

Electromagnetic Liquid System Installation guide

Electromagnetic Liquid System Definitions	Page 2
Removing Turbines from standard HD	Page 3
EMHD Software Requirements	Page 6
Hardware Installation requirements	
• Plumbing requirements	Page 6
• SRM Base System Installation	Page 6
• EMHD System Specific Requirements	Page 6
• Control Pair Requirements	Page 7
• Row by Row Control Installation Requirements	Page 7
• EM Section Installation Requirements	Page 8
• EMFlowsense Monitoring Only Requirements	Page 9
• Rate Control Module Requirements	Page 9
20 20 Setup with Individual Row Control	Page 10
20 20 Setup with EMHD Section Control	Page 19
Understanding the Diagnose Page	
EMHD Diagnose Page	Page 25
EM FlowSense Diagnose Page	Page 27
Operational processes	
Zero EM FlowSense	Page 28

Electromagnetic Liquid System Definitions:

EMHD- Refers to the Electromagnetic vApplyHD module.

EMFS- Refers to the Electromagnetic FlowSense module.

Control Pair- The Electromagnetic HD and Electromagnetic FlowSense that are paired together. Also, can be a Turbines Removed vApplyHD paired with an Electromagnetic FlowSense.

In a row x row setup, each row will have a Control Pair. In a section system, each section will have a control pair.

Row Monitoring EMFS- Refers to the Electromagnetic FlowSense used to monitor flow on an individual row in a section-controlled system or on a monitor only system. Specifically, this module is not being used by an HD to control flow.

Turbines Removed HD- A vApplyHD which both turbines have been removed from the module. This HD must be paired with an Electromagnetic FlowSense to control flow.

Gen 2 Rate Control Module- Refers to the original module used to control pump monitor pressure at the pump and filter. It has the pressure ports built into the module. This module will work on a Gen 2 display or a Gen 3 display.

Gen 3 Rate Control Module- Refers to the new style module used to control pump speed. This module does not have pressure ports. It should be paired with a liquid pressure module in order to monitor pressure at the pump and filter.

Removing Turbines from Standard HD to Pair with EM FlowSense

A standard vApplyHD can be paired with an EM FlowSense in order to run liquids that can't pass through an 80 mesh filter. Once the turbines are removed, only filtering to 50 mesh is required. The row strainers can also be removed from an existing system if switching to an EM system.

Follow the steps below to remove both the low flow and total flow turbines and prepare the vApplyHD to be run with an EM FlowSense.

Step 1. Using the deutsch removal tool from the vApplyHD essentials kit (kit #724408), remove the collet and O-ring from the inlet to the HD. The picture below shows these items having been removed.



Step 2. Use the same removal tool to hook the total flow turbine and pull the turbine out.



Step 3. Replace the O-ring and Collet.

Step 4. Remove the top valve assembly. There are 4 screws holding the valve on as shown below. Pull on the outlet portion of the valve to separate from the body of the vApplyHD.



Step 5. Use the pliers from the vApplyHD essentials kit to pull out the low flow turbine as shown below.



Step 6. Replace the valve on top of the vApplyHD body.

Software Requirements

EMHD, EM FlowSense, and Turbines Removed liquid systems will require 2022.1.4 or later software.

2023.0.0 is recommended for Spring 2023

Note: Software requirements have not changed for standard vApplyHD, CAN FlowSense, or Aux FlowSense systems.

Hardware Installation Requirements

Installation of the Pump and Plumbing for EMHD Systems

All EMHD systems have certain plumbing requirements and recommendations to ensure performance.

The document “vApply Plumbing Recommendations and Installation (955657)” should be referenced for pump and plumbing installation. It can be found on our website under vApplyHD installation guides within product resources.

SRM Base System Installation

All EMHD and EM FlowSense systems will need the SRM base system installed on the implement. This includes a 20|20 Gen3 monitor in the tractor to operate the system. Installation documents and videos for the SRM base system can be found at <https://cloud.precisionplanting.com/products/#product-86-installation-resources>. Below is a diagram of the SRM base system. Note: Sidedress systems utilizing vApplyHD flex modules will not need the SRM or row harness.

EMHD System Specific Requirements

1. All Electromagnetic systems must be filtered to a 50 mesh size filter. It is recommended to filter before and after the pump.
2. All vApplyHD requirements (Ex. Pump style, plumbing size and routing) not specified below still apply to EM systems.

Control Pair Requirements

1. All EMHDs and Turbines removed HDs must be paired with an EM FlowSense. Flow will not be controlled by the EMHD without an EM Flowsense to report flow.
2. The Control Pair cannot include an Aux or CAN style FlowSense. The EMHD must be paired with an EM style Flowsense.
3. The EMHD and EMFlowsense composing the Control Pair must be plugged into the same location (same row)
4. Each Control Pair must use the same color jumper for both modules (EMHD and EMFS).
5. The EM FlowSense must be plumbed into the liquid system upstream of the EMHD or Turbines Removed HD as shown below in Figure A.

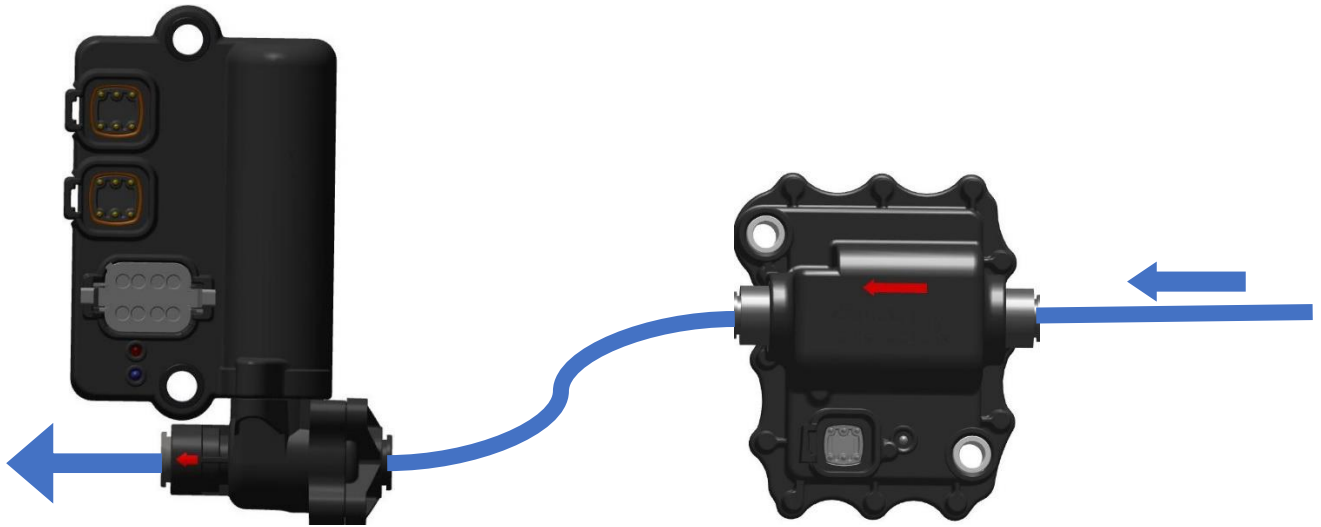


Figure Shows Direction of Flow through EMFS and EMHD as control pair

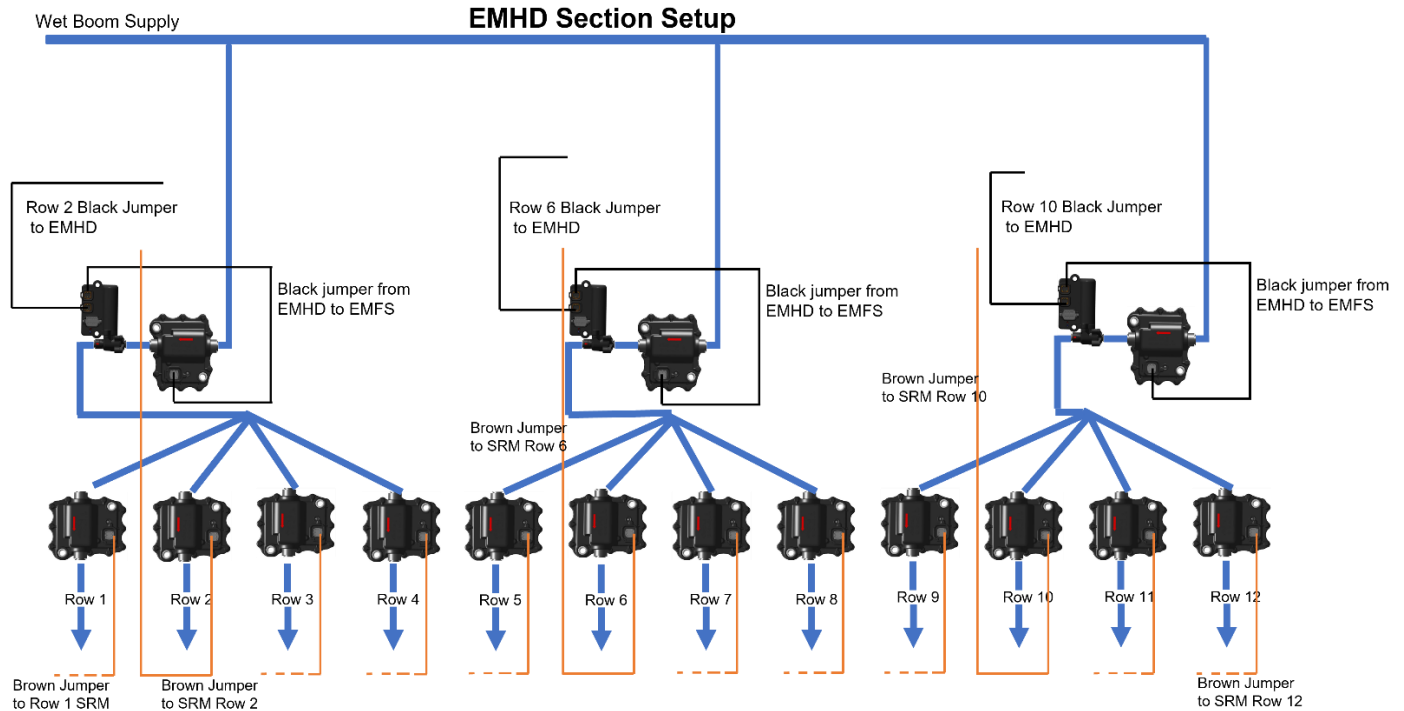
Row by Row Control Installation Requirements

1. When controlling liquid in an individual row style, each row will require its own control pair.
2. All control pair modules on a single product must have the same color jumper.
3. The EM FlowSense will be plumbed in upstream of the EMHD or Turbines Removed HD.
4. If the application point is being split after the EMHD, such as with Furrow Jet or Conceal, orifices will be required to balance flow like on a vApplyHD system.

EM Section Installation Requirements

1. It is recommended to have no more than 4 rows in one section.
2. Each section needs one Control Pair to control flow for all rows.
3. Each row in every section also needs a single EM Flow Sense plumbed into the liquid system downstream of the control pair to monitor flow on individual rows.
4. A CAN or Aux FlowSense can be used to monitor individual row flow on an EM Section system, but the liquid product will need to be filtered like any other turbine system.
5. The Control pair modules need to be plugged in with the same color jumper.
6. The row monitoring EM FlowSense will be plugged in with a different color jumper with the color being consistent across all rows.
7. Orifices will be used to balance flow to reduce flow variance from row to row.
8. Orifices will be installed after the row monitoring EM FlowSense.
9. A check valve will need to be used on every row after the row monitoring EM FlowSense to keep the EM FlowSense full of product. This ensures accurate readings while applying.

Example of electrical connections and plumbing on a section EM system.



EM FlowSense Monitoring only Requirements

1. EM FlowSense can be used by itself to monitor flow on individual rows. This can be set up to monitor certain rows on a planter or all rows.
2. All EM FlowSense in this setup should match jumper color.
3. A check valve and orifice need to be installed after the EM FlowSense in order to balance flow and to keep the EM FlowSense full of product. This is critical for accuracy with an EM FlowSense system.
4. If a check valve is installed more than 2ft. after the EM FlowSense, the module needs to be mounted so the outlet is on top. With direction of flow going up through the module, it will stay full of product after priming or swathing off at headlands.

Rate Control Module Requirements

1. A Rate Control Module is required to be installed on each liquid system even if the 20|20 is not controlling the pump such as a ground driven system. This is true on a standard vApplyHD system as well.
2. Either a Gen 2 or Gen 3 style Rate Control Module can be used with an EM style liquid system to control the pump and can be plugged in to any location (PDM or Row). Either one will have the same function.
3. A Gen 3 style Rate Control Module will come with a separate Liquid Pressure Module to monitor pressure at the pump and before/after the filter. These two modules are required to be plugged

in at the same location (PDM or Row) with the same color jumper (it is recommended to match the jumper colors with the control pairs as well).

4. A Liquid Pressure Module can be paired with a Gen 2 style rate control module if the pressure sensor on the module have failed.
5. The Liquid Pressure Module has to be paired with Rate Control Module in order to read pressure. A liquid pressure module not assigned to a Rate Control Module in software will not show pressure on the 20|20.
6. Functionality of both Rate Control Modules will look and work the same on the 20|20 when set up.

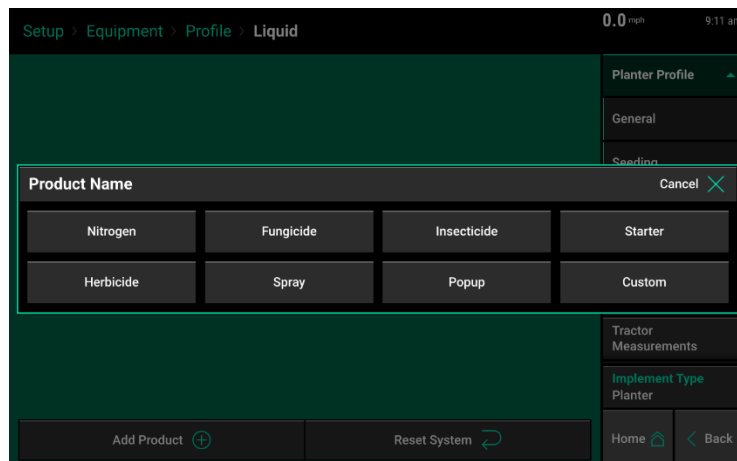
20|20 setup Individual Row Control

The following steps will walk through setting up an EMHD system or a turbines removed system and assigning modules for an individual row control system. All pictures are based on an example of a 16-row planter with a Nitrogen application.

Equipment Product Setup

Step 1. In the equipment tab, press add system and select liquid as the product.

Step 2. Press add product. This will give a list of predetermined names to use, or a custom name can be setup. Use a name that corresponds to the product being applied.



Step 3. Navigate to Control Sections under Setup > Systems. Setup Rate Sections and Swath sections if not done already. Rate and Swath must be setup to Enable Control.

Setup > Systems > Control Sections 0.0 mph 10:20 am

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14

Rate Sections

Rate Section 1	Rate Section 2	Rate Section 3	Rate Section 4
All	None	None	None

Swath Control

Control Style	Number of Sections
Dual Ends	14

Control Sections

Seeding

Nitrogen

Lift Switch ⚠

Radar ⚠

PDM

Display >

Home < Back

Step 4. Continue to the Liquid system under Setup > Systems > *Product Name*.

Setup > Systems > Nitrogen 0.0 mph 9:11 am

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

• Module Locations

Active Rows	Application Position	Tank Size
All	0.00 in. in front of seed exit	300 gal

Coverage Pattern

50.0 %

Tap "Add Hardware" below to add and configure connected hardware.

Add Hardware +

Control Sections

Seeding

Nitrogen

Lift Switch ⚠

PDM

Display >

Home < Back

Step 5. Set Active Rows to All. This should always be set to All rows with an individual row control system.

Setup > Systems > Nitrogen 0.0 mph 9:11 am

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

• Module Locations

Active Rows
All

Application Position
0.00 in. in front of seed exit

Tank Size
300 gal

Coverage Pattern
50.0 %

Tap "Add Hardware" below to add and configure connected hardware.

Add Hardware +

Control Sections

Seeding

Nitrogen

Lift Switch ⚠

PDM

Display >

Home < Back

Step 6. Measure the distance from seed exit to the liquid application point. Enter distance in the box name Application position. This will set the swath timing for liquid based off seeding swath timing.

Setup > Systems > Nitrogen 0.0 mph 9:11 am

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

• Module Locations

Active Rows
All

Application Position
0.00 in. in front of seed exit

Tank Size
300 gal

Coverage Pattern
50.0 %

Tap "Add Hardware" below to add and configure connected hardware.

Add Hardware +

Control Sections

Seeding

Nitrogen

Lift Switch ⚠

PDM

Display >

Home < Back

Step 7. Enter a Tank Size which matches the tank size on the planter. This is used to track gallons remaining.

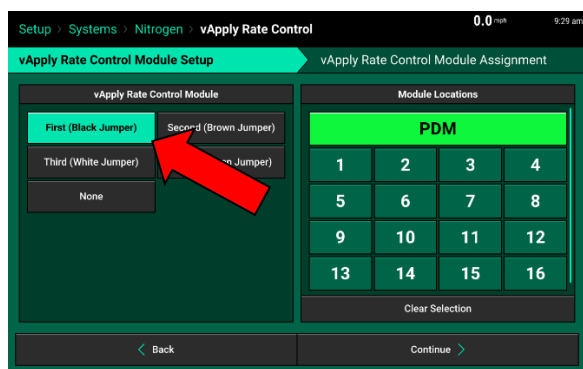
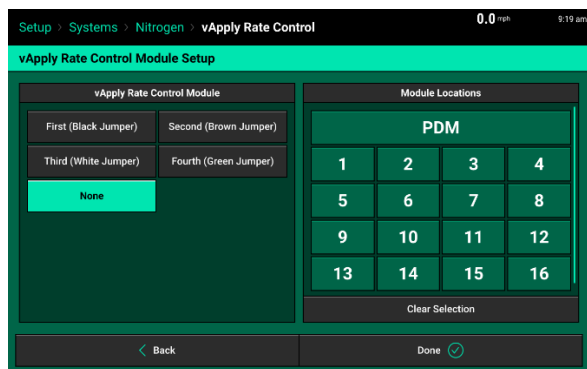
The screenshot shows the 'Nitrogen' setup screen in a mobile application. At the top, there's a breadcrumb trail: 'Setup > Systems > Nitrogen'. Below this is a row of 16 numbered buttons (1-16). Underneath is a section titled 'Module Locations' containing three input fields: 'Active Rows' with the value 'All', 'Application Position' with the value '0.00 in. in front of seed ex', and 'Tank Size' with the value '300 gal'. The 'Tank Size' field is circled in red. Below these fields is a 'Coverage Pattern' field with the value '50.0 %'. At the bottom, there's a button labeled 'Add Hardware' with a plus icon. On the right side, there's a vertical menu with options: 'Control Sections', 'Seeding', 'Nitrogen' (highlighted in green), 'Lift Switch' with a yellow warning icon, 'PDM', and 'Display' with a right arrow. At the very bottom right are 'Home' and 'Back' buttons.

Assigning Hardware: Rate Control Module

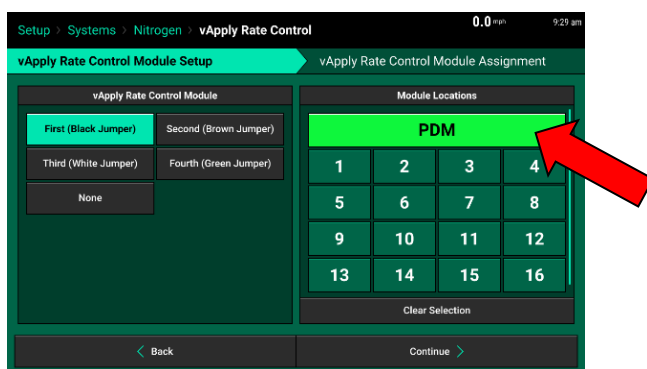
Step 1. Press add hardware and select vApply Rate Control Module from the list of hardware options.

The screenshot shows the 'Add Hardware' dialog box overlaid on the 'Nitrogen' setup screen. The dialog box has a title bar with 'Add Hardware' and a 'Cancel' button with an 'X' icon. Inside the dialog, there are five buttons arranged in two rows: 'vApply Rate Control', 'Flow Meter', 'vApplyHD', 'FlowSense' in the top row, and 'Liquid Pressure Module' in the bottom row. A red arrow points to the 'vApply Rate Control' button. The background screen shows the same 'Nitrogen' setup interface as the previous screenshot, but the 'Add Hardware' button at the bottom is now disabled.

Step 2. Choose the corresponding color jumper the Rate Control Module is plugged in to. If plugged in with a black jumper, choose "First (Black Jumper)"

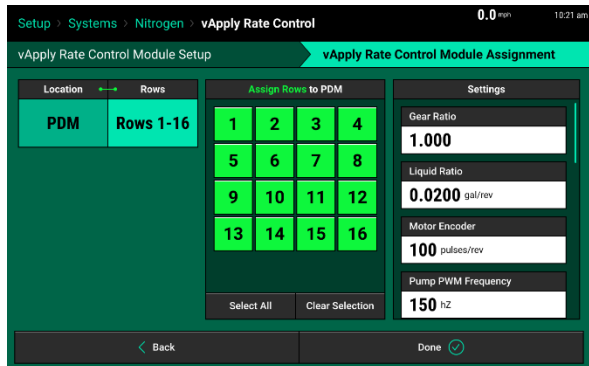
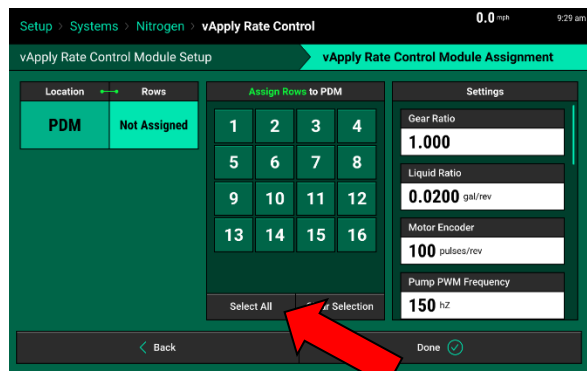


Step 3. Under Module location, select the row or PDM where the module is physically plugged in. In this example, PDM has been selected. Press continue to progress to next page.



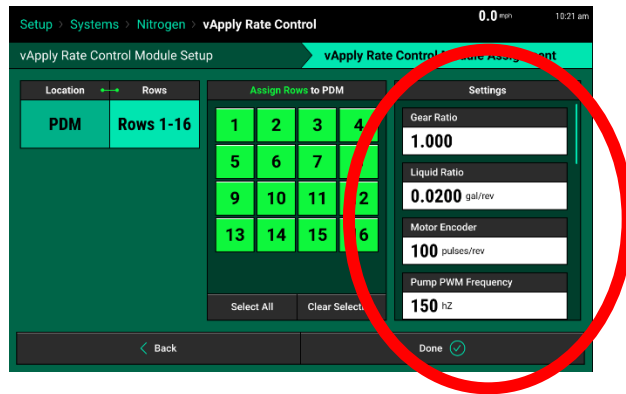
Note: If using PDM local CAN, a Y Harness (724280) should be used to terminate the local CAN. If plugging in more than one module, use one Y harness per module.

Step 4. Assign all rows with liquid application points to the module location.



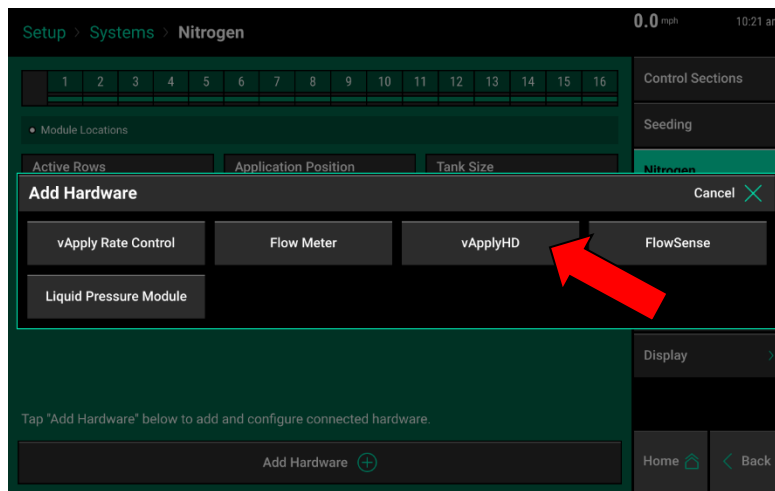
Step 5. Press done to accept changes to the module assignment.

Note: Use the Document *Gen 3 Pump Calibration Procedure* found on Product Resources for guidance on changing the settings for the Rate Control Module.

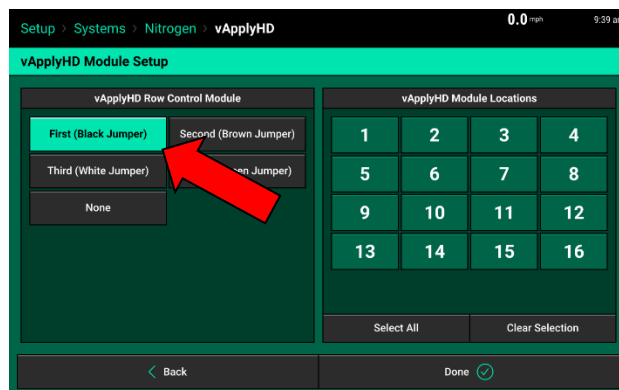


Assigning Hardware: EMHD

Step 1. Press add hardware and select vApplyHD from the list of hardware options.



Step 2. Select the corresponding jumper color which the EMHDs are connected.



Note: If an EMHD is plugged in with the 8-pin row drop as a flex style, it is required to select First (Black Jumper).

Step 3. For an individual row control system, press *Select All* to select all rows. Press continue to proceed to next page.

Setup > Systems > Nitrogen > vApplyHD

0.0 mph 10:21 am

vApplyHD Module Setup vApplyHD Module Assignment

vApplyHD Row Control Module

First (Black Jumper)	Second (Brown Jumper)
Third (White Jumper)	Fourth (Green Jumper)
None	

vApplyHD Module Locations

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Select All Clear Selection

Back Continue

Step 4. Assign each row to the corresponding location. In an individual row setup, selecting *Row by Row* will assign individual rows to individual module locations.

Setup > Systems > Nitrogen > vApplyHD

0.0 mph 9:42 am

vApplyHD Module Setup vApplyHD Module Assignment

Location	Rows
Row 1	Not Assigned
Row 2	Not Assigned
Row 3	Not Assigned
Row 4	Not Assigned
Row 5	Not Assigned
Row 6	Not Assigned
Row 7	Not Assigned
Row 8	Not Assigned
Row 9	Not Assigned

Assign Rows to Row 1

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Row by Row Clear Selection

Flow Rate Adjustment 0.00 %

Flow Source Internal

Back Done

Setup > Systems > Nitrogen > vApplyHD

0.0 mph 10:22 am

vApplyHD Module Setup vApplyHD Module Assignment

Location	Rows
Row 1	Row 1
Row 2	Row 2
Row 3	Row 3
Row 4	Row 4
Row 5	Row 5
Row 6	Row 6
Row 7	Row 7
Row 8	Row 8
Row 9	Row 9

Assign Rows to Row 1

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Row by Row Clear Selection

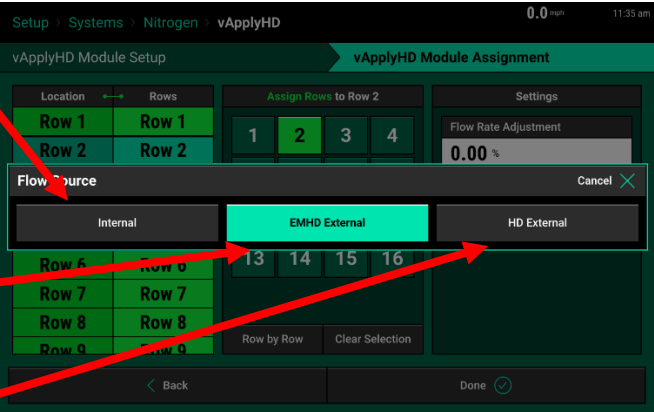
Flow Rate Adjustment 0.00 %

Flow Source Internal

Back Done

Step 5. Select the correct Flow Source for the style of vApplyHD being used. There are 3 options for Flow Source.

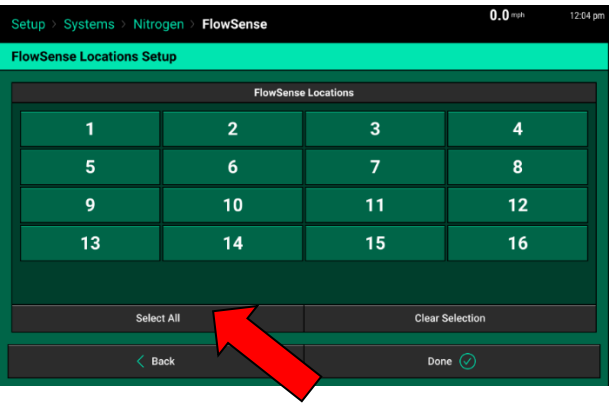
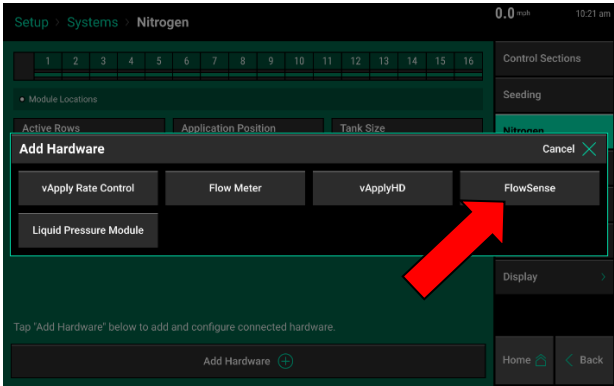
- Option 1.
- Option 2.
- Option 3.



- Option1. vApplyHD Internal- For vApplyHD that is using turbines to measure flow.
 - Option 2. EMHD- For new EMHD modules paired with an EMFS.
 - Option3. vApplyHD External- For vApplyHD modules with the turbines removed and paired with an EMFS.
- IMPORTANT!! YOU MUST SELECT THE FLOW SOURCE FOR EVERY EMHD OR vApplyHD ON THE PLANTER!**

Assigning Hardware: EM FlowSense

Step 1. Press add hardware and select FlowSense. Select every row for Row-by-Row Control. The *Select All* button will select every row automatically. Then press continue.



Step 2. For each FlowSense location select the corresponding color of Electromagnetic jumper. The jumper color needs to match the color used on the HD which it is paired. Press Continue.

Note: There are four different color options for Electromagnetic FlowSense. This is what designates the correct style of FlowSense. (EM vs. CAN FlowSense)

The screenshot shows the 'FlowSense Row Assignment' screen. On the left, a table lists rows 1 through 9, all currently 'Not Assigned'. On the right, a list of jumpers is available for assignment. A red box highlights the bottom four options: Black Jumper, Electromagnetic; Brown Jumper, Electromagnetic; White Jumper, Electromagnetic; and Green Jumper, Electromagnetic. The 'Back' and 'Continue' buttons are at the bottom.

FlowSense Location	Jumpers & Flow Paths
Row 1	Not Assigned
Row 2	Not Assigned
Row 3	Not Assigned
Row 4	Not Assigned
Row 5	Not Assigned
Row 6	Not Assigned
Row 7	Not Assigned
Row 8	Not Assigned
Row 9	Not Assigned

Assign Jumpers & Flow Paths	
Black Jumper, Flow Path A	Black Jumper, Flow Path B
Brown Jumper, Flow Path A	Brown Jumper, Flow Path B
White Jumper, Flow Path A	White Jumper, Flow Path B
Green Jumper, Flow Path A	Green Jumper, Flow Path B
Black Jumper, Electromagnetic	Brown Jumper, Electromagnetic
White Jumper, Electromagnetic	Green Jumper, Electromagnetic

Step 3. Select the rows to assign to each Row and jumper. Press the button Row by Row to assign rows to individual locations.

The screenshot shows the 'FlowSense Row Assignment' screen after assignment. All rows 1 through 9 are now assigned to 'Black Electromagnetic'. The 'Back' and 'Continue' buttons are at the bottom.

FlowSense Location	Jumpers & Flow Paths
Row 1	Black Electromagnetic
Row 2	Black Electromagnetic
Row 3	Black Electromagnetic
Row 4	Black Electromagnetic
Row 5	Black Electromagnetic
Row 6	Black Electromagnetic
Row 7	Black Electromagnetic
Row 8	Black Electromagnetic
Row 9	Black Electromagnetic

Assign Jumpers & Flow Paths	
Black Jumper, Flow Path A	Black Jumper, Flow Path B
Brown Jumper, Flow Path A	Brown Jumper, Flow Path B
White Jumper, Flow Path A	White Jumper, Flow Path B
Green Jumper, Flow Path A	Green Jumper, Flow Path B
Black Jumper, Electromagnetic	Brown Jumper, Electromagnetic
White Jumper, Electromagnetic	Green Jumper, Electromagnetic

Step 4. Use the system schematic on the diagnose page to confirm setup matches what is physically plugged in. Any drop-down arrows that are

20|20 setup EMHD Section Control

The following steps will walk through setting up an EMHD system or a turbines removed system and assigning modules for a section control system.

All pictures are based on an example of a 16-row planter with a Nitrogen application.

The following is listed for example purposes only. Set up actual sections according to our standard section guidelines in the vApplyHD Installation Manual (955653)

Control pairs are located on rows 2, 6, 9, 12, 15.

Monitoring EM FlowSense are located on every row.

Sections are set as follows: 1-3, 4-6, 7-10, 11-13, 14-16

Equipment Product setup

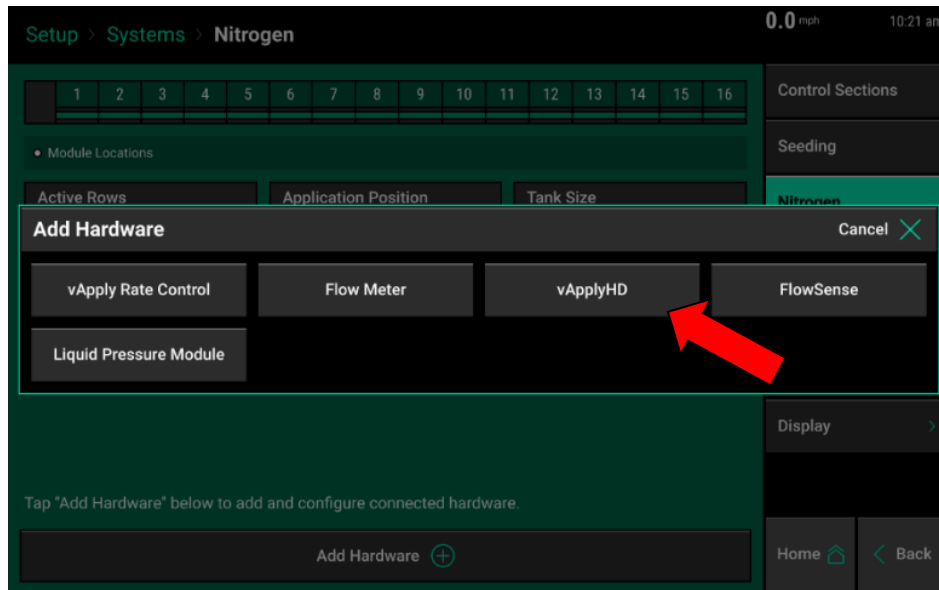
Use the Equipment Setup steps under individual control starting on page 7.

Assigning Hardware: Rate Control Module

Use the steps outlined under individual Control on page 10.

Assigning Hardware: EMHD

Step 1. Press Add Hardware and select vApplyHD from the list of hardware options.



Step 2. Select the corresponding jumper color which the EMHDs are connected.

Note: If an EMHD is plugged in with the 8-pin row drop as a flex style, it is required to select First (Black Jumper).]

Setup > Systems > Nitrogen > vApplyHD

0.0 mph9:39 am

vApplyHD Module Setup

vApplyHD Row Control Module

First (Black Jumper)

Second (Brown Jumper)

Third (White Jumper)

Fourth (Green Jumper)

None

vApplyHD Module Locations

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Select All

Clear Selection

< Back

Done ✓

Step 3. For an EMHD section system, Select the rows that have a control pair plugged in to them. Press Continue.

For this example, rows 2, 6, 9, 12, and 15 will be selected.

Setup > Systems > Nitrogen > vApplyHD

0.0 mph2:00 pm

vApplyHD Module Setup

vApplyHD Module Assignment

vApplyHD Row Control Module

First (Black Jumper)

Second (Brown Jumper)

Third (White Jumper)

Fourth (Green Jumper)

None

vApplyHD Module Locations

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Select All

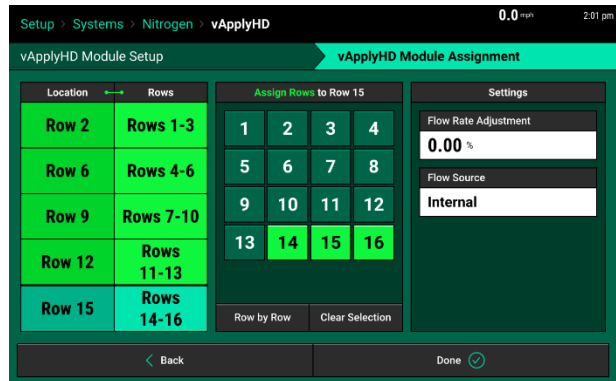
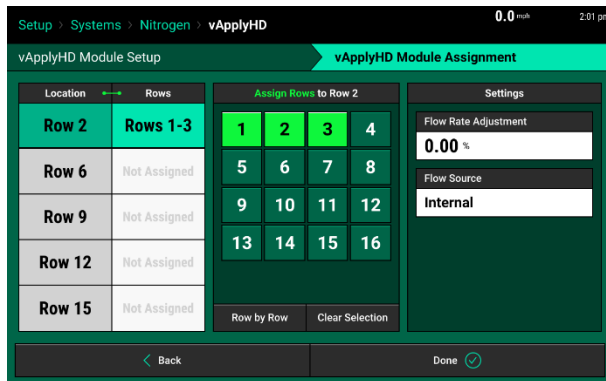
Clear Selection

< Back

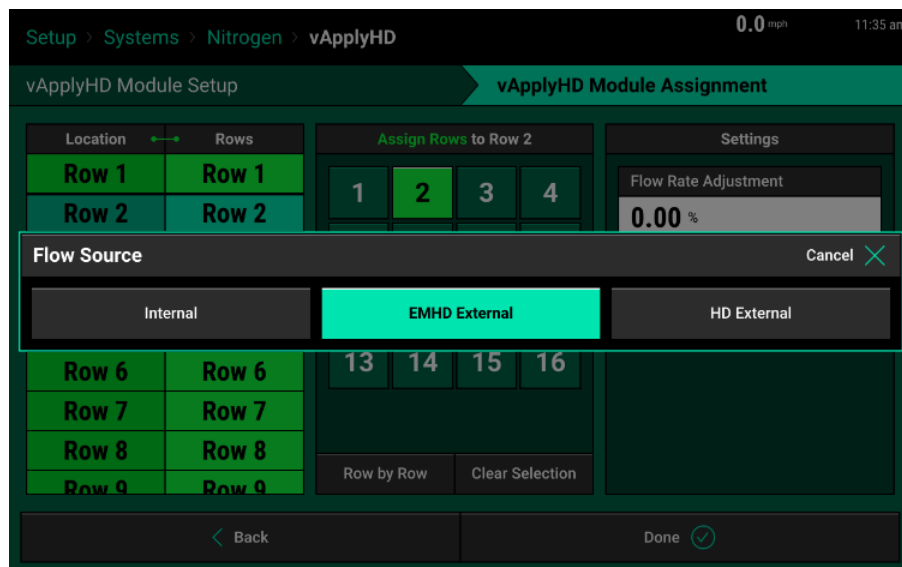
Continue >

Step 4. Select the rows which will be assigned to the control pair.

For this example, the first control pair is located on row 2 and is controlling rows 1,2, and 3.

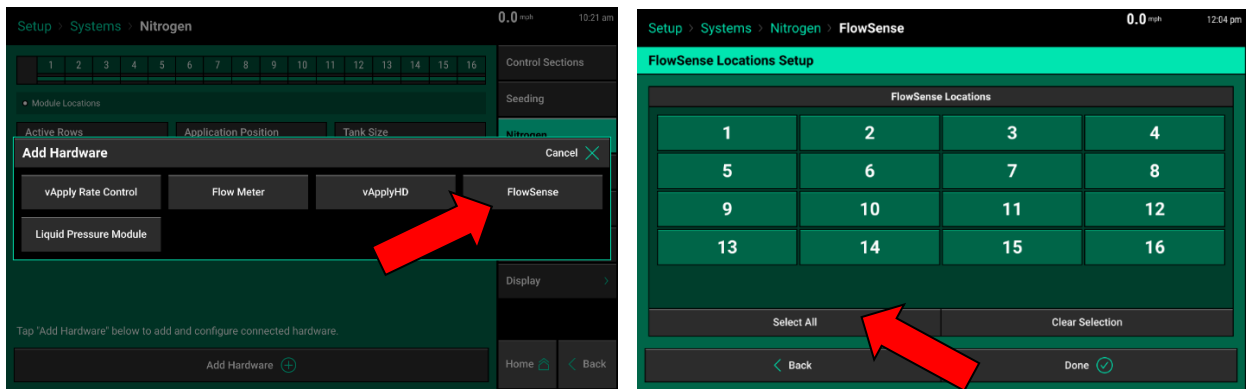


Step 5. Select the correct Flow Source for the style of HD. You must set the Flow Source for each EMHD on the assigned to the system. The three Flow Source options are explained on Page 13 under the Individual Row Control Setup instructions.



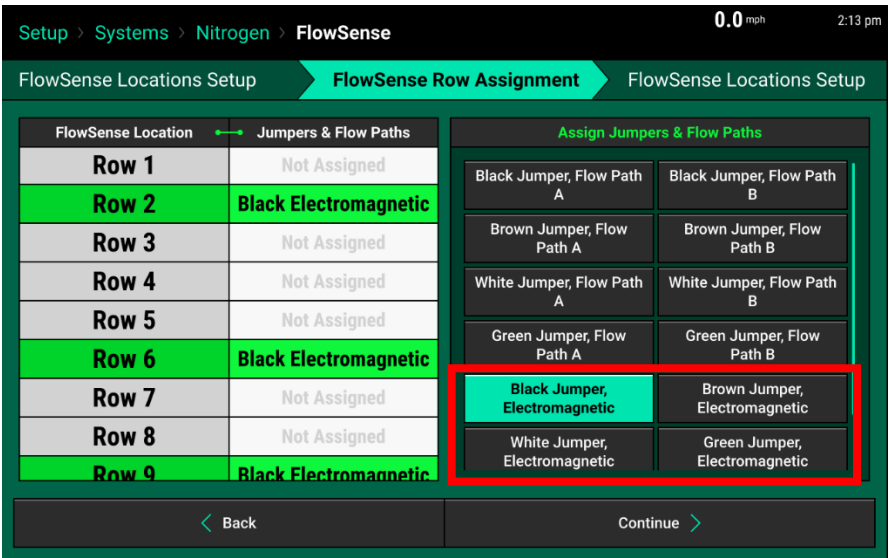
Assigning Hardware: EM FlowSense

Step 1. Press Add Hardware and select FlowSense. For a section control system, every row will have an EM Flowsense for monitoring. Select all rows for Locations Setup. Press Continue.



Step 2. Select the Corresponding color jumper plugged in to the Control Pair’s EM Flowsense for the rows which have a control pair. This jumper is required to match the jumper color plugged in to the EMHD or vApplyHD with turbines removed.

In this example rows 2,6,9,12, and 15 will have a Black Jumper, Electromagnetic assigned.



Step 3. Assign jumper color for row monitoring EM FlowSense. The EM FlowSense which are monitoring individual row flow, must be plugged in with a different color jumper other than the control pair for designation. Press Continue.

In this example, a brown jumper is used to plug in all monitoring EM FlowSense.

Note: Rows that have both a control pair and a row monitoring FlowSense will have 2 jumper colors assigned.

The screenshot shows the 'FlowSense Row Assignment' screen. At the top, there are navigation tabs: 'FlowSense Locations Setup', 'FlowSense Row Assignment' (selected), and 'FlowSense Locations Setup'. The screen displays a table of row assignments and a grid of jumper options.

FlowSense Location	Jumpers & Flow Paths
Row 1	Brown Electromagnetic
Row 2	Black Electromagnetic, Brown Electromagnetic
Row 3	Brown Electromagnetic
Row 4	Brown Electromagnetic
Row 5	Brown Electromagnetic
Row 6	Black Electromagnetic, Brown Electromagnetic
Row 7	Brown Electromagnetic
Row 8	Brown Electromagnetic
Row 9	Black Electromagnetic, Brown

Assign Jumpers & Flow Paths	
Black Jumper, Flow Path A	Black Jumper, Flow Path B
Brown Jumper, Flow Path A	Brown Jumper, Flow Path B
White Jumper, Flow Path A	White Jumper, Flow Path B
Green Jumper, Flow Path A	Green Jumper, Flow Path B
Black Jumper, Electromagnetic	Brown Jumper, Electromagnetic
White Jumper, Electromagnetic	Green Jumper, Electromagnetic

At the bottom, there are two buttons: 'Back' and 'Continue'.

Step 4. Assign the rows being monitored for each EM FlowSense. For the monitoring rows, you will select only the row that it is monitoring. For the EM FlowSense on the Control Pair, assign all rows being controlled in the section. Press done.

In this example, the first location is a Brown Electromagnetic. The brown jumpers are being used on monitoring EM FlowSense. Only row 1 is assigned to that jumper. Row 2 black jumper is the EM FlowSense monitoring section flow and has all rows in the section assigned to it.

Setup > Systems > Nitrogen > FlowSense

0.0 mph2:20 pm

FlowSense Locations Setup

FlowSense Row Assignment

FlowSense Locations Setup

Location	Rows
Row 1 Brown Electromagnetic	Row 1
Row 2 Black Electromagnetic	Rows 1-3
Row 2 Brown Electromagnetic	Not Assigned
Row 3 Brown Electromagnetic	Not Assigned
Row 4 Brown Electromagnetic	Not Assigned
Row 5 Brown Electromagnetic	Not Assigned
Row 6 Black Electromagnetic	Not Assigned
Row 6 Brown Electromagnetic	Not Assigned
Row 7 Brown Electromagnetic	Not Assigned

Assign Rows to Row 2 Black Electromagnetic

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Row by Row

Clear Selection

Settings

Flow Rate Adjustment

0.00 %

Reference Value

0.0

Back

Done

Setup > Systems > Nitrogen > FlowSense

0.0 mph2:20 pm

FlowSense Locations Setup

FlowSense Row Assignment

FlowSense Locations Setup

Location	Rows
Row 1 Brown Electromagnetic	Row 1
Row 2 Black Electromagnetic	Rows 1-3
Row 2 Brown Electromagnetic	Row 2
Row 3 Brown Electromagnetic	Row 3
Row 4 Brown Electromagnetic	Row 4
Row 5 Brown Electromagnetic	Row 5
Row 6 Black Electromagnetic	Rows 4-6
Row 6 Brown Electromagnetic	Row 6
Row 7 Brown Electromagnetic	Row 7

Assign Rows to Row 7 Brown Electromagnetic

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Row by Row

Clear Selection

Settings

Flow Rate Adjustment

0.00 %

Reference Value

0.0

Back

Done

Above picture shows completed rows assignments

Understanding the EMHD Diagnose Page

This Section will outline the different sections of the diagnose page when running EMHD systems.

The vApply Rate Control page has not changed from a standard turbine style vApply HD system. Please refer to the liquid Operator's guide for details on the rate control diagnose page.

EMHD Diagnose Page

The following picture is an example of an EMHD system setup as a section control system with EMHD Control Pairs on rows 2,6,9,11, and 14.

Row	Flow (gal/min)	Flow Command (gal/min)	Encoder Low-Total (counts/sec)	Ball Position (°)	Pressure (psi)	Pressure Stability	Supply (Volts)
2	0.00	0.85	0-0	31	0	0%	12.4
6	0.00	0.85	0-0	47	0	0%	12.4
9	0.00	1.14	0-0	50	0	0%	12.4
11	0.00	0.85	0-0	46	0	0%	12.5
14	0.00	0.85	0-0	50	0	0%	12.5

8.0 mph 53° 3:14 pm

Setup > Diagnose > Starter > vApplyHD

Reset Modules ↻

Health Checks +

SRM

vApply Rate Control

vApplyHD

FlowSense

Home < Back

Lift State Lowered

Radar Speed 8.0 mph

GPS Speed Waiting Comm

FWD Accel 0.000 ft/s/s

Master Plant On

Turn Rate 0.00 deg/s

Row- Designates the row number the Control Pair which it is assigned and connected.

Flow(gal/min)- Will always show 0 GPM because EMHD and turbines removed modules are not reporting flow.

Flow Command (gal/min)- Commanded GPM flow based on target rate enter, traveling speed, and section swath width.

Encoder Low-Total (counts/sec)- Will always show 0-0 on EMHD and turbines removed style vApply HD.

Ball Position- Indicates position of ball valve inside EMHD.

Note: for EMHD -5 is fully closed, 150 is wide open. There is no “check point” between closed and open. If the system is not hitting target GPM, the valve will continue to open until the Control Pair hits target GPM or is wide open.

Note: for turbines removed vApply HD, -5 is closed and 75 is wide open. There will be no more L designation for a low flow turbine.

Pressure (psi)- For EMHD, this will always show 0 as there is no pressure sensor inside the EMHD. For Turbines removed vApplyHD, this will still show pressure monitored at the module.

Pressure Stability- For EMHD, this will always show 0%. For turbines removed style vApplyHD, this will still show a %.

Supply Volts- The voltage that is supplied to the EMHD or Turbines Removed vApplyHD module.

EM FlowSense Diagnose Page

The following Picture shows an example of EM FlowSense installed on every row of a 16 row planter.

Setup > Diagnose > Starter > FlowSense						0.0 mph	4:31 pm
Row	Flow (gal/min)	Sensor Type	Sensor Value (counts/sec)	Reference Value	Supply (Volts)	Reset Modules	
1	0.00	Electromagnetic		9.6	12.3	Zero EM FlowSense	
2	0.00	Electromagnetic		7.8	12.3	SRM	
3	0.00	Electromagnetic		-1.4	12.3	vApply Rate Control	
4	0.00	Electromagnetic		7.6	12.3	vApplyHD	
5	0.00	Electromagnetic		7.5	12.0	FlowSense	
6	0.00	Electromagnetic		-7.0	12.3		
7	0.04	Electromagnetic		21.3	12.4		
8	0.00	Electromagnetic		-1.6	12.3		
9	0.00	Electromagnetic		-5.7	12.3		
10	0.00	Electromagnetic		10.6	12.3		
11	0.00	Electromagnetic		5.4	12.4		
12	0.00	Electromagnetic		6.9	12.4		
Lift State Lowered						Home	< Back
Radar Speed Wait Signal							
GPS Speed Waiting Comm							
FWD Accel 0.000 ft/s/s							
Master Plant Off							
Turn Rate 0.00 deg/s							

Row- Designates the row an EM FlowSense is plugged in to.

Flow (gal/min)- This shows the actual flow being reported by the EM FlowSense whether it is monitoring only or is paired with an EMHD.

Sensor Type- Indicates the type of FlowSense that has been assigned to that row and that it is communicating on the CANBUS.

Sensor Value (counts/sec)- This will stay blank as there is no turbine sensor input on the EM FlowSense.

Reference Value- This shows the microvolt reading from the sensor inside the EM FlowSense module. With the cavity inside the EM FlowSense full and with zero flow, this number should be within 30 from 0. While product is flowing through the EM FlowSense, this number will rise. Once again, on a healthy system, flow rates should be within 30 points of each other. This is also assuming the swath width each module is monitoring for is the same.

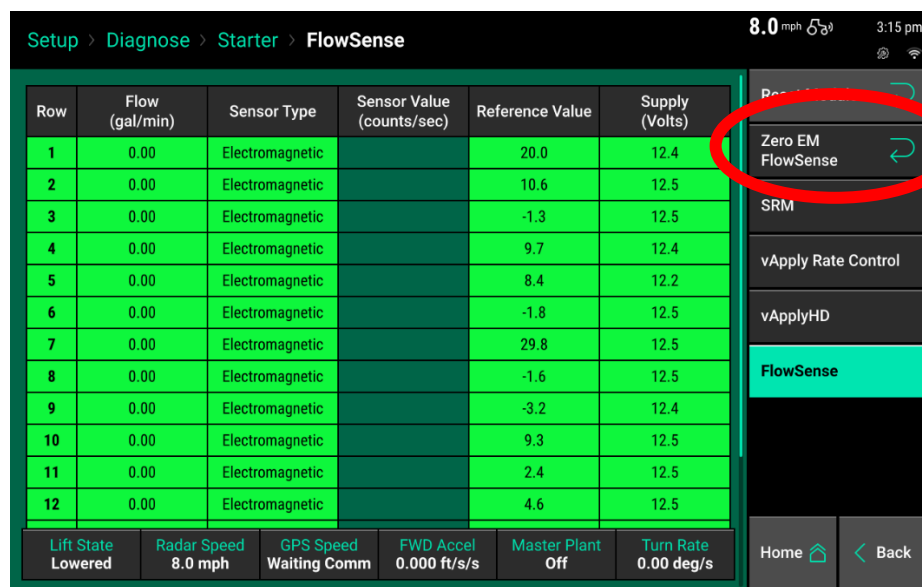
Operational Processes

Listed below are the steps that should be taken specific to EMHD, EMFS, and Turbines Removed systems in order to operate a healthy liquid system.

1. Pump selection, system install, bypass setting, pump calibration, and orifice sizing will all be the same unless described different specifically in this document. Use the resources listed below for detailed steps for each of these processes.

2. Zeroing EM FlowSense-

- a. Each EM FlowSense must be zeroed before being used in a pump calibration or any in-field application.
- b. Press the Zero EM FlowSense button on the FlowSense Diagnose page. This will zero every EM FlowSense assigned to the selected Liquid system whether it is a RxR system or Section Controlled.



Row	Flow (gal/min)	Sensor Type	Sensor Value (counts/sec)	Reference Value	Supply (Volts)
1	0.00	Electromagnetic		20.0	12.4
2	0.00	Electromagnetic		10.6	12.5
3	0.00	Electromagnetic		-1.3	12.5
4	0.00	Electromagnetic		9.7	12.4
5	0.00	Electromagnetic		8.4	12.2
6	0.00	Electromagnetic		-1.8	12.5
7	0.00	Electromagnetic		29.8	12.5
8	0.00	Electromagnetic		-1.6	12.5
9	0.00	Electromagnetic		-3.2	12.4
10	0.00	Electromagnetic		9.3	12.5
11	0.00	Electromagnetic		2.4	12.5
12	0.00	Electromagnetic		4.6	12.5

FlowSense Diagnose page controls:

- Buttons: SRM, vApply Rate Control, vApplyHD, FlowSense (highlighted), Home, Back
- Bottom status bar: Lift State Lowered, Radar Speed 8.0 mph, GPS Speed Waiting Comm, FWD Accel 0.000 ft/s/s, Master Plant Off, Turn Rate 0.00 deg/s

- c. In order to perform a Zero EM FlowSense, there must be product inside the EM FlowSense module, and it must not be flowing.
 - i. Use the information lined out on page 7 of this document under *EM FlowSense Monitoring only Requirements*.

Note: A popup window will appear once the Zero EM FlowSense button is pushed outlining the requirements needed before zeroing.

- d. This process will true-up the reference value to a zero-flow reading.

