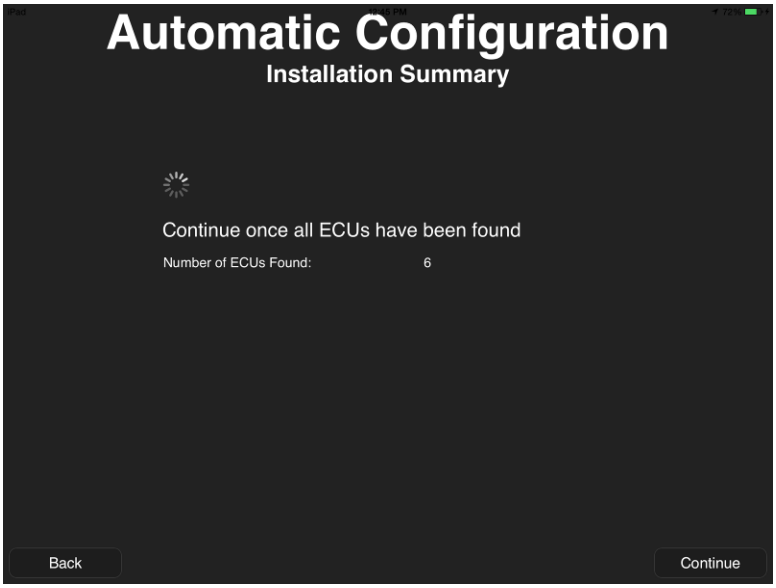


Figure 23: Automatic Configuration - Installation Summary screen (standard set-up)

8. Configure your set-up. Because your system is in a standard set-up, you do not need to change any of the default settings, but you must declare which ECU is connected to the work switch and you should also ensure that the system has been correctly configured.
    a. Ensure that the number given under **How many manifolds are being monitored?** matches the number of manifolds on the implement.
    b. Ensure that **No** is selected under **Is any manifold connected to more than one ECU?**.
    c. Ensure that **1** is selected under **How many product types are being monitored?**.
    d. Select **Yes** or **No** under **Is the implement operating with section control?**, depending on if your implement is equipped with a Section Control system. Section Control automatically avoids duplicate seeding over areas that have already been seeded.

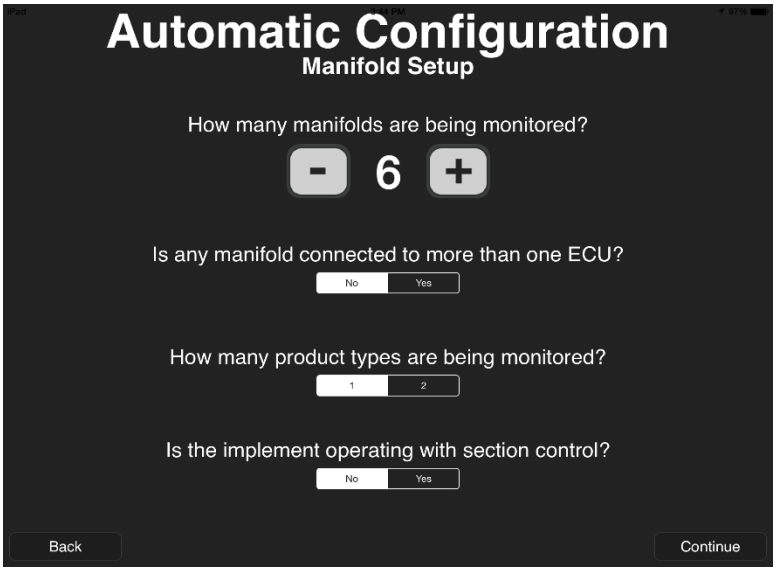


Figure 24: Automatic Configuration – Manifold Setup (standard set-up)

9. Tap **Continue** to continue to the Automatic Configuration – Work Switch Configuration screen.
    a. Select the serial number of the ECU that the work switch is connected to from the **Which ECU has the work switch attached to it?** drop-down menu.
    b. Select **Raised** or **Lowered** under **What mode is the implement currently in?** This determines the configuration of your work switch. Refer to Section 2.11 for information about the work switch feature.

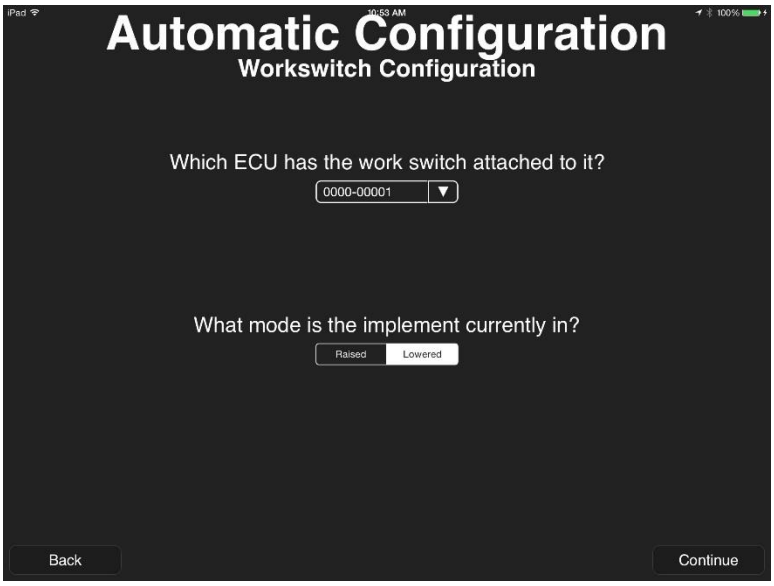


Figure 25: Automatic Configuration – Work Switch Configuration (standard set-up)

10. Tap **Continue** to continue to the Automatic Configuration – Assign Manifolds screen.
    a. Use the "ECU" drop-down menus to assign ECU serial numbers to the manifolds that they are connected to.

       NOTE: The ECU serial number is found on the ECU label.

    b. Select the number of runs on each manifold from the **Runs** drop-down menu.
    c. Once you have finished selecting the number of ports and assigning each manifold to an ECU, tap **Save**.

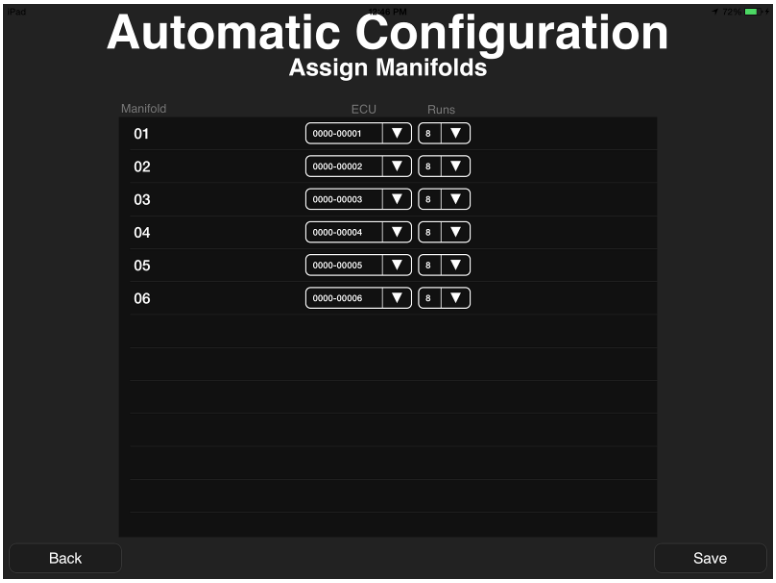


Figure 26: Automatic Configuration - Assign Manifolds screen (standard set-up)

Configuring a nonstandard system set-up

1. Power on the ECUs and the access point.
2. Connect the iPad to the *IASBlockage* wireless network.
3. Tap the Wireless Blockage and Flow Monitor icon on your iPad's Home screen to open the app.
4. Tap the **Configure** icon on the Blockage screen.
5. Tap **Auto-Configure**.
6. Input the number of ECUs you are configuring.

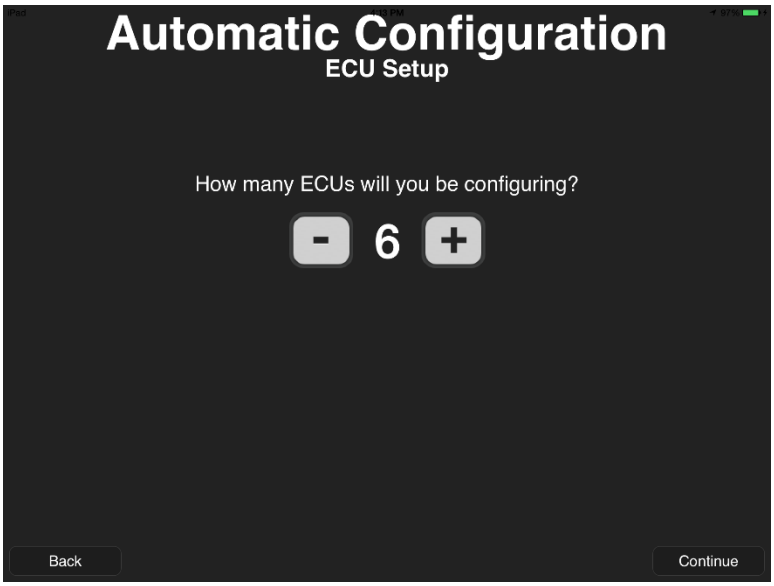


Figure 27: Automatic Configuration – ECU Setup (nonstandard set-up)

7. Tap **Done** to continue to the Automatic Configuration – Installation Summary screen. If the number of ECUs found matches the number you input on the previous screen, you

will auto-advance to the Automatic Configuration – Manifold Setup screen, shown in Figure 30.

NOTE: If the number on the screen is different than the number of ECUs installed, the ECUs are unable to communicate with the Wireless Blockage and Flow Monitor app. Ensure that all ECUs are correctly installed. If you are unable to determine why the WBFM cannot detect the ECU, refer to the Wireless Blockage and Flow Monitor Troubleshooting Guide located on the information ⓘ screen of the app.

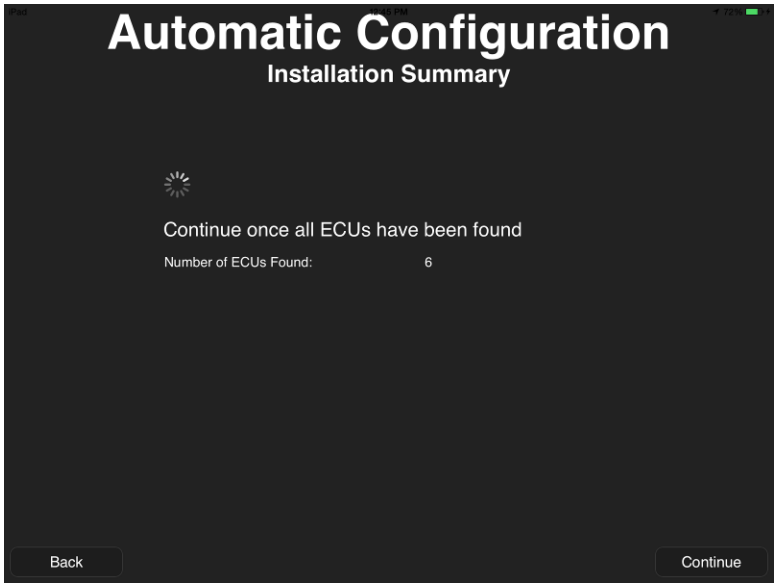


Figure 28: Automatic Configuration - Installation Summary screen (nonstandard set-up)

8. Configure your set-up.
    a. Ensure that the number given under **How many manifolds are being monitored?** Matches the number of manifolds on the implement. By default, this is the same as the number of ECUs installed.
    b. Select **Yes** or **No** under **Is any manifold connected to more than one ECU?**.
    c. Select **1** or **2** under **How many product types are being monitored?**.

        EXAMPLE: Dual shoot – Two products (e.g. seed and fertilizer pellets) simultaneously flowing through the implement via different air streams. However, if the two products are flowing through the same air streams (single shoot), select **1**.

    d. Select **Yes** or **No** under **Is the implement operating with section control?** depending on if your implement is equipped with a Section Control system. Section Control automatically avoids duplicate seeding over areas that have already been seeded.

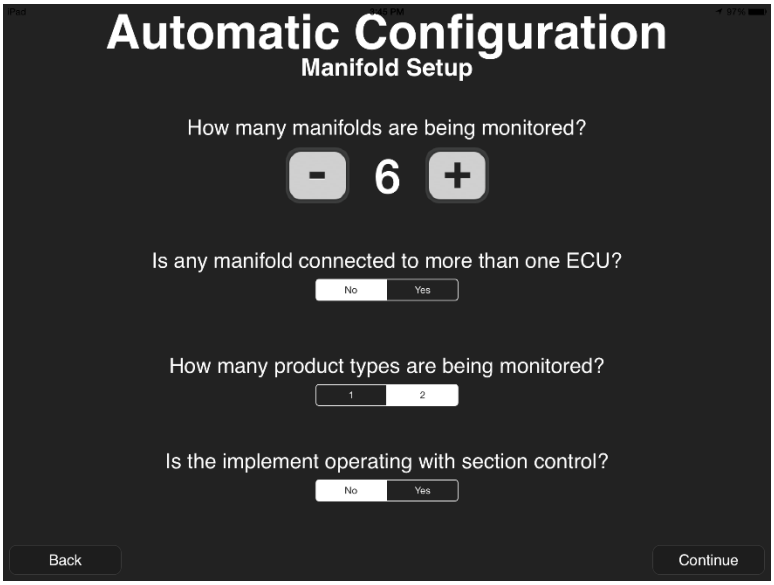


Figure 29: Automatic Configuration – Manifold Setup (nonstandard set-up)

9. Tap **Continue** to continue to the Automatic Configuration – Work Switch Configuration screen.
    a. Select the serial number of the ECU that the work switch is connected to from the **Which ECU has the work switch attached to it?** drop-down menu.
    b. Select **Raised** or **Lowered** under **What mode is the implement currently in?** This determines the configuration of your work switch. Refer to Section 2.11 for information about the work switch feature.

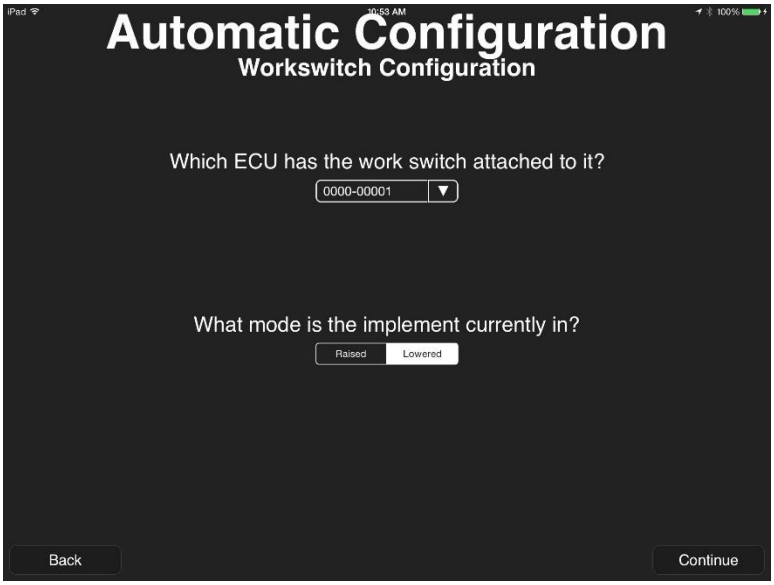


Figure 30: Automatic Configuration – Work Switch Configuration (nonstandard set-up)

10. Tap **Save** to continue to the Automatic Configuration – Assign Manifolds screen, shown in Figure 31.
    a. If you selected **2** in Step 4c., a **Product Type** column will display on the screen. For each manifold, select **Product A** or **Product B** to signify what type of material is being run through that manifold.

       NOTE: Ensure that you assign product types consistently. For example, if Manifolds 01 and 03 are running seed and Manifolds 02 and 04 are running fertilizer pellets, you should assign Product A to Manifolds 01 and 03, and Product B to Manifolds 02 and 04.

    b. Use the ECU drop-down menus to assign each manifold to the ECU that it is connected to, using the ECU serial number. If you have a manifold connected to more than one ECU, use the ECU 2 drop-down menu to select the second ECU serial number.
    c. Select the number of runs connected to each ECU from the **Runs** drop-down menu.
    d. Once you have finished selecting the number of ports and assigning each manifold to an ECU, tap **Save**.

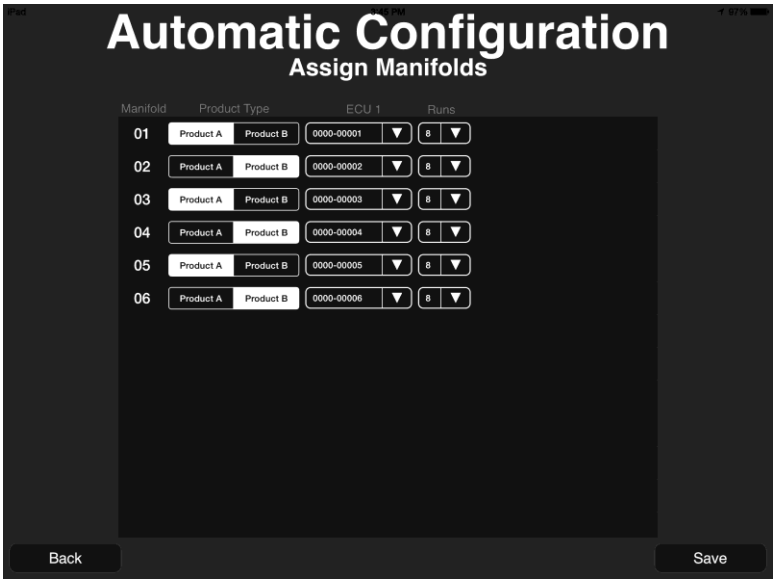


Figure 31: Automatic Configuration - Assign Manifolds screen (nonstandard set-up)

NOTE: If you have signified that the implement is only running one product type, the Product Type column will not appear. If you have signified that no ECU is monitoring more than one manifold, the ECU2 column will not appear either.

Editing the Wireless Blockage and Flow Monitor configuration

NOTE: For full instructions about how to use the WBFM after installation, refer to the Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015). The Wireless Blockage and Flow Monitor Operator's Manual is accessible via the Wireless Blockage and Flow Monitor app's Information ⓘ screen.

Changing manifold run direction

By default, ports are displayed in clockwise order around the manifold. Figure 11 illustrates port ordering around a manifold. If you attach the ports in counterclockwise order around the manifold, you can change the way the ports are displayed on the app so that it more closely resembles the physical installation of the Wireless Blockage and Flow Monitor system on your implement.

To change the order the ports are displayed the app:

Manifold view:

1. Tap **Settings** on the Blockage screen.
2. Change the Manifold run direction setting to “Counterclockwise.”

Row view:

1. Tap **Settings** on the Blockage screen.
2. Slide the “Consecutive row ordering” slider to the left.

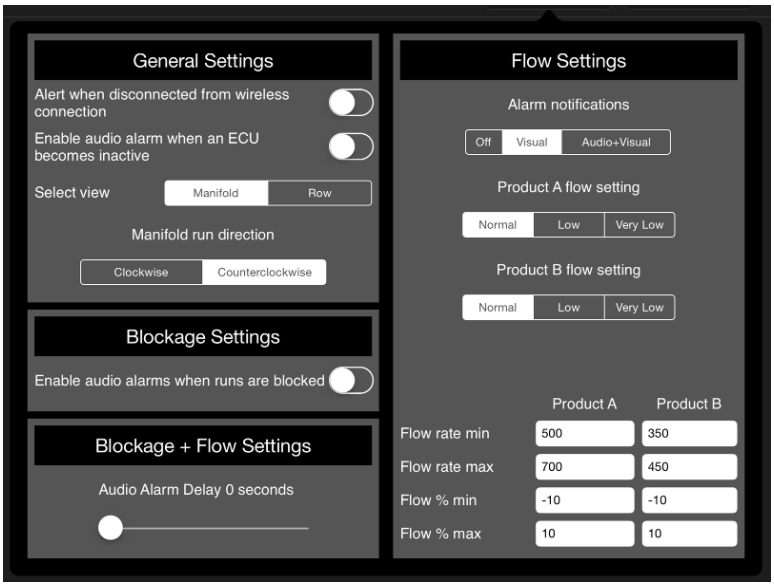


Figure 32: Settings pop-up screen

Changing which ECU is labeled Work Switch ECU

1. Tap the **Configure** icon on the Wireless Blockage and Flow Monitor app’s home screen.
2. Tap **Configure** on the Configuration Summary screen.
3. Select the name of the ECU that should be labeled as the Work Switch ECU from the Work Switch ECU drop-down menu. This menu is located on the bottom of the Edit Current Configuration screen.
4. Tap **Save**.

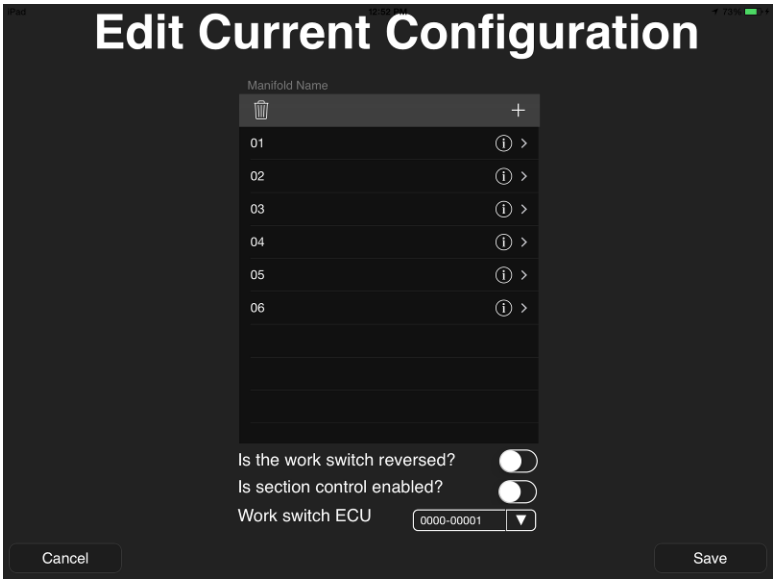


Figure 33: Edit Current Configuration screen

Reversing the work switch option in the Wireless Blockage and Flow Monitor app

NOTE: You only have to perform this procedure if the work switch uses the non-default method. Refer to the "About work switch methods" description given in Section 2.6 for a description of the non-default work switch method.

1. Open the Wireless Blockage and Flow Monitor app on your iPad by tapping the icon on your iPad's home screen (if the app is not already open).
2. Tap **Configure** on the app's home screen.
3. On the Edit Current Configuration screen, turn on the **"Work Switch Reversed**" switch.

2.11 Configuring the work switch

About configuring the work switch

Follow this procedure to ensure that the WBFM work switch has been correctly installed and is communicating with the Wireless Blockage and Flow Monitor app.

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

Table 22: Parts needed to configure the WBFM work switch

Tools needed

None

Number of times procedure performed

Once per WBFM system

Ensuring work switch has been correctly installed

NOTE: The default and reversed work switch methods are described in Section 2.6.

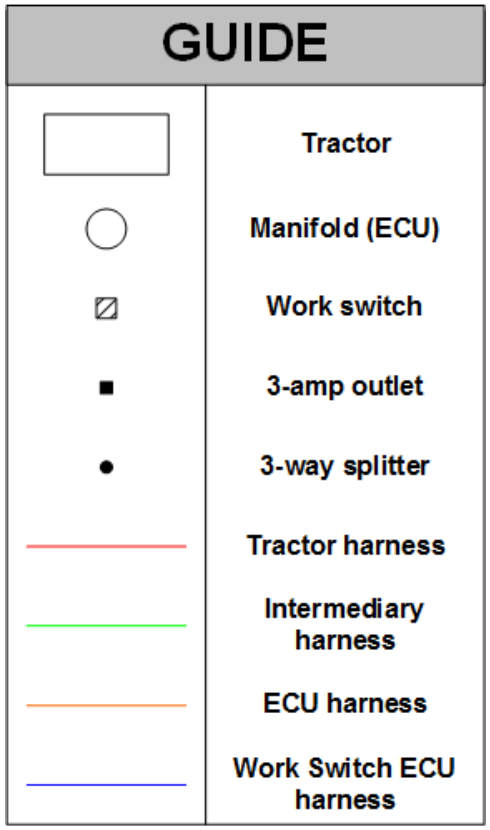
1. Ensure that the iPad is connected to the WBFM wireless network. Open the Wireless Blockage and Flow Monitor app on the iPad. Navigate to the Blockage screen.
2. Power on the tractor and connect the implement, if you have not already done so.
3. Adjust your hydraulic system according to the method your work switch was installed following the instructions below. The circle next to "Work Switch*"* on the top left corner of the Blockage screen (the "Work Switch circle") should be **green** once the adjustment is made.
    a. Default work switch installation: adjust the implement's hydraulic system so that the implement is ***lowered***.
    b. Reversed work switch installation: adjust the implement's hydraulic system so that the implement is ***raised***.
4. Adjust your hydraulic system according to method your work switch was installed following the instructions below. The Work Switch circle should change from green to **gray** after the adjustment is made.
    a. Default work switch installation: adjust the implement's hydraulic system so that the implement is ***lowered***.
    b. Reversed work switch installation: adjust the implement's hydraulic system so that the implement is ***raised***.
5. Adjust your hydraulic system again, following the instructions below. The Work Switch circle should change from gray to **green** again.
    a. Default work switch installation: adjust the implement's hydraulic system so that the implement is ***lowered*** again.
    b. Reversed work switch installation: adjust the implement's hydraulic system so that the implement is ***raised*** again.

NOTE: If the Work Switch circle is not the correct color as noted in the instructions above, or does not change when you adjust the implement's hydraulic system, contact your dealer for assistance.

Appendix A: Wiring harness diagrams per implement configuration

The graphics on this and the following pages 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 set-up may differ from that shown in these diagrams.

Two and Three Manifold Wiring Harness Diagrams



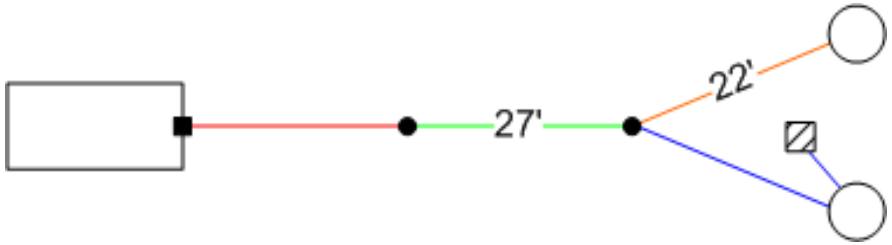


Figure 34: Two (2) manifold wiring harness

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

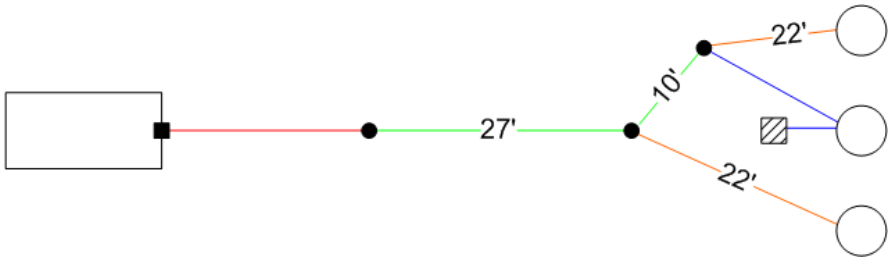
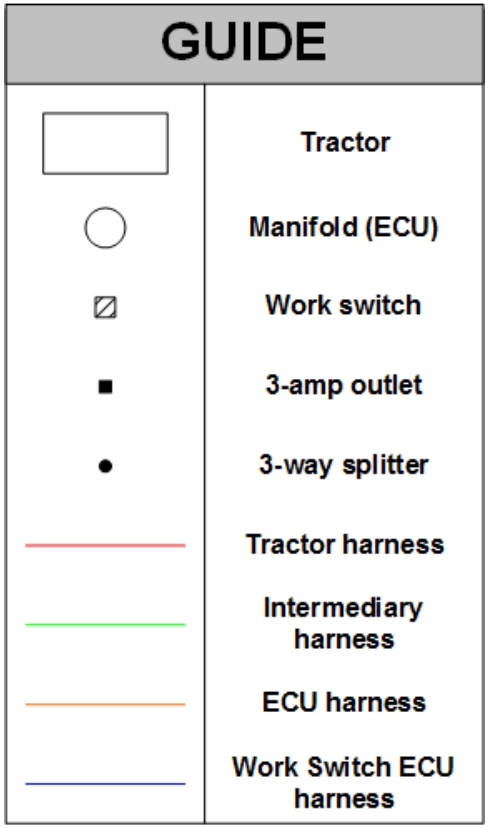


Figure 35: Three (3) manifold wiring harness

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



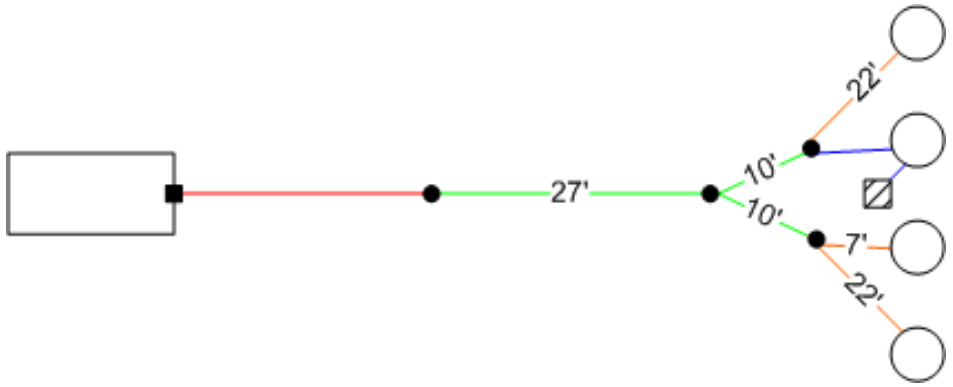


Figure 36: Four (4) manifold wiring harness

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

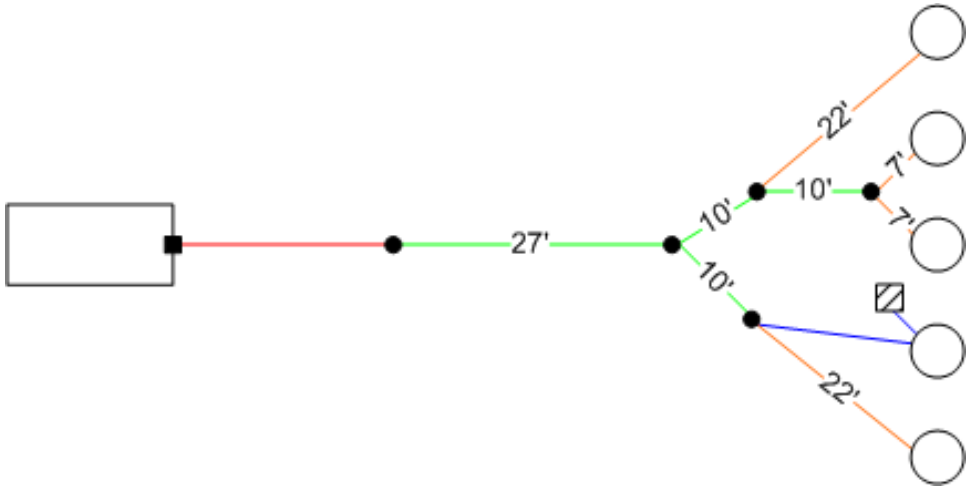
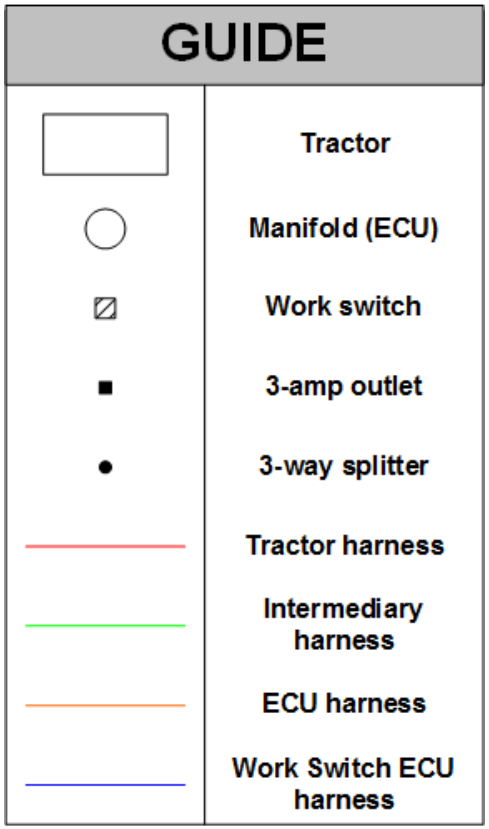


Figure 37: Five (5) manifold wiring harness

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



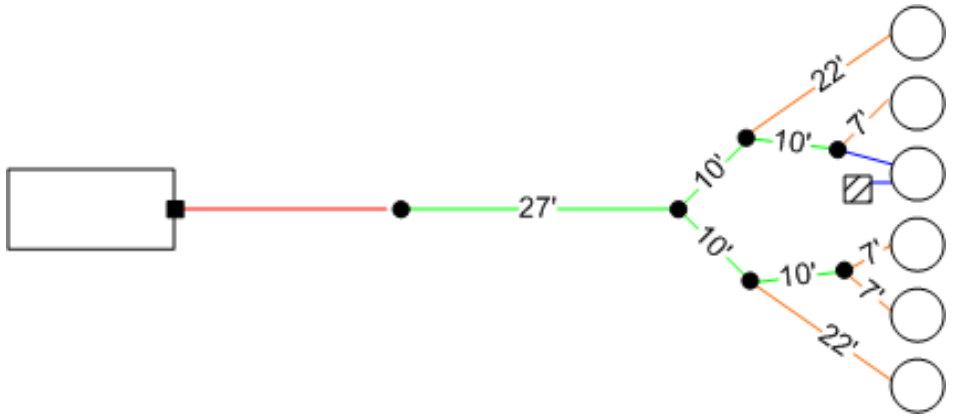


Figure 38: Six (6) manifold wiring harness

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

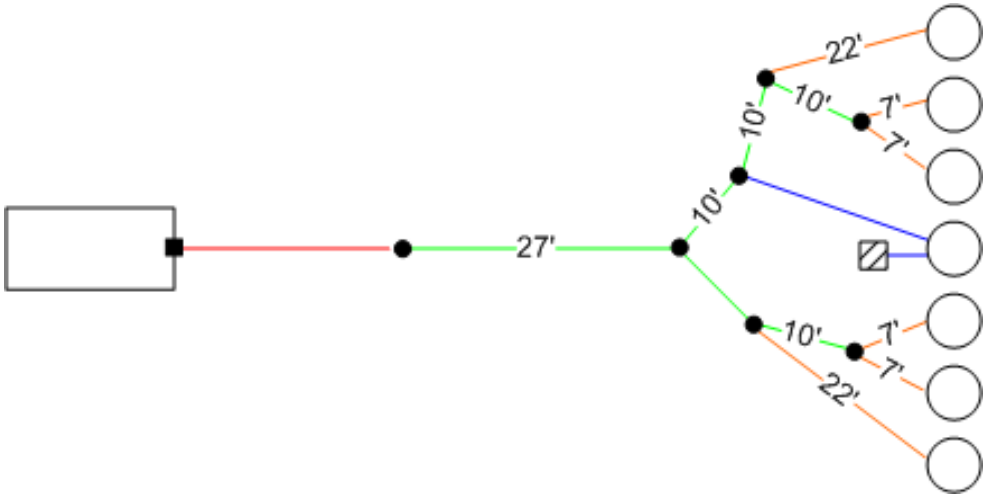
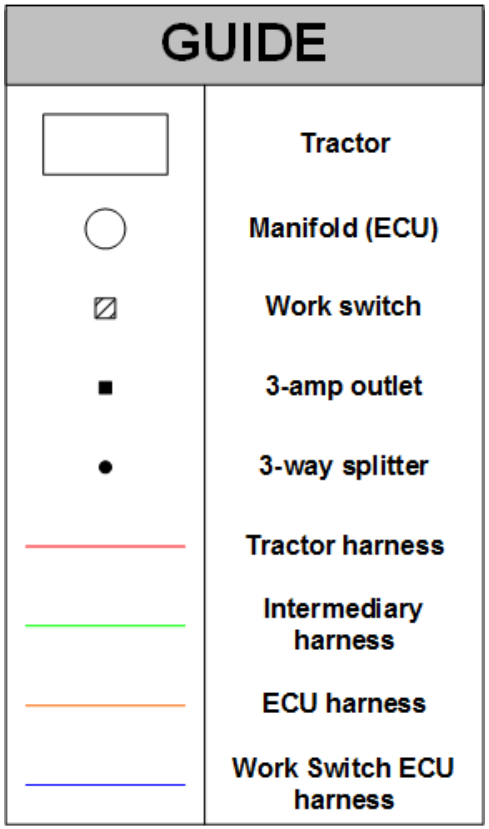


Figure 39: Seven (7) manifold wiring harness

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



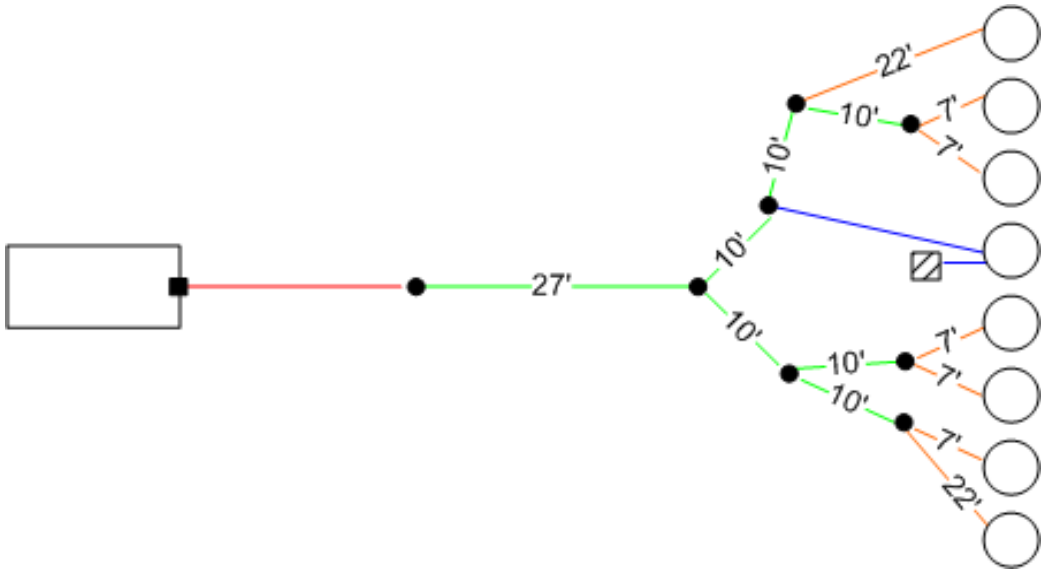
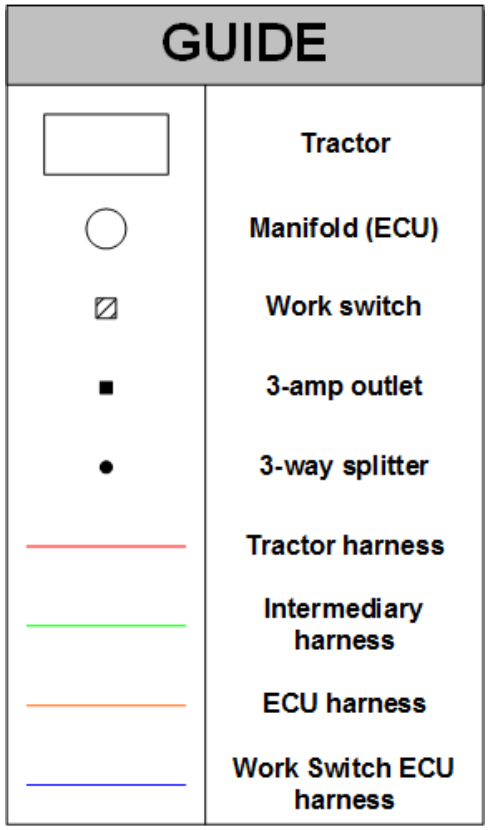


Figure 40: Eight (8) manifold wiring harness
1 Tractor harness, 7 Intermediary harnesses (one 27 ft/8.2 m, six 10 ft/3 m), 7 ECU harnesses (two 22 ft/6.7 m, five 7 ft/2.1 m), 1 Work Switch ECU harness

Nine Manifold Wiring Harness Diagram



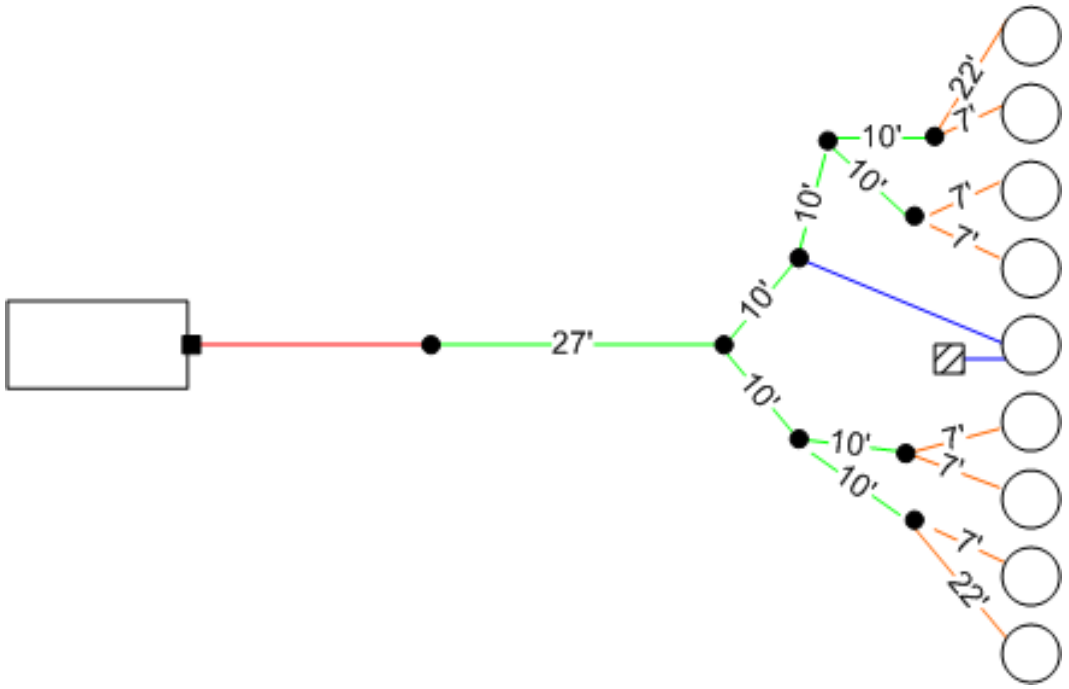
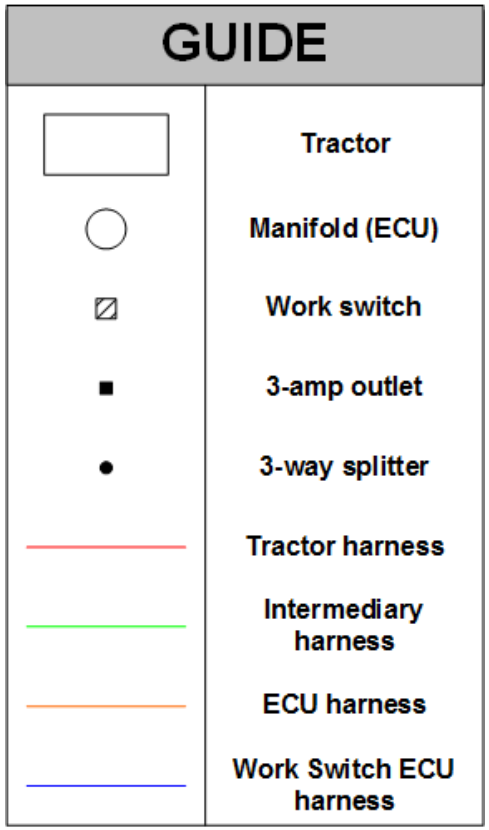


Figure 41: Nine (9) manifold wiring harness
1 Tractor harness, 8 Intermediary harnesses (one 27 ft/8.2 m, seven 10 ft/3 m), 8 ECU harnesses (two 22 ft/6.7m, six 7 ft/2.1 m), 1 Work Switch ECU harness

Ten Manifold Wiring Harness Diagram



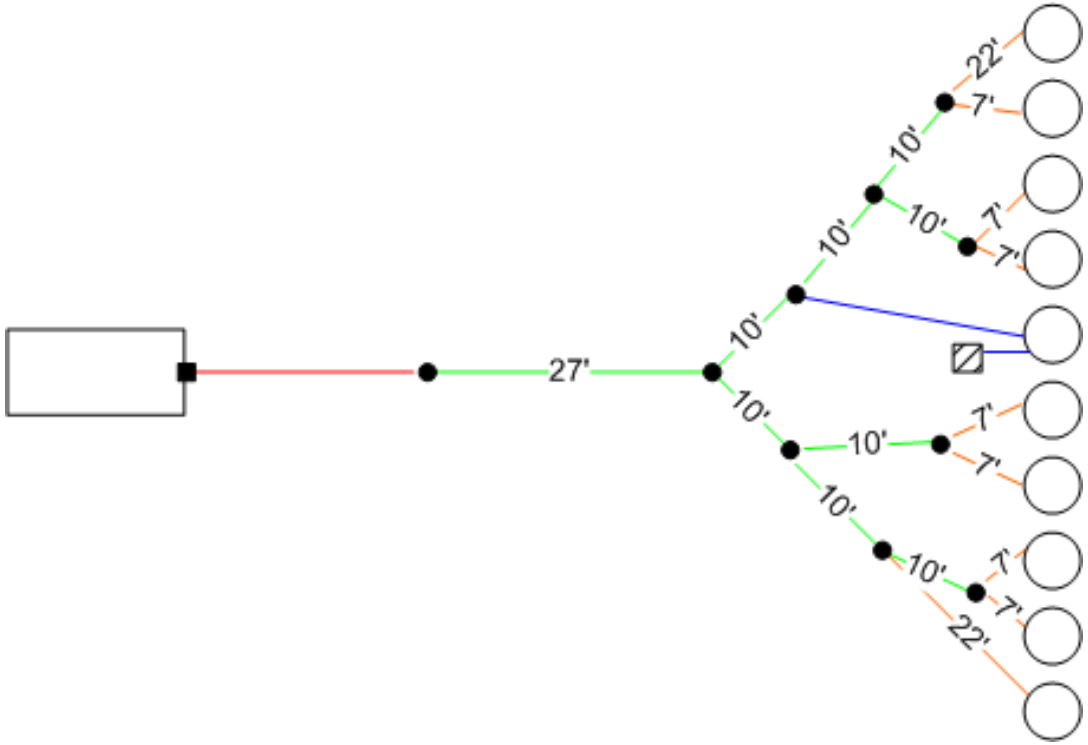
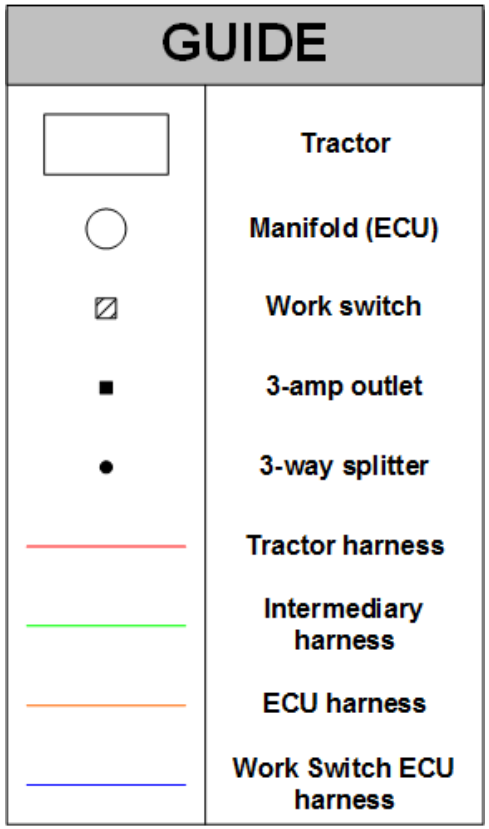


Figure 42: Ten (10) manifold wiring harness
1 Tractor harness, 9 Intermediary harnesses (one 27 ft/8.2 m, eight 10 ft/3 m), 9 ECU harnesses (two 22 ft/6.7 m, seven 7 ft/2.1 m), 1 Work Switch ECU harness

Twelve Manifold Wiring Harness Diagram



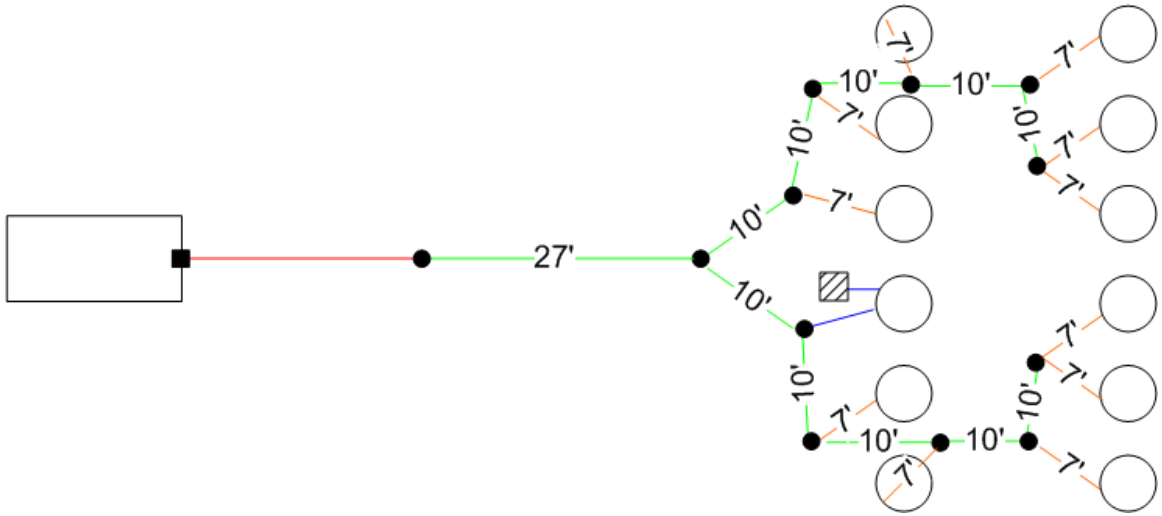


Figure 43: Twelve (12) manifold wiring harness
1 Tractor harness, 11 Intermediary harnesses (ten 10 ft/3 m, one 27 ft/8.2 m), 11 ECU harnesses (all 7 ft/2.1m), 1 Work Switch ECU harness

Sixteen Manifold Wiring Harness Diagram

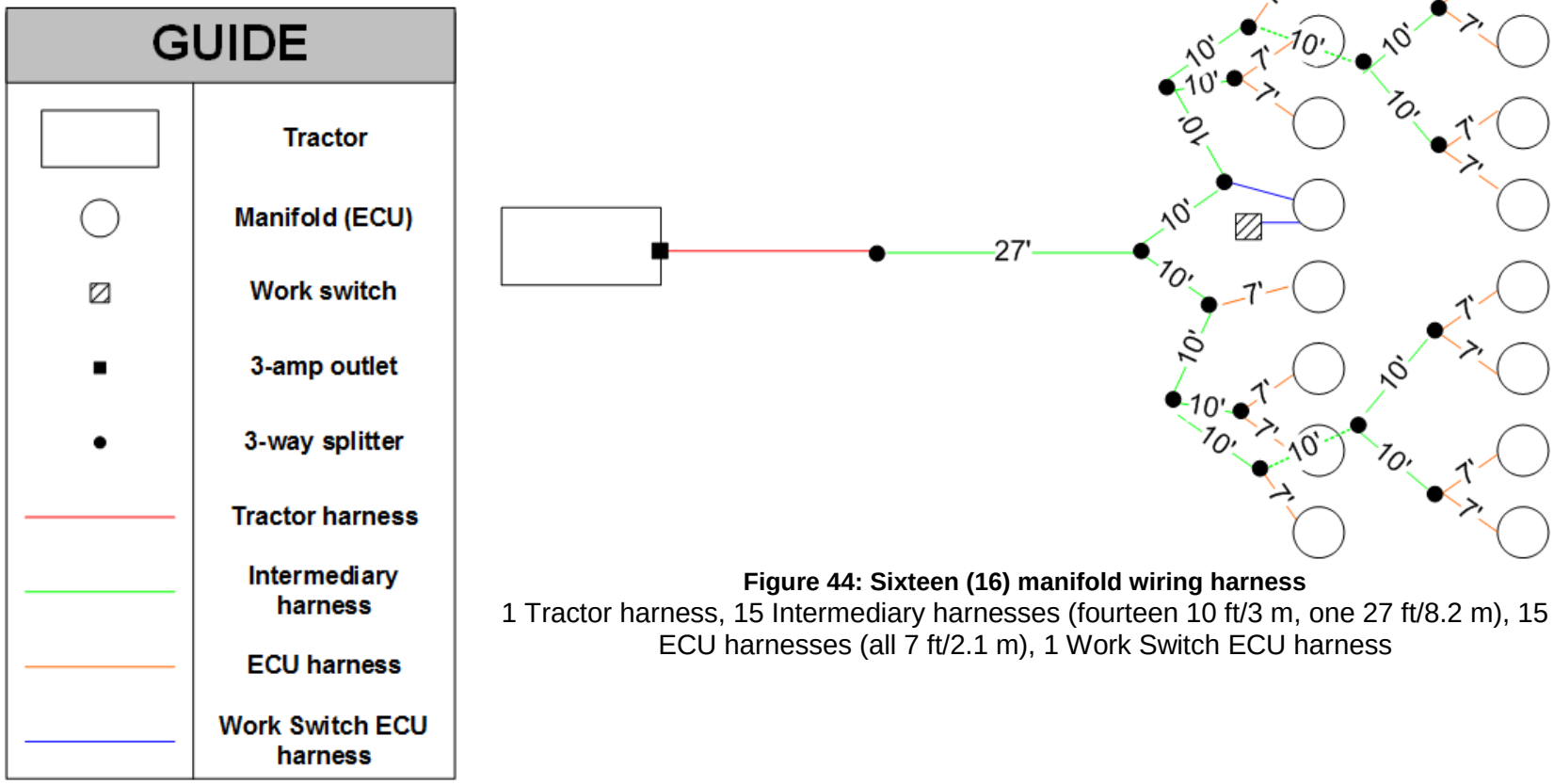


Figure 44: Sixteen (16) manifold wiring harness
1 Tractor harness, 15 Intermediary harnesses (fourteen 10 ft/3 m, one 27 ft/8.2 m), 15 ECU harnesses (all 7 ft/2.1 m), 1 Work Switch ECU harness

Twenty Manifold Wiring Harness Diagram

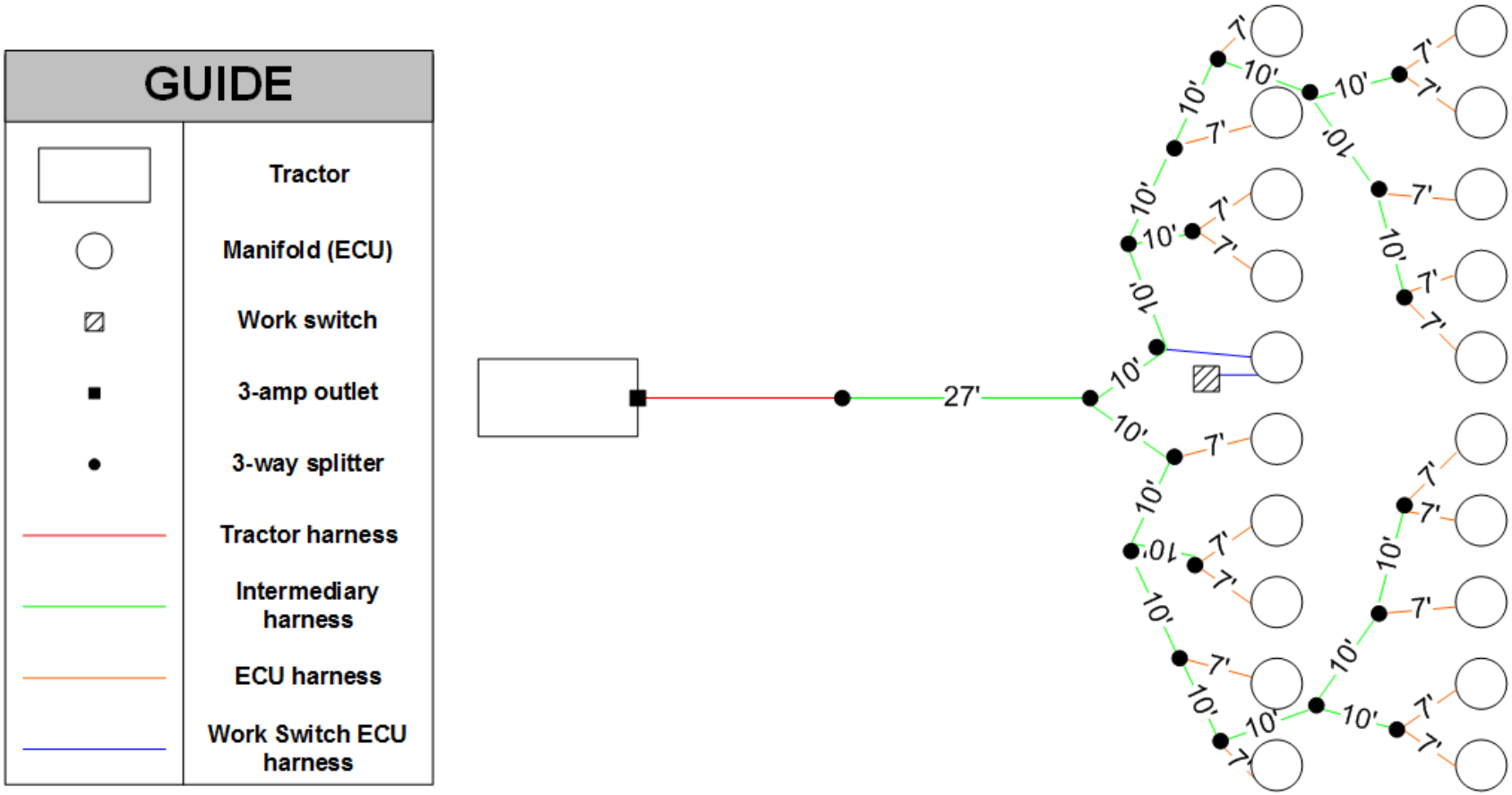
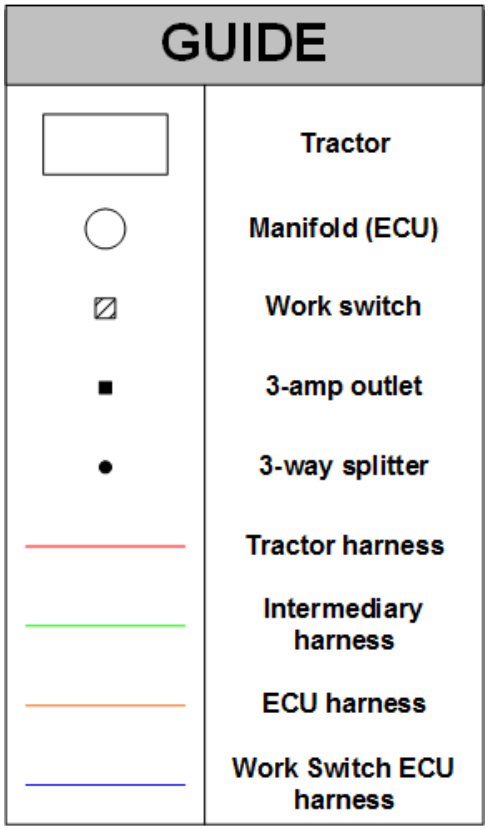


Figure 45: Twenty (20) manifold wiring harness

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 Air Cart



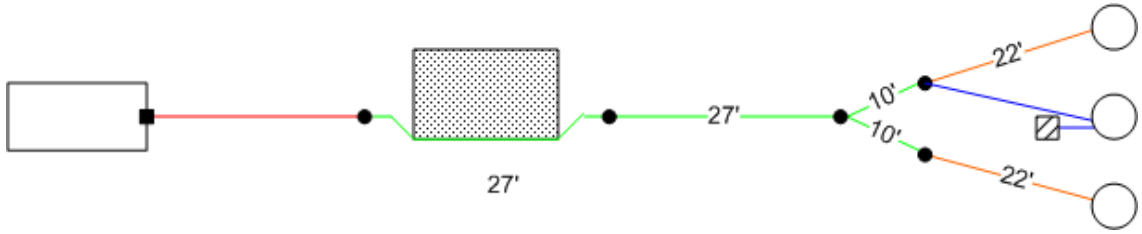


Figure 46: Wiring Harness Diagram with Air Cart

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

Appendix B: Wiring directly to an existing switch to control work switch

About wiring a mechanical or electrical switch to control the Wireless Blockage and Flow Monitor work switch
Standard WBFM installations use the magnetic work switch assembly that is included with the purchase of a WBFM installation. Some WBFM customers, however, may choose to control the WBFM work switch by wiring a switch directly to the Work Switch ECU. This appendix gives instructions for how to wire a switch directly to the Work Switch ECU.

NOTE: Switches are not part of standard WBFM installations and are not available for purchase from Intelligent Ag. If you choose to wire a switch to control the WBFM work switch instead of using the included work switch assembly, you must identify an existing switch on your tractor or implement that could be used to control the work switch.

WARNING: This step requires knowledge of basic electrical safety and wiring procedures.

Part Name	Part Number	Quantity Needed	Contained within
22 foot ECU Harness – Work switch	355020-000018	One per system	Tractor kit

Table 23: Parts needed to wire a switch to control a WBFM work switch

The parts listed in Table 24 are **not** used for this alternative installation method.

Part Name	Part Number	Quantity Unused	Contained within
Work switch Bracket	351050-000016	1	Tractor kit
Work switch	153560-000014	1	Tractor kit
Ceramic Work switch Magnet	359035-000001	1	Tractor kit

Table 24: Unused parts from the Tractor kit

Tools Needed
- multimeter
- 16 or 18 gauge wire of sufficient length to reach from the switch's wiring harness to an ECU
- wiring tools: wire cutter, wire stripper, pliers, wire nuts, and/or soldering iron

Number of times procedure is performed
This is an optional step. If performed, once per WBFM system.

Installation location
The work switch will be wired between an existing switch on your tractor or implement and the Work Switch ECU.

Testing if a switch is compatible with the Wireless Blockage and Flow Monitor system

Testing if DC voltage is compatible

1. Place switch into the open (off) position.

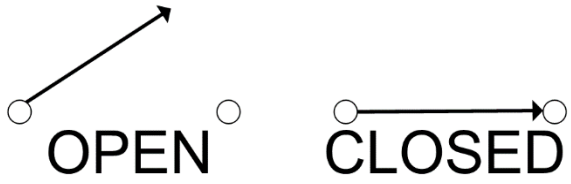


Figure 47: Switch State

2. Apply power to the switch.
3. Prepare the multimeter to measure DC voltage.

   NOTE: Refer to the multimeter's user manual for instructions for how to measure DC voltage.

4. Touch the positive probe of the multimeter to exposed wire near terminal A and ground the negative probe. Figure 48 shows the location of Terminal A.
5. Ensure measured DC voltage is between 3.0 VDC and 16.0 VDC. Switches with DC voltages outside of this range are not compatible with the WBFM and should not be used to control the work switch.
6. Remove power to the switch.

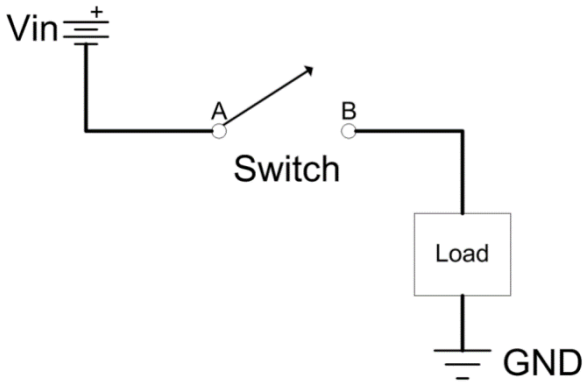


Figure 48: Test Circuit

Testing if resistance is compatible

1. Leave the switch in the open position.

   NOTE: You do not need to apply power to the switch during this step.

2. Prepare the multimeter to measure resistance.

   NOTE: Refer to the multimeter's user's manual for instructions for how to measure resistance.

3. Touch the positive probe of the multimeter to exposed wire near terminal B and ground the negative probe. Figure 48 shows the location of Terminal B.

NOTE: The switch's resistance may keep decreasing while you are measuring it. This is normal if your switch is connected to a motor. Take the measured resistance value that the multimeter measures after three seconds of contact with node B.

4. Ensure the resistance is less than 150kΩ. Switches with greater resistance are not compatible with the WBFM and should not be used to control the work switch.

Wiring a switch to control the Wireless Blockage and Flow Monitor work switch

Do not complete these steps unless you have determined that the switch is compatible with the WBFM. See "Testing if a switch is compatible with the Wireless Blockage and Flow Monitor system" instructions given earlier in this section for instructions.

WARNING! RISK OF ELECTRICAL SHOCK: Ensure the WBFM and the switch you will be connecting it to are completely powered off before completing these steps.

1. Locate the work switch connector on the ECU harness – work switch (355020-000018). It is a solid gray, Deutsch connector connected only to two white wires.
2. Refer to the labels on the work switch connector to determine the functions of each wire. The wire labeled "1" is the work switch power and the wire labeled "2" is the work switch ground. Take note of which wire does which function. You may want to temporarily mark the wires because you will be removing the wire switch connector in the next step.
3. Using a wire cutter, cut the wires of the harness immediately above the work switch connector to remove the connector.

   CAUTION: Ensure the switch is compatible with the WBFM before cutting the wires of the harness.

4. Cap the work switch – ground wire. It will not be connected to anything.
5. Using a wire stripper, remove ½ inch (1.27 cm) of insulation from the work switch power ("1") wire.
6. Connect the work switch power wire to the switch's wiring harness anywhere after terminal B, as shown in Figure 49.

   NOTE: You may crimp or solder the wires, depending on your preference.

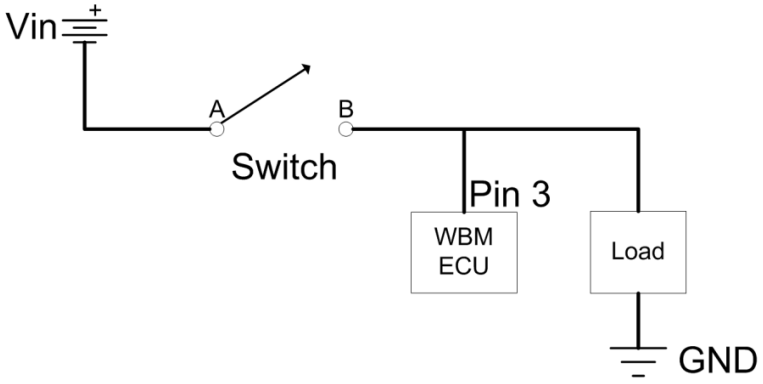


Figure 49: Finished Setup

7. Follow the "Changing which ECU is labeled Work Switch ECU" instructions in Section 2.11 to label the ECU you have connected the switch to as the Work Switch ECU.
8. The work switch will use the "reversed" method to determine if the implement is in the ground. Refer to the "About work switch methods" description in Section 2.6 for a

description of the reversed work switch method. Since the work switch uses the reversed method, you must follow the “Reversing the work switch option in the Wireless Blockage and Flow Monitor app” instructions in Section 2.11. If you do not reverse the work switch, the Wireless Blockage and Flow Monitor app will incorrectly alert the operator that blockages are occurring when the implement is out of the ground.

9. Follow the “Ensuring work switch has been correctly installed” instructions in Section 2.11.

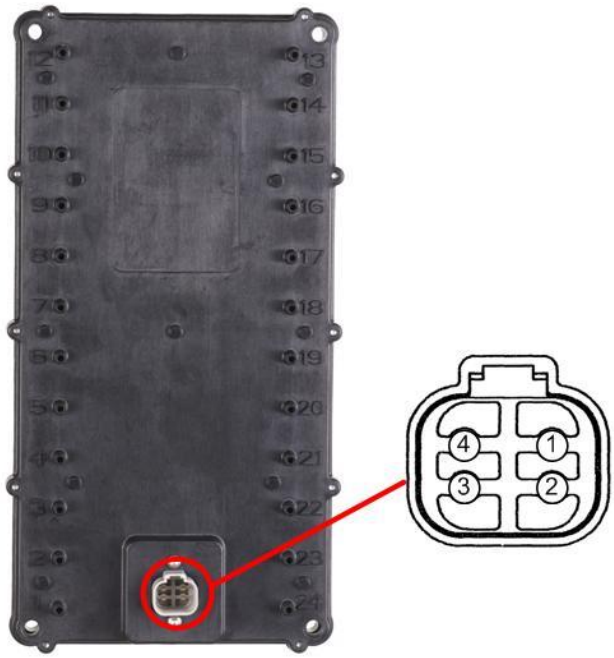


Figure 50: Work Switch ECU pin diagram

Pin Number	Function	Description
1	PWR	Power
2	GND	Ground
3	WS - PWR	Work switch power
4	WS - GND	Work switch ground

Table 25: ECU pin functions

Figure 51: Work switch pin diagram

Pin Number	Function	Description
1	WS – PWR	Work switch power
2	WS – GND	Work switch ground

Table 26: Work switch pin functions

Appendix C: Virtual Terminal Installation

This appendix is for customers that are using virtual terminal displays instead of iPads to view blockage and flow information from their 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 on a virtual terminal requires the additional parts listed below in lieu of a tractor kit. You are responsible for sourcing the mounting hardware. You must also have a virtual terminal installed in your tractor cab that is ISO 11783 compatible in order to use this version of the Wireless Blockage and Flow Monitor system.

Part Description	Part Number	Quantity Needed
ISO harness	353050-000006	1 per installation
Gateway – WBFM Edition	153510-000002	1 per installation

Table 27: Parts required for VT installation

About the Gateway
The Gateway, Wireless Blockage and Flow Monitor edition, is a computing platform that allows for the communication from the ECUs to your tractor's virtual terminal display. Using a Gateway with the Wireless Blockage and Flow Monitor system replaces the need for the access point and iPad. For this reason, 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.

Installing a Gateway
Mounting Location: The operator is in charge of determining the location and method of installing the Gateway. The Gateway can be installed on either the tractor or on the implement itself—anywhere with a flat surface large enough to attach the Gateway and that is within reach of the tractor's ISO outlet (the harness is 15 feet/4.6 meters long).

Mounting Orientation: The Gateway should be installed with the labeling facing up. To prevent water from pooling in the connector, the Gateway should not be installed with the connector facing up.

Mounting Hardware: Mounting hardware is not included with the Wireless Blockage and Flow Monitoring system. Use ¼" or 6 mm diameter u-bolts or self-tapping screws to secure the Gateway to the mounting location. The length of the mounting hardware needed depends on the mounting location.

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. Consult your tractor's owner's manual if you are unsure of the outlet's location.
2. Stretch the harness until it reaches the Gateway's installation location. Connect the connectors on the opposite end of the ISO harness into the two outside connectors of the Gateway.
3. Secure the harness to the tractor or implement using zip ties (not included with the Wireless Blockage and Flow Monitor system).
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.