ReconBlockage

for Strip-Till

Installation Manual

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ReconBlockage™ for Strip-Till Installation Manual

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Related Documentation		
Document Number Document Title		
600820-000044 ReconBlockage Quick Reference Guide		
600820-000057 ReconBlockage for Strip-Till Troubleshooting Guide		
600890-000075	ReconBlockage Operator's Guide	

1. Introduction

1.1. About ReconBlockage™ for Strip-Till

ReconBlockage for Strip-Till by Precision Planting® is an acoustic-based blockage and flow monitoring system that quickly and accurately notifies you of blockages anywhere on your strip-till machine's air hoses.

Use the ReconHub app on your iPad® to monitor your system's performance. For instructions to configure the system after installation and use the app, see the ReconBlockage Operator's Guide from the app's About and Support tab.

For current documentation, iPad and software requirements, and other resources, visit cloud.precisionplanting.com/product-resources.

1.2. Required Tools and Equipment

You will need the following tools and equipment to install ReconBlockage for Strip-Till:

- Cordless drill with standard nut driver or socket set
- Phillips and flathead screwdriver set
- Measuring tape
- Cutting tool, such as a PEX tubing cutter, box cutter, or shears
- Pliers
- Standard wrench set
- Paint pen or other permanent marking tool (optional)

1.3. Installation Overview

ESTIMATED INSTALL TIME: 6 hours

	Install flow sensors
	Install ECUs
	Connect auditory tubes to ECUs
	Install work switch
	Install gateway
	Install Wi-Fi antenna
	Install harnessing
	Install iPad mount and download app

2. Installing Flow Sensors

Flow sensors detect when product is flowing through the air hose.

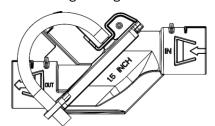


Figure 1: Flow sensor

Provided Parts

Part Name	Part Number	Quantity
1.5-inch flow sensor	153510-000206	
or	or	1/air hose
2-inch flow sensor	153510-000234	
1.75" hose to 2-inch sensor adapter	353070-000563	2/air hose
(for 1.75" OD hose only)	333070-000363	2/411 11056
Hose clamp	356060-000429	2/air hose

Tools Needed

- Cordless drill with 5/16-inch nut driver or socket, or a flathead screwdriver
- Measuring tape
- Cutting tool, such as a PEX tubing cutter, box cutter, or shears

Installation Location

Installed after the diffuser (if applicable) or primary splitter on the air hose.

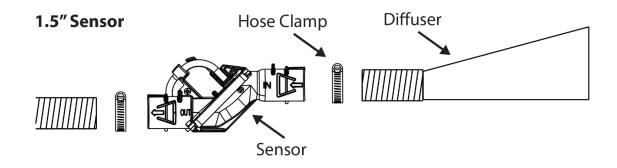




Figure 2: Example flow sensor installation location

Installing Flow Sensors

NOTE: Complete the steps below one time for each sensor.



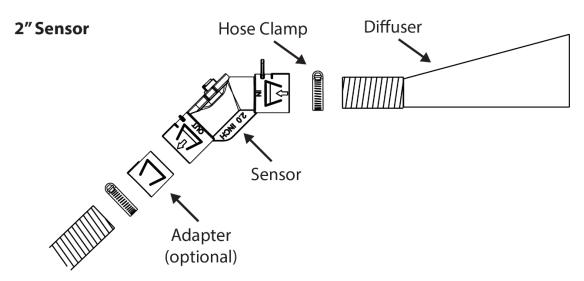


Figure 3: Installing flow sensors on an air hose

IMPORTANT: Make sure that the sensor is installed in a location where it won't hit a beam, hose, or any other part of the implement when the machine is in use or folded.

IMPORTANT: Make cuts on the air hoses as straight as possible. If the hose doesn't sit flush against the backstop inside the sensor, fertilizer could build up.

- 1. If you are using adapters (353070-000563), snap them into the sensor in the orientation shown in Figure 3.
- 2. Cut an air hose in a place that allows for downward flow and appropriate fit once the sensor is installed.

- 3. Orient a sensor (153510-000206 or 153510-000234) so that the flow arrows point away from the diffuser, and the auditory hose is on top. Slide the sensor on the air hose until the hose hits the backstop inside the sensor.
- 4. Secure using a hose clamp (356060-000429) between the two ridges on the end of the sensor, making sure that the hose clamp lays flat, and the head (worm drive) does not hit the sensor ridge, as shown in Figure 4.







Figure 4: Correctly placing the hose clamps

- 5. Slide the remaining air hose piece into the lower end of the sensor assembly until the hose piece hits the backstop inside of the sensor.
- 6. Secure using a hose clamp, positioning the clamp again as shown in Figure 4.

3. Installing ECUs



WARNING: Do not use a high-pressure washer on electronic components.

Electronic Control Units (ECUs) communicate the data from the flow sensors to the gateway.

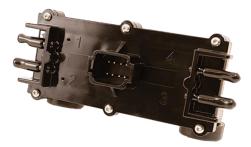


Figure 5: ECU

Provided Parts

Part name	Part number	Quantity
ECU	153510-000045	varies
Flat-plate ECU bracket	353070-000135	1 per ECU
C-channel ECU bracket (optional)	353070-000139	varies
Rubber mount	353070-000239	2 per ECU
3/8"-16 x 2.5" bolt	356060-000237	2 per ECU
1.25" OD washer	356060-000239	4 per ECU
Hose clamp	356060-000246	2 per ECU
3/8"-16 locknut	356060-000425	2 per ECU

Tools Needed

Cordless drill and standard socket set

Installation Location

Mounted on the frame (best).



Figure 6: Example ECU mounting location

Installing the ECUs

NOTE: Complete the steps below one time for each ECU.

- 1. Determine the mounting location for an ECU. The ECU should be mounted:
 - On the frame (best), product tube, or on a row unit.
 - Centrally between sensors (between 4 sensors is best).
 - Between sensors within the same fold section. Auditory tubes that connect the sensors to the ECU cannot cross a fold point, or they could disconnect when the toolbar is folded.

NOTE: If there are multiple ECUs per fold section, determine the ECU install location based on the best wire routing.

NOTE: Most installations will use a flat plate bracket to mount the ECU to the frame. However, if you need to mount the ECU on a row unit or other installation location, use a C-channel bracket. Refer to the alternate mounting instructions on page 13.

2. Mount an ECU (153510-000045) to a bracket (353070-000135) using bolts (356060-000237), washers (356060-000239), rubber mount backs (353070-000239), and locknuts (356060-000425), as shown in Figure 7.

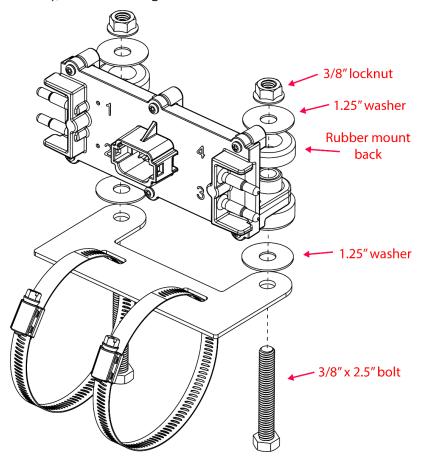


Figure 7: Installing ECU to bracket

- 3. Mount the bracket to the machine.
 - a. Position the bracket onto the machine using the guidelines from step 1.
 - b. Thread the hose clamps (356060-000246) through the bracket and secure the ECU to the machine.

NOTE: Make sure that when the toolbar is folded up, the ECU connectors point downward so that they do not collect water. This might mean rotating the bracket and ECU on the machine.

NOTE: If the hose clamp won't fit around larger structures, connect two hose clamps together to make a larger hose clamp.

Installing ECUs with the C-Channel Bracket

NOTE: Most installations will use a flat plate bracket to mount the ECU to the frame (see instructions in the previous section). However, if you need to mount the ECU on a row unit or other installation location, use a C-channel bracket.

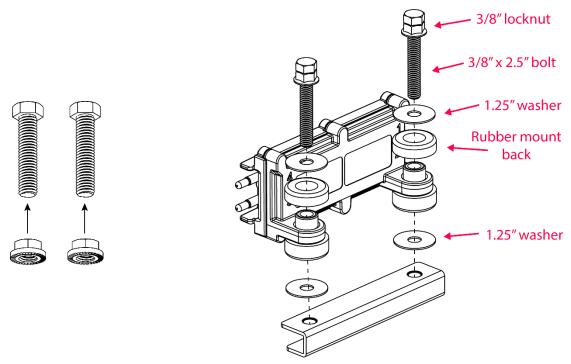


Figure 8: Installing C-channel bracket ECUs

- 1. Twist the locknut (356060-000425) onto the bolt (356060-000237) and screw it upwards until it reaches the head of the bolt, as shown in the left image of Figure 8.
- 2. Align the ECU (153510-000045) with the bracket as oriented in the right image of Figure 8.
- 3. Secure the ECU to the bracket using the bolt/locknut, washers (356060-000239), and rubber mount back (353070-000239).

4. Position the bracket onto the machine using the guidelines on page 11. Tighten the bolt head to secure the bracket to the machine.

NOTE: Make sure that when the toolbar is folded up, the ECU connectors point downward so that they do not collect water. This might mean re-installing the ECU on the bracket so that the ECU faces the other direction.



Figure 9: Installed C-channel bracket ECU

5. Screw the nut downward to secure the ECU to the bracket.

4. Connecting Auditory Tubes to ECUs

The auditory tubes on the sensors allow sound to be transmitted from the sensor to the ECU.

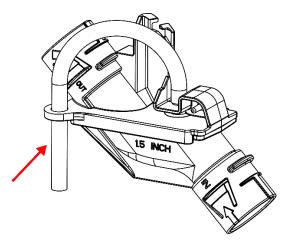


Figure 10: Auditory tube

Tools Needed

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

Connecting Auditory Tubes to ECUs

IMPORTANT: Do not cut or change the length of the auditory tubes. This will cause incorrect readings.

1. Remove the caps from the ECU ports that you will be using, beginning with ECU port 1. You will use one ECU port per sensor.

NOTE: Make sure that you do not get any dirt inside the ECU ports or the loose end of the auditory hose.

2. Locate the auditory tube of the leftmost sensor (when facing the back of the tractor) and route it toward the closest ECU. Connect the auditory tube to the port labeled "1".

IMPORTANT: Make sure that the hose is not kinked.

3. **Optional:** Mark the flow sensor hose with the ECU port number that the sensor is connected to.

4. Zip tie the auditory tube to the frame or another structure within 12" of the sensor to prevent excessive movement.



Figure 11: Auditory tube zip tied to the hose

5. Zip tie the other end of the auditory tube to the frame or another structure within 12" of the ECU.



Figure 12: Auditory tube zip tied to the frame

- 6. Continue connecting auditory tubes to the ECU, working toward the right.
- 7. Make sure that unused ECU ports are covered with the caps originally supplied on the ECU.



WARNING: Damage can occur, and warranty may be voided if unused ports are not covered.

5. Installing the Work Switch

The work switch signals to the app when the implement is in or out of the ground.



Figure 13: Work switch

Provided Parts

Part Name	Part Number	Quantity
Work switch assembly	353070-000534	1

Tools Needed

None

Installation Location

Installed in a location where the work switch tilts from one end to the other when the toolbar is changing from raised to lowered positions.



Figure 14: Work switch mounting location

5.1. Installing the Work Switch

The work switch is a mercury switch, meaning the switch is engaged when the mercury inside is tilted toward the wires and it contacts the electrical leads.

Mount the work switch (353070-000534) in a location where the work switch tilts from one end to the other when the toolbar is changing from raised to lowered positions.

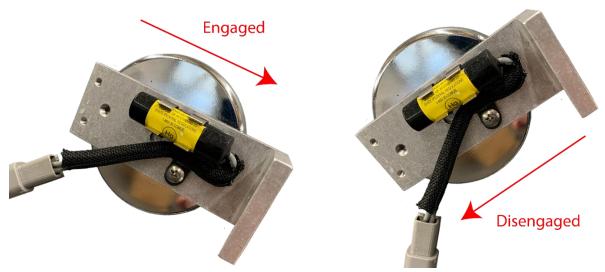


Figure 15: Work switch functionality

Determining Work Switch Method

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

Default method

- o The work switch is tilted toward the wires when the implement is in the ground.
- The work switch is tilted away from the wires when the implement is out of the ground.

Inverted method

- o The work switch is **tilted away from the wires** when the implement is **in the ground**.
- o The work switch is tilted toward the wires when the implement is out of the ground.

Take note of your work switch method. It will be configured during system configuration in the app. See the ReconBlockage for Strip-Till Operator's Guide (document number 600890-000080) for instructions.

5.2. Verifying Work Switch Installation

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

6. Installing the Gateway

The gateway is a computing platform that sends ECU data to the iPad through the Wi-Fi antenna.

Provided Parts

Part Name	Part Number	Quantity
Gateway 260	153010-000085	1
1/4" nut	352011-000040	4
1/4" flat washer	352012-000024	8
Gateway mounting bracket	353070-000079	1
U-bolt	356060-000152 or	<u> </u>
O-Dott	356060-000403	2
3/8" washer	356060-000239	4
1/4" x 2-1/2" screw	356060-000303	4
3/8" locknut	356060-000425	4

Tools Needed

Standard wrench set

Installation Location

Mounted on the toolbar.

Installing the Gateway

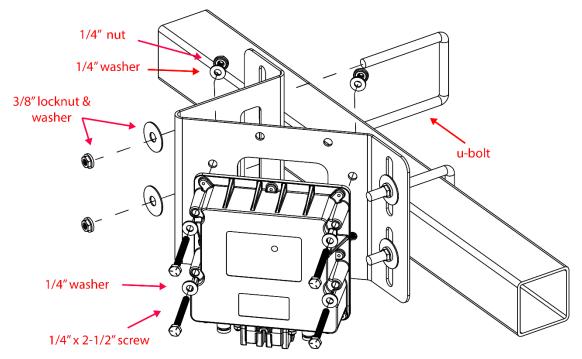


Figure 16: Mounting a gateway

- 1. Position the gateway (153010-000085) 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.
- 2. Secure the gateway to the mounting bracket using the provided screws (356060-000303), washers (352012-000024), and nuts (352011-000040) as shown in Figure 16.
- 3. Mount the gateway on the toolbar. Make sure that the gateway is mounted at least 8 inches (20 cm) away from the operator to ensure safe operation.
- 4. Secure the gateway to the mounting location using u-bolts, washers (356060-000239), and locknuts (356060-000425).



Figure 17: Example gateway mounting location

7. Installing the Wi-Fi Antenna

The Wi-Fi antenna sends information from the ReconBlockage™ for Strip-Till system to the iPad.

Provided Parts

Part Name	Part Number	Quantity Needed
SMA cap	251015-000139	2
Wi-Fi antenna	252005-000010	1
Antenna bracket	353070-000083	1
U-bolt	356060-000152	2
3/8" washer	356060-000239	4
3/8" locknut	356060-000425	4

Tools Needed

Standard wrench set

Installation Location

Mounted on the toolbar.

Installing the Wi-Fi Antenna

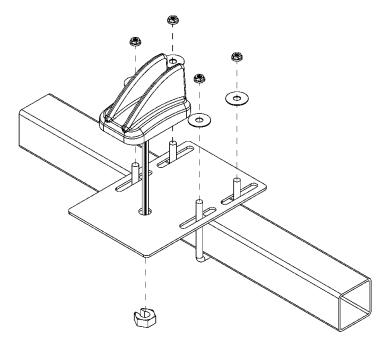


Figure 18: Mounting the Wi-Fi antenna

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. Do not over-torque.

- 2. Find a location for the antenna bracket on the toolbar. Make sure that the antenna is:
 - At least 8 inches (20 cm) away from the gateway, but close enough so that the antenna cables can connect to it.
 - At least 2 feet (60 cm) away from the operator.
 - Oriented so that the side of the antenna fins face the iPad, as shown in the left image below.

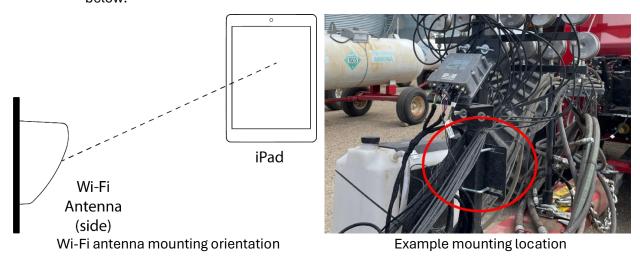


Figure 19: Example Wi-Fi antenna mounting location

- 3. Mount the bracket on the toolbar using u-bolts (356060-000152). Secure with washers (356060-000239) and locknuts (356060-000425).
- 4. Connect the Cellular Main and Wi-Fi/BT antenna cables to the gateway.

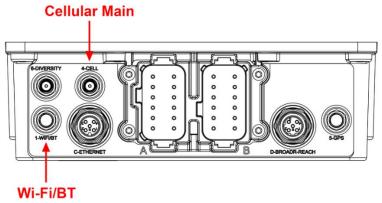


Figure 20: Gateway connections

- 5. Coil and zip-tie the 433 MHz antenna cable to the other cables.
- 6. Cover connectors 5 and 6 with the provided caps (251015-000139).

8. Installing Harnessing

The wiring harnesses provide power from the tractor to ReconBlockage™ for Strip-Till.

Refer to Appendix A for wiring diagrams for the steps below.

NOTE: The gateway uses the tractor's key switch for proper operation. Make sure that the key switch is wired to the key switch terminal of the 3-pin power outlet in the tractor cab.

Part name	Part number	Quantity
CAN termination plug	153510-000051	2
Work switch extension harness (optional)	353050-000011	1
10' ECU harness	353050-000025	varies
20' ECU harness	353050-000027	varies
Power/CAN split harness	353050-000028	1
Power extension harness	353050-000098	1
Tractor harness	353050-000100	1
Gateway harness	353050-000113	1
Cable ties	356070-000101	varies

Tools Needed

None

Installation Location

Refer to Appendix A for a wiring diagram.

8.1. Installing ECU Harnesses

- 1. Connect **S3** of a 10' ECU harness (353050-000025) or 20' ECU harness (353050-000027) to **each ECU**.
- 2. Connect **S1** of each ECU harness to **S2** of the nearest ECU harness to chain the ECU harnesses together.

NOTE: Do not connect S1 of the two centermost ECU harnesses until the next step.

3. Insert a **CAN termination plug** (153510-000051) into the **two unused S2 ends** of the outermost ECU harnesses.

8.2. Installing Power/Can Split Harness

Connect **S2** and **S3** of the Power/CAN Split harness (353050-00028) to **S1** of each of the two centermost ECU harnesses.

8.3. Installing Gateway Harness

- 1. Connect **S2** of the Gateway harness (353050-000113) to **S1** of the Power/CAN Split harness.
- 2. Connect **S3** of the Gateway harness to **Port A** on the gateway.
- 3. Connect **S4** of the Gateway harness to **Port B** on the gateway.
- 4. Connect **S5** of the Gateway harness to the **connector on the work switch**.

NOTE: If you need more length to reach the work switch, use the Work Switch Extension harness (353050-000011) between the gateway harness and the work switch.

8.4. Connecting Power Extension Harness

NOTE: If you have enough length to connect S1 of the Gateway harness to the convenience outlet of the cab, you do not need to use the Power Extension harness.

Connect **S2** of the Power Extension harness (353050-000098) to **S1** of the Gateway harness.

8.5. Connecting Tractor Harness

- 1. Connect **S2** of the Tractor Harness (353050-000100) to **S1** of the Power Extension Harness.
- 2. Connect S1 of the Power Extension harness into the convenience outlet of the tractor cab.

8.6. Securing Loose Harnessing

Coil any loose harnessing around a hydraulic line or electrical wire. Secure all harnessing to the tractor and/or implement using cable ties (356070-000101).

9. Installing the iPad Mount and App

9.1. Installing the iPad Mount

Part Name	Part Number	Quantity needed
USB charger	254040-000014	1
Tablet mount arm	352004-000003	1
Rail attachment	352004-000004	1
iPad mount (for 9"-11.5" iPads)	356070-000089	1

Tools Needed

Phillips screwdriver

Installation Location

Installed on a mounting bar in the tractor cab, or anywhere in the tractor cab where it is easily visible and within reach of the operator.



Figure 21: Installing the iPad mount

Installing the iPad Mount

- 1. Connect the iPad mount (356070-000089) to the tablet mount arm (352004-000003) and rail attachment (352004-000004) according to the instructions provided with the mount. Then, mount it to the cab's mounting bar or other desired installation location.
- 2. Place the iPad into the iPad mount.
- 3. Plug the USB charger (254040-000002) into the tractor's cigarette lighter socket. Use it to keep the iPad charged while using the system.

9.2. Downloading the ReconHub app

To interface with the system, download the ReconHub app from the Apple App Store and install it onto your iPad.

- 1. Connect the iPad to the internet.
- 2. Tap the App Store icon from the iPad's home screen.
- 3. Tap **Search** in the bottom right corner of the App Store screen.
- 4. Type ReconHub in the search field, then tap **Search**.
- 5. Tap the ReconHub app when it appears in your search results.
- 6. Tap the **Get** button, 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.

IMPORTANT: If you are prompted to enable location services, select **Only While Using the App** or **Always Allow**. If you select **Don't Allow**, this will prevent the iPad from connecting to the gateway network.

IMPORTANT: If you are prompted to allow the app to find and connect to devices on your local network, select **OK**. If you select **Don't Allow**, this will prevent the iPad from connecting to the gateway network.

9.3. Connecting the iPad to the Wireless Network

The iPad must be in close range of the gateway and connected to the gateway's wireless network to communicate with the system.

Make sure that your iPad is connected to the wireless network at the beginning of every planting session. This is especially important if your iPad is connected to another network, such as a home wireless network, between sessions.

To connect the iPad to the wireless network:

- 1. Make sure that you have power to the gateway. The gateway's LED is green when it's done starting up.
- 2. Tap the **Settings** icon on your iPad's home screen.
- 3. Tap **Wi-Fi**. Then, connect to the gateway's network.

If it's your first time connecting to the gateway:

- a. Connect to the Gateway-XXXXXX network.
- "XXXXXX" represents the gateway's serial number.
- b. Open the Precision Planting Recon app from the iPad's Home screen. Once the gateway is configured for ReconBlockage ™ for Strip-Till, close the app and navigate back to the iPad's Wi-Fi settings.
- c. Connect to the PrP-XXXXXX network.

If you've connected to the gateway before: Connect to the PrP-XXXXXX network.

4. Press the iPad's Home button or swipe up and open the ReconHub app.

For instructions to configure and use ReconBlockage for Strip-Till after installation, see the ReconBlockage Operator's Guide (600890-000075) from the app's About and Support tab.

10. Maintenance

10.1. Daily Maintenance

We recommend a daily visual inspection of the ReconBlockage $^{\mathtt{m}}$ for Strip-Till system to ensure proper operation and reduce downtime.

Perform the checks below. Correct any issues before operating the system again.

 Make sure that all connections are secure. Make sure that there are no signs of rubbing or pinching. 		
Sensors	 Make sure that sensors are: Not cracked or broken. Fastened to the hose securely with hose clamps. Make sure that auditory tubes: Have no cracks. Have no holes. Are not kinked. Are not rubbing. Start the system and check each sensor for leaks. 	
ECUs	 Make sure that ECUs are: Securely mounted. Powered on. Not cracked or broken. Showing a blinking green LED. Make sure that auditory tubes are attached to the correct port. Make sure that harnesses are correctly connected. 	
Gateway	 Make sure that the gateway is: Securely mounted. Powered on. Showing a solid green LED. Make sure that harnesses are correctly connected. 	
 Make sure that the antennas are securely mounted. Make sure that appropriate wires are correctly connected to gateway. 		

10.2. Seasonal Maintenance

At the end of the season, perform the checks below. Correct any issues before operating the system again.

Sensors	Check each sensor for product buildup. Use the sensor cleaning tool (included with the system) to clean any buildup.
Entire Strip-Till machine	At the end of the season, follow your strip-till bar's winterization instructions.

Appendix A: Wiring Diagram

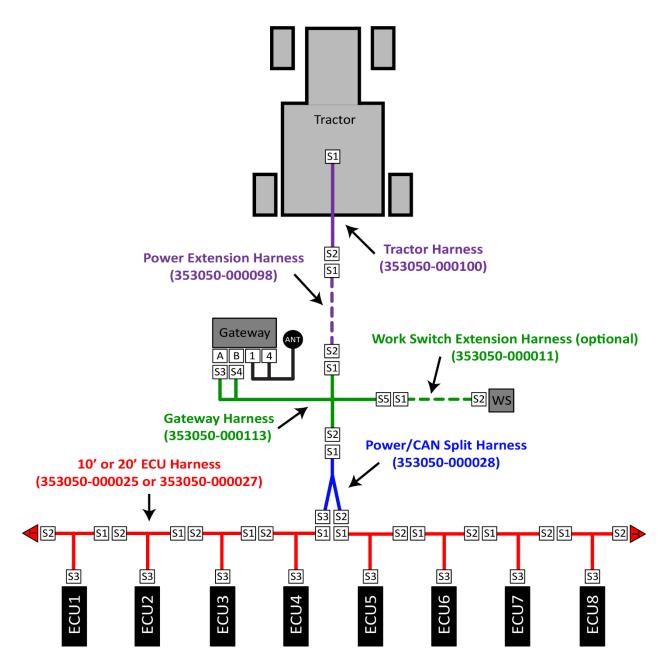


Figure 22: Wiring diagram

Appendix B: System Configuration Table

Use the following table to record notes about your system configuration. To view your current configuration in the app, tap **Settings** > **General** > **Machine Setup**.

Primary or Section #	ECU Serial #	# of Runs	Product	Notes on Ports Out of Sequence (e.g. "Run 1 on Port 3")
			A or B	
			A or B	
			A or B	
			A or B	
			A or B	
			A or B	
			A or B	
			A or B	
			A or B	
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