



HarvestMaster™

BY JUNIPER SYSTEMS



alvo™

Sensor Upgrade Kit

USER MANUAL

# Alvo Sensor Upgrade Kit User Manual

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## Cautions

**⚠ CAUTION: This symbol indicates that failure to follow directions could result in serious injury, damage to equipment, or loss of information.**



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## Sensor Upgrade Kit



### CHAPTER 1

## Prepare the Software

# 1 Prepare the Software

The Alvo Sensor Upgrade Kit provides additional hardware and software for the Alvo Field Applicator that allows you to control the system pressure, application rate, and flow rate of each boom in your system. This user manual covers how to set up and use Alvo Sensor in Mirus.

For instructions on using Alvo Field Applicator, refer to the [Alvo Field Applicator User Manual](#).

## 1.1 Install Alvo Sensor Plugin

Mirus provides the user interface and software control for the Alvo Field Applicator and Alvo Sensor. To use the Alvo Sensor Plugin in Mirus, you need Mirus, Alvo Field Applicator, and the GNSS Attachment.

### Software Requirements


- Mirus, version 4.6.7 or later
- Alvo Field Applicator, version 2.1.3 or later
- GNSS Attachment, version 2.1.1 or later

### System Requirements

- Operating system: Windows 11 64-bit OS
- Processor speed: 2.0 GHz Quad Core
- Memory: 8 GB or more recommended
- Data storage: 500 MB available desk space
- Display resolution: 1280 x 800 or higher
- Video playback: Windows Media Player, version 11 or later

### 1.1.1 Install and Activate Alvo Sensor Plugin

After you purchase a license for Alvo Sensor Plugin,

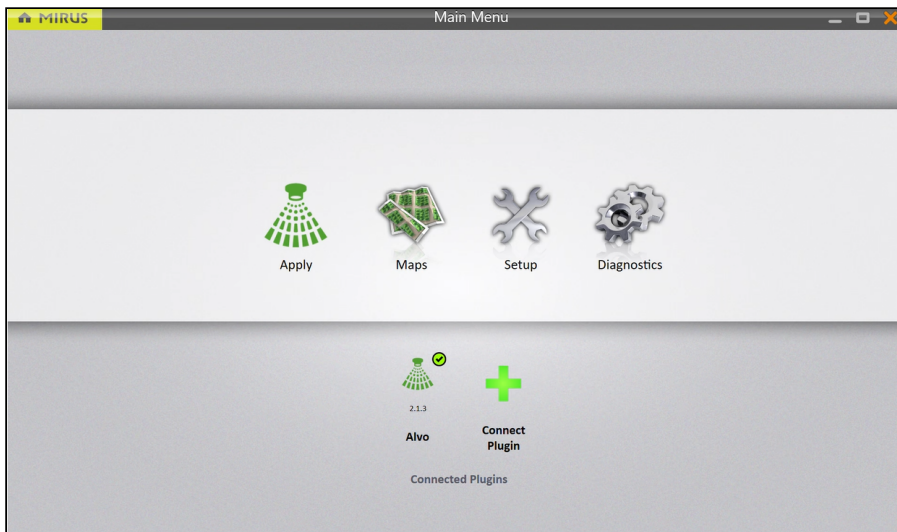
1. Go to [Mirus Plugins and Conditional Actions](#).
2. Tap the download icon  for Alvo Sensor. The files automatically download.
3. Run the .mbp file for Alvo Sensor.
4. Follow the installation instructions.
5. Activate the software online at [www.harvestmaster.com/activate](http://www.harvestmaster.com/activate).

## 1.2 Connect the Alvo Sensor Plugin

To connect the Alvo Sensor Plugin,


1. Open Mirus .

- From the Main Menu, tap **Connect Plugin**.  
*Note: You must have the Alvo plugin connected.*

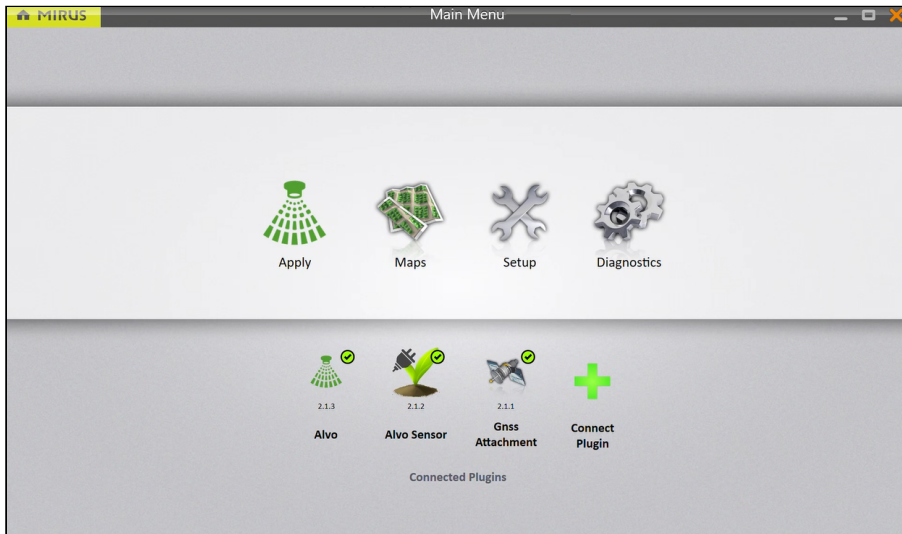


- Tap **Attachments**.
- Tap **Alvo Sensor**.



- Tap the check icon .

6. Return to the Main Menu. Alvo Sensor has a green check mark.



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## CHAPTER 2

### Define Settings & Check Calibration

## 2 Define Settings & Check Calibration

Before you apply treatments, define the sensor settings in Mirus.

### 2.1 Adjust Digital Inputs

From the Digital Inputs screen, adjust the system pressure as well as the application rate and flow rate for each boom.

1. Select **Setup > Applicator > Digital Inputs**.



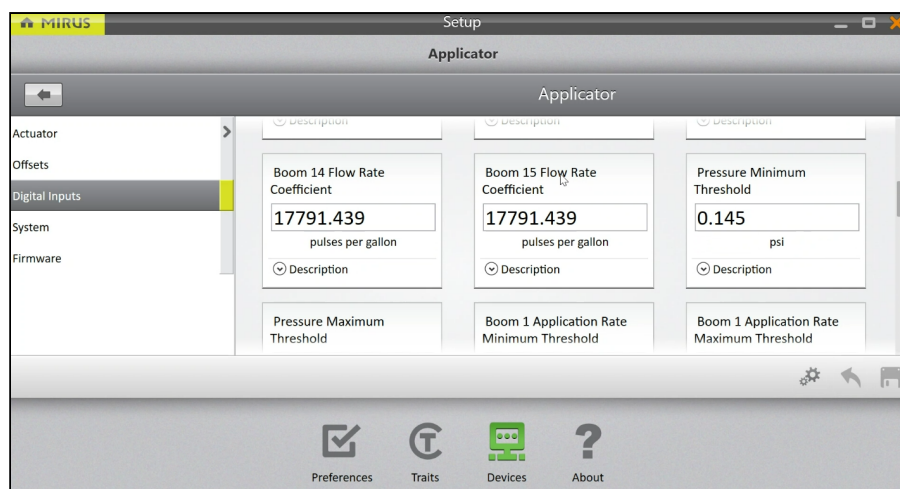
*Note: In most cases, the default values for System Pressure Coefficient and System Pressure Offset are accurate. Contact HarvestMaster if you need to adjust these values.*

2. Enter values in **Flow rate coefficient** for each boom.

*Note: The default value is based off the density of water and is accurate for most cases. If you are using a liquid with a density different from that of water, adjust the coefficients.*

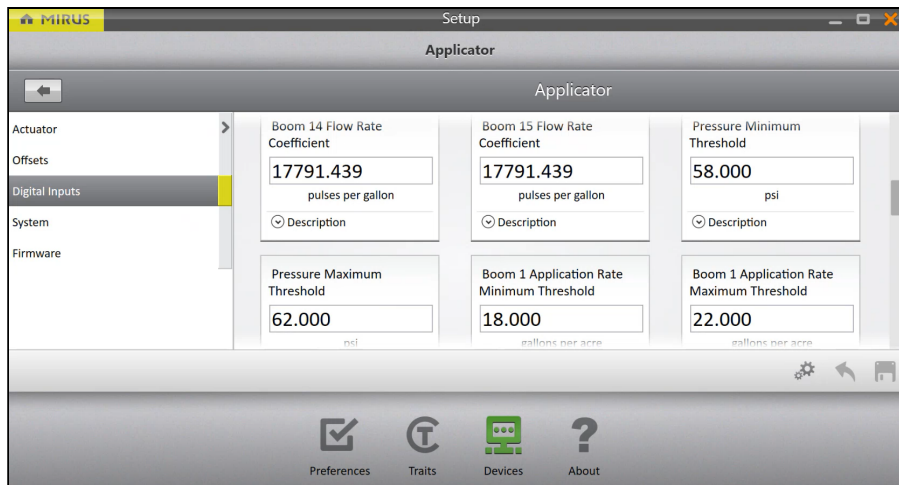
3. Enter values in **Pressure minimum threshold** and **Pressure maximum threshold**.

These two values set the acceptable range for the system pressure. The difference between the values should be relatively small, for example, 4 psi.



- Enter values in **Application rate minimum threshold** and **Application rate maximum threshold** for each boom.

Customize the application rate for each boom to accommodate different nozzle sizes. These two values set the acceptable range for the application rate.



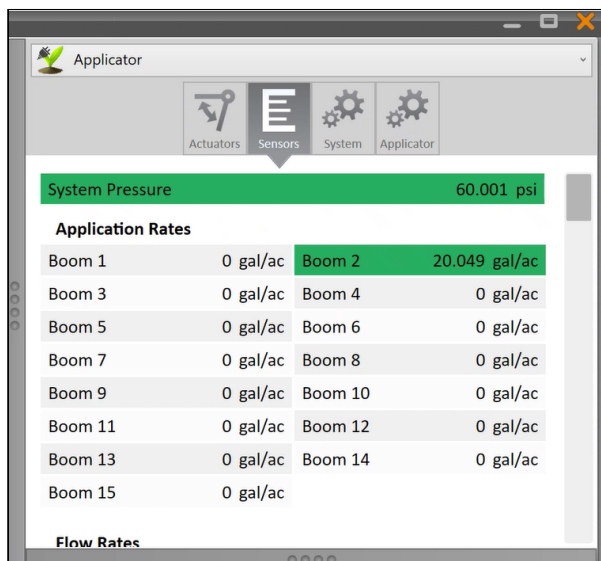
- Tap Save .

### Verify the System Pressure and Application Rate

On the Sensors tab, Mirus uses a green band to indicate that the system pressure and application rate are within the acceptable ranges set on the Digital Inputs screen. Yellow and red bands indicate values outside the acceptable range.

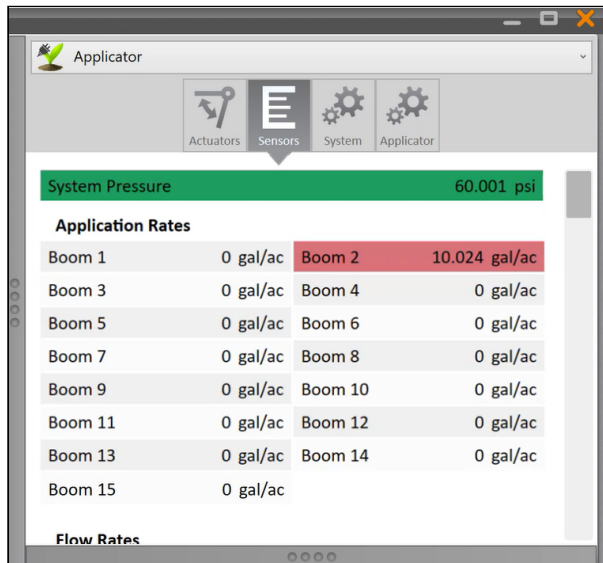
To verify the system pressure and application rate,

- From the Main Menu, select **Diagnostics**.
- Select the **Sensors** tab.
- Verify the system pressure and application rate have green bands, as shown below.



- If system pressure or application rate has a yellow or red band, adjust the value on the Digital Input screen. In this example, the system pressure is within the accept-

able range, but the application rate for boom 2 is above the maximum threshold.

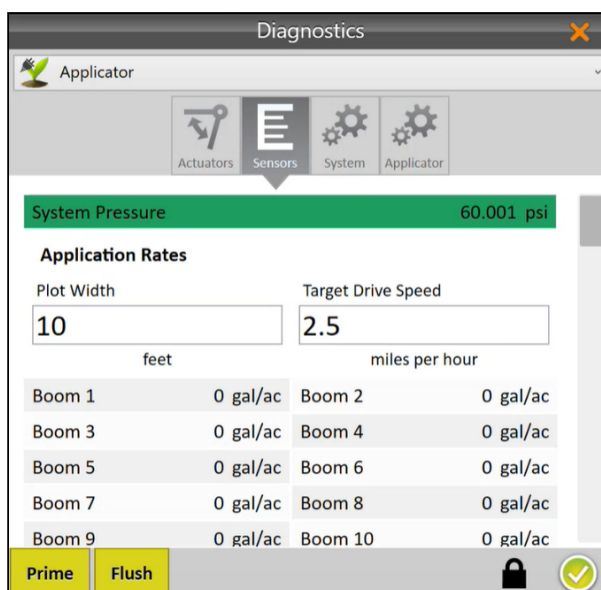


## 2.2 Check Application Width and Drive Speed Configuration

While stationary, you can check the flow rate and application rate in the calibration configuration. For best practice, the plot width should equal the swath width that you will drive. Set the target drive speed to the speed that achieves the desired application rate.

To set the application width and drive speed,

1. From the Main Menu, select **Diagnostics**.
2. Select the **Sensors** tab.
3. In **Plot width**, enter the width of the area covered by the field applicator. This should match the swath width.
4. In **Target drive speed**, enter the speed that achieves the desired application rate.

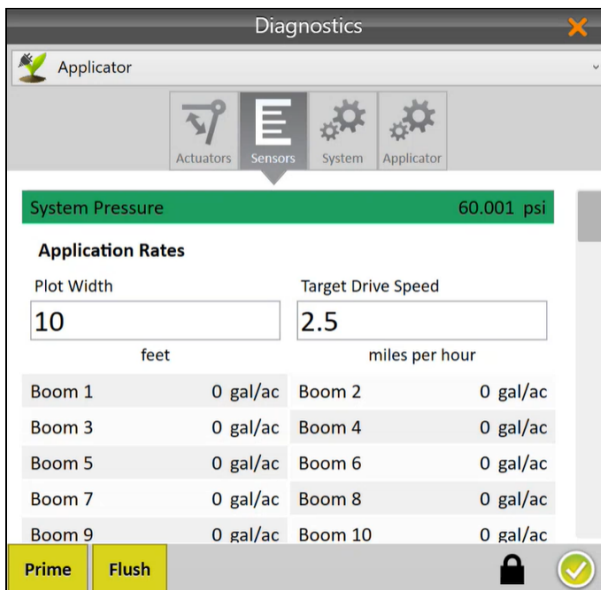


5. Tap the check icon .

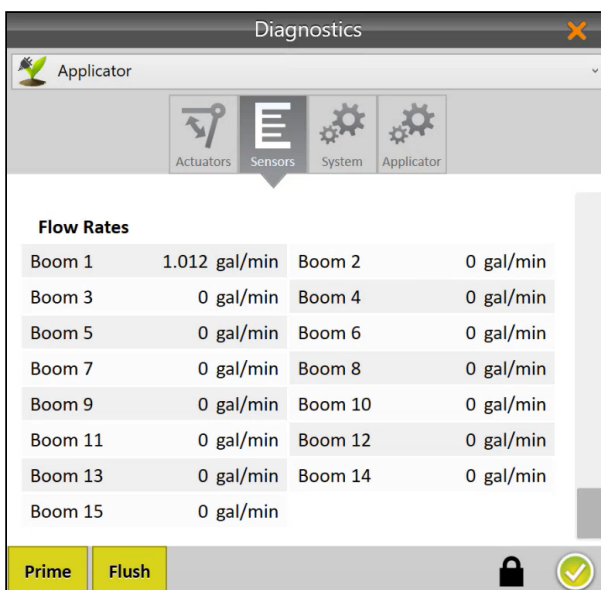
## 2.3 Check Flow Rate Calibration

You can verify the sensor calibration by checking that the output for each boom matches the flow rate calculated by Mirus.


1. Fill a container with liquid and connect it to the boom that you want to test.
2. Place a catch bucket under each nozzle on the targeted boom.
3. Turn on the boom for 1 minute.
4. Pour the contents in each catch bucket into a liquid measuring container.
5. Open Mirus and select **Diagnostics**.
6. Select the **Sensors** tab.



7. Scroll down to see the boom's flow rate.



8. Verify that the flow rate shown in Mirus matches the amount of liquid that you collected in the measuring container.

9. If the values are not the same, adjust the flow rate coefficient on the [Digital Inputs screen](#).  
For example, if the collected volume is 10% below the reported flow rate, raise the flow rate coefficient on the Digital Inputs screen by 10%.
10. Tap the check icon .
11. Repeat this procedure for each boom.

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### CHAPTER 3

## Operate System

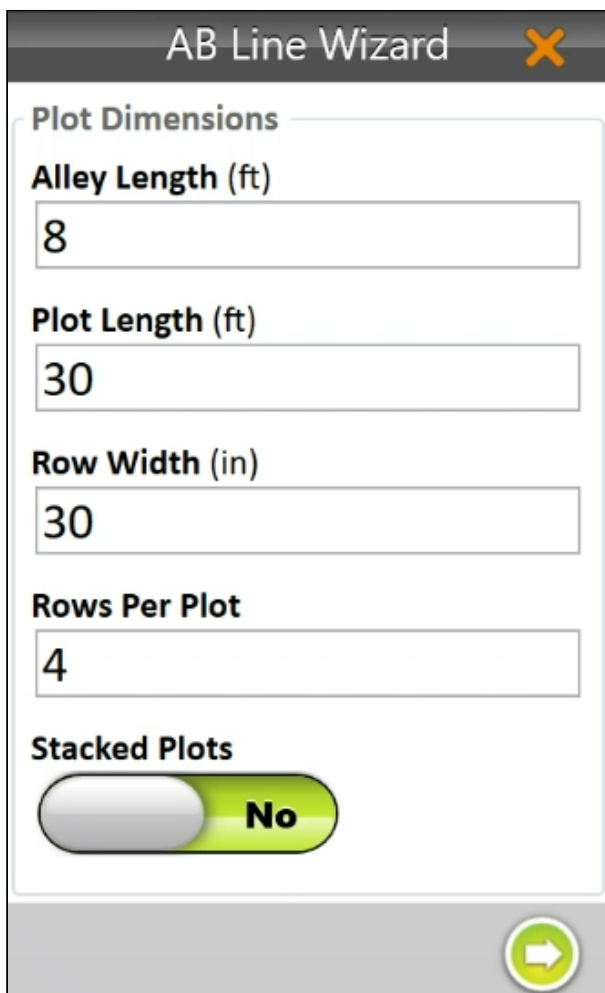
## 3 Operate System

Follow the instructions on applying treatments as outlined in [Alvo Field Applicator User's Guide, Chapter 5 "Apply Treatments."](#) This section contains additional details specifically for using the Alvo Sensor plugin.

### 3.1 Set Plot Dimensions in AB Line Wizard

Mirus uses the plot dimensions entered in the AB Line Wizard in the application rate calculation. Ensure these values are accurate. For more information on using the AB Line Wizard, see [Alvo Field Applicator User's Guide, Chapter 5, "Apply Treatments."](#)

*Note: Application rate is calculated from the swath width entered in the AB Line Wizard. For example, six 30-inch rows generates a 15-foot swath width. In the event you are applying treatments on the center four rows of the 15-foot swath width, the application rate in the Sensors screen will show the rate for the full 15-foot swath. In this case, the target application rate in the Sensors screen will be 2/3 of your actual application rate.*



The screenshot shows the 'AB Line Wizard' dialog box with the following settings:

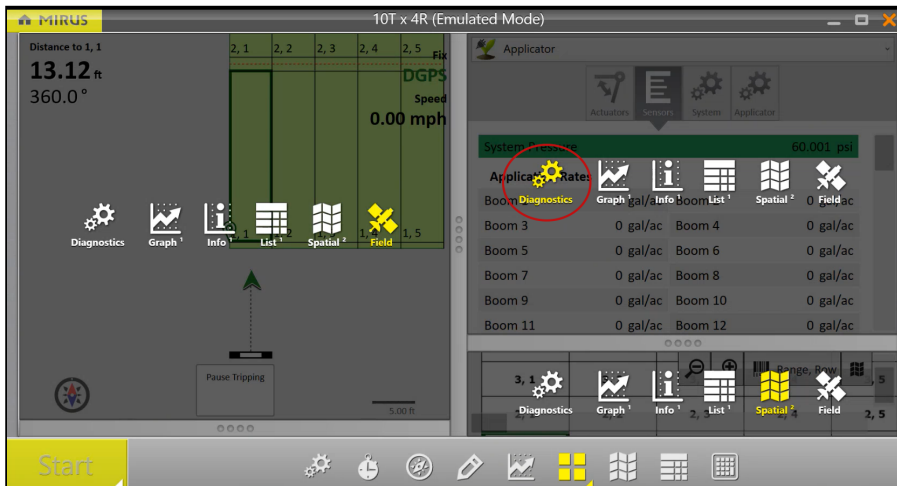
- Plot Dimensions**
- Alley Length (ft)**: 8
- Plot Length (ft)**: 30
- Row Width (in)**: 30
- Rows Per Plot**: 4
- Stacked Plots**: No (toggle switch)

A green arrow button is located at the bottom right of the dialog box.

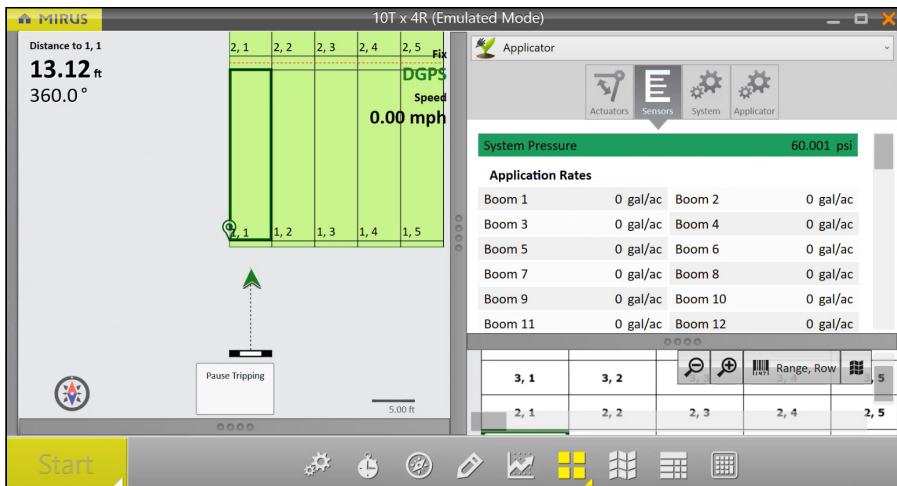
### 3.2 Configure Map Screen

To monitor the system pressure, application rate, and flow rate while applying treatments,

1. Set up the Map screen to display Diagnostics.



2. Select the **Sensor** tab.



### 3.3 View Treatment Data from the Map Screen

From the Map screen, you can view the treatment data in Spatial Display or List View.

#### Spatial Display

Use the Spatial Display to view the average application rate and flow rate for each plot. In the Attribute section, scroll down and select the boom and attribute for which you want to view data.



## List View

Use List View to review the treatment for each plot. The system pressure, application rate, and flow rate are averaged for each plot.

The screenshot shows a software window titled "15 trt (Emulated Mode)". The interface displays a table with the following data:

Range, Row	Treatment	Boom 1 Application Rate	Boom 2 Application Rate	Boom 3 Application Rate	Boom 4 Application Rate
1, 1 1		16.444 gal/ac	0 gal/ac	0 gal/ac	0 gal/ac
2, 1 2		0 gal/ac	17.71 gal/ac	0 gal/ac	0 gal/ac
3, 1 3		0 gal/ac	0 gal/ac	17.629 gal/ac	0 gal/ac
4, 1 4		0 gal/ac	0 gal/ac	0 gal/ac	17.629 gal/ac
5, 1 5		0 gal/ac	0 gal/ac	0 gal/ac	0 gal/ac
6, 1 6		0 gal/ac	0 gal/ac	0 gal/ac	0 gal/ac
7, 1 7					

The table is part of a larger interface with a "Start" button and various icons at the bottom.

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## CHAPTER 4

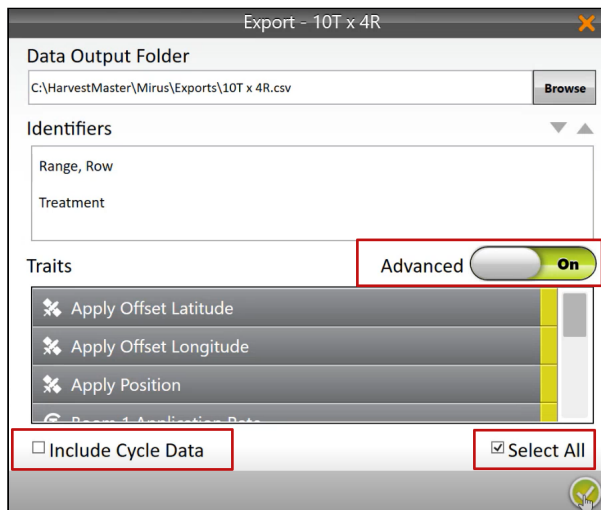
### Export Data

## 4 Export Data

The procedure for exporting treatment data is the same as for the Alvo Field Applicator. However, with the addition of the Alvo Sensor Plugin, the exported data contains the system pressure as well as application rate and flow rate for each boom. For more information on exporting information, see [Alvo Field Applicator User's Guide, Chapter 6 "Export Information."](#)

When you are exporting Alvo data, use the following settings to customize the sensor data.

1. Turn on **Advanced**.
2. Select the traits that you want to include. To view all traits, select the **Select all** checkbox.
3. Select how the data is reported.
  - To see values recorded every 200 milliseconds (5 Hz), select the **Include cycle data** checkbox.
  - To see averaged values across the entire plot, clear the **Include cycle data** checkbox.



Mirus saves the exported data in a CSV file.

	A	B	C	D	E	F	G
1	Date/Time	Range	Row	Cycle	System Pri	Boom 1 Ap	Boom 1 Flc
2	10/31/2024 14:34	1	1	1	40.845	10.048	0.641
3	10/31/2024 14:34	1	1	2	41.608	12.343	0.779
4	10/31/2024 14:34	1	1	3	40.845	12.076	0.762
5	10/31/2024 14:34	1	1	4	40.845	12.18	0.762
6	10/31/2024 14:34	1	1	5	41.608	12.596	0.779
7	10/31/2024 14:34	1	1	6	40.845	12.414	0.762
8	10/31/2024 14:34	1	1	7	40.845	12.478	0.762
9	10/31/2024 14:34	1	1	8	40.845	12.532	0.762
10	10/31/2024 14:34	1	1	9	40.845	12.607	0.762
11	10/31/2024 14:34	1	1	10	40.845	12.662	0.762
12	10/31/2024 14:34	1	1	11	40.845	12.707	0.762
13	10/31/2024 14:34	1	1	12	40.845	12.729	0.762
14	10/31/2024 14:34	1	1	13	40.845	12.769	0.762
15	10/31/2024 14:34	1	1	14	40.845	12.85	0.762
16	10/31/2024 14:34	1	1	15	40.082	12.606	0.745
17	10/31/2024 14:34	1	1	16	40.845	12.935	0.762
18	10/31/2024 14:34	1	1	17	40.845	12.979	0.762

The following table describes the exported data unique to the Alvo Sensor plugin.

Exported Data	
Field Name	Description
Cycle	<p>Length of the data cycle. If the field displays</p> <ul style="list-style-type: none"> <li>T—Data is an average across the plot</li> <li>Number—Data was captured every 200 milliseconds (5 Hz) across the plot</li> </ul>
System pressure	System pressure averaged across the plot or captured every 200 milliseconds (5 Hz) if you included cycle data.
Application rate	Application rate averaged across the plot or captured every 200 milliseconds (5 Hz) if you included cycle data.
Flow rate	Flow rate averaged across the plot or captured every 200 milliseconds (5 Hz) if you included cycle data.