



396-3790Y1

QuickStart setup instructions for Raven RCM and SureFire harness for NH3 Profile with Liquid

Harness 213-00-3816Y1 and possibly others

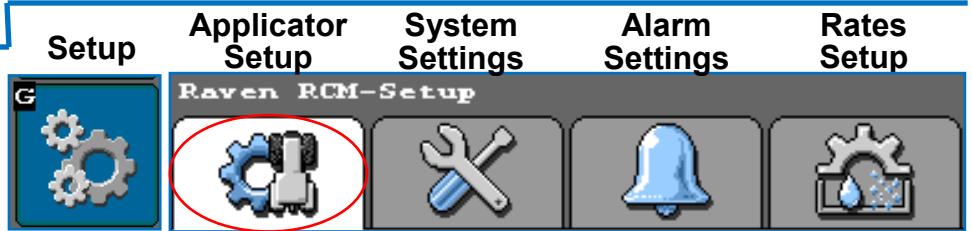


Below are typical SureFire System setup screens for NH3 plus Liquid. *Your setup may vary.*

Read the [Raven RCM Operation Manual](#) for safety information and additional setup/operating information.

NH3 is a very dangerous product. It can kill you or blind you or worse. If you have not taken an approved NH3 Safety Class, do not work around it. If you have had the course, follow ALL safety precautions ALL the time.

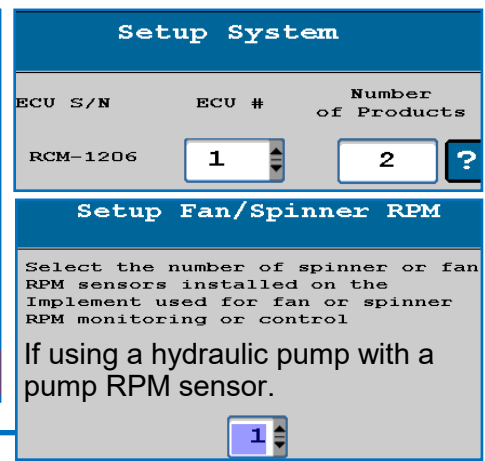
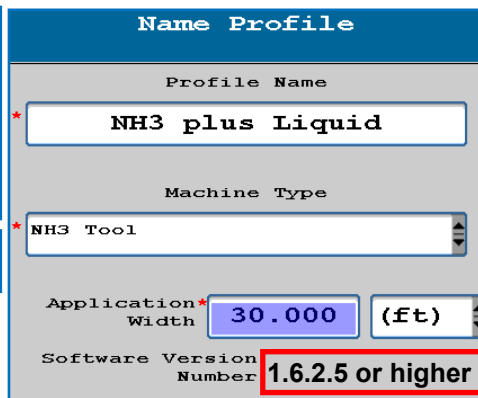
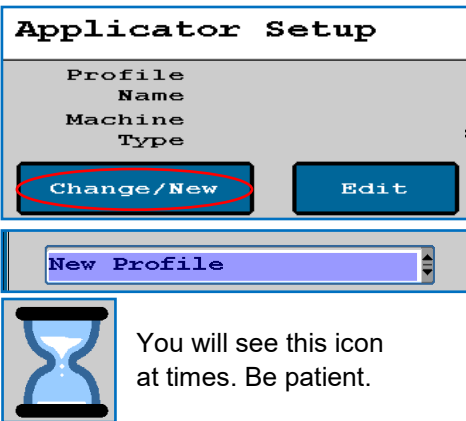
1. Navigate to the Setup Wizard



2. Start a New Profile.

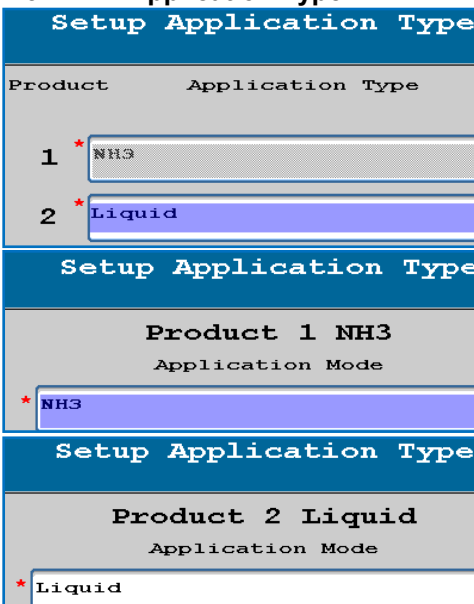
3. Enter a Profile Name. Machine Type > NH3 Tool

4. Number of Products = 2



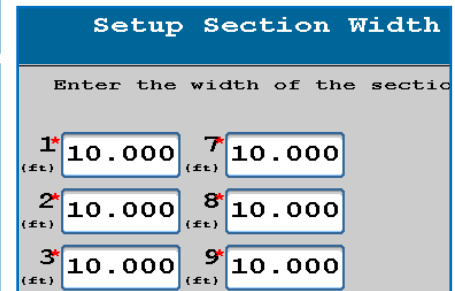
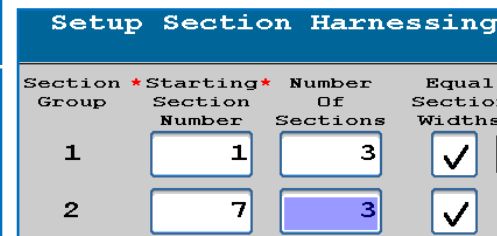
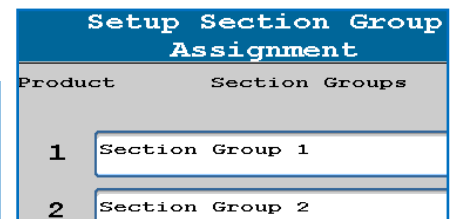
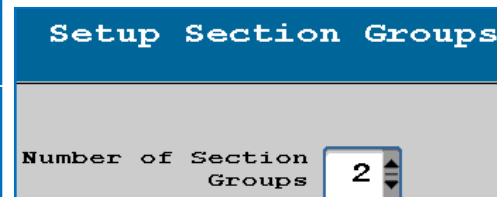
You will see this icon at times. Be patient.

5. Select Application Type.



6. Set up Section Groups (example shows 3 sections for NH3 and liquid).

Sections 1-6 are reserved for NH3. Liquid will start with Section Driver 7.



QuickStart setup instructions for Raven RCM and SureFire NH3

Use with SureFire adapter harness: 213-00-3816Y1 NH3 Profile plus Liquid

7. Set up **Pressure Sensors**. Sensors 1 & 2 are reserved for NH3. Sensor 3 will be for Liquid. The example shows 1 sensor for NH3 and 1 for Liquid.

Setup Pressure Sensors

Pressure Sensor 1	Custom
Pressure Sensor 2	None
Pressure Sensor 3	Custom

Choose **“Custom”** for SureFire pressure sensors.

Normally, do not set any Pressure Alarms. Pressure Alarms become control limits on a liquid system.

Setup Pressure Assignment

Pressure Sensor 3

Product 1

Product 2

Setup Pressure Alarms

	Min	Max	Alarm
Pressure 1 (PSI)	0	0	<input type="checkbox"/>
Pressure 2 (PSI)	0	0	<input type="checkbox"/>
Pressure 3 (PSI)	0	0	<input type="checkbox"/>
Pressure 4 (PSI)	0	0	<input type="checkbox"/>

8. Set up **Fan/Spinner RPM**.

Use this if running a liquid hydraulic pump with an RPM sensor.

Setup Fan/Spinner RPM Calibration

RPM 1 Calibration (Pulse/Revolution)	15	Alarm
RPM 1 Low Limit (RPM)	0	<input type="checkbox"/>
RPM 1 High Limit (RPM)	500	<input type="checkbox"/>

Set RPM if using a hydraulic pump with a pump RPM sensor for the liquid product.

In this setup that would be Product 2.

Setup RPM Sensor Assignment

RPM Sensor 1

Product 1

Product 2

9. Set up **Control Valve, Rate Sensor, Tank, and Rates for Product 1—NH3**

Setup Control Valve

Product 1 NH3

Control Valve Type: AccuFlow Dual Valve

Valve Response Rate (1-100): 50

Control Deadband (%): 3

Valve Delay (Seconds): 0.0

Valve Advance (Seconds): 0.0

Control Effort (%): 35

Setup Tank/Bin

Product 1 NH3

OPTIONAL: Use as desired.

Tank Capacity (lb N): 0

Current Tank Level (%): 0

Setup Alarms

Product 1 NH3

Off Rate Alarm (% off target rate): 20

Section Valve Status Feedback Alarm:

Set **Off Rate Alarm** as desired.

Setup Rate Sensor

Product 1 NH3

Flowmeter* Calibration: 340

Use 340 when using flowmeter that is 144 pls/gal. Verify in field.

Flowmeter calibration units are (Pulses/10lbs of Actual N) for NH3 applications.

Setup Rates

Product 1 NH3

	Rate 1	Rate 2	Rate 3
Preset Rate Values (Lbs N/Ac)	125	0	0
Rate Bump (Lbs N/Ac)	0		
Rate Selection	Predefined or Rx		
Display Smoothing	<input checked="" type="checkbox"/>		

Must enter at least 1 rate.

Check **Display Smoothing**.



QuickStart setup instructions for Raven RCM and SureFire NH3

Use with SureFire adapter harness: 213-00-3816Y1 NH3 Profile plus Liquid

10. **Control Valve Setup**—Start with these numbers. Adjust as needed in the field.

Valve Response Rate: For software 1.4 or higher (Adjust as needed in field)

- PumpRight (hydraulic) **1**
- Tower (electric) **20**
- Catalyst and Spartan **5**

Control Deadband: Start at 2

If pump is slow responding to rate or speed changes, increase **Valve Response Rate**. If product oscillates around rate going across the field, reduce **Valve Response Rate**.

Electric Pumps will NOT use **Advanced Tuning** with software 1.4 or higher.

Low Limit (Adjust in field as needed)

- PumpRight (hydraulic) 25
- Tower (electric) 8
- Catalyst and Spartan 5

PWM Startup (Adjust in field as needed)

- PumpRight (hydraulic) 40
- Tower (electric) 20
- Catalyst and Spartan 5-10

Setup PWM

Product 2 Liquid

Coil Frequency (Hz)

PWM High Limit (%)

PWM Low Limit (%)

PWM Startup (%)

Fine-tune PWM Low Limit at Diagnostics > Tests > Calibrate PWM Limits

Setup Control Valve

Product 2 Liquid

Control Valve Type

Valve Response Rate (1-100)

Control Deadband (%)

11. Enter appropriate Flowmeter Cal

Setup Rate Sensor

Product 2 Liquid

Flowmeter Calibration

Flowmeter Pulse/Units

Flowmeter Size (GPM)	Pulses/Gal	Spartan model #	Puls/fl oz
0.08-1.6	22710	#	
0.13-2.6	3000		
0.3-5.0	3000	115	1700
0.6-13	2000	125	890
1.3-26	2000	135	450
2.6-53	2000	145	220

SureFire Electromagnetic Flowmeters. Verify pls/gal on Serial Number label.

13. Set Rates as desired.

You must enter at least one rate.

Check **Display Smoothing**

Set the **Decimal Shift** box at 1.

Set **Decimal Shift** at 2 for rates such as 0.25 gal/ac.

12(a). Tank and Fill Flowmeter set-

Setup Tank/Bin

Product 2 Liquid

Tank Capacity (gal)

Current Tank Level (gal)

OPTIONAL: Use as desired

Low Tank Level (gal) Alarm?

Tank Fill Monitor

Check **Tank Fill Monitor** box if using a fill flowmeter.

12(b). Fill Flowmeter Cal setup

Setup Tank Fill

Product 1 Liquid

Tank Fill Flowmeter Calibration

Tank Fill Flowmeter Pulse/Units

Then enter **Tank Fill Flowmeter Calibration**

SFA 3" Fill Flowmeter 130

SFA 2" Fill Flowmeter 300

(Units are 10 gal on SureFire Tank Fill flowmeters.)

14. Set **Off-Rate Alarm** as desired.

Setup Rates

Product 2 Liquid

Preset Rate Values (gal/ac)

Rate Bump (gal/ac)

Rate Selection

Display Smoothing

Decimal Shift

Setup Alarms

Product 2 Liquid

Off Rate Alarm (% off target rate) Alarm?

? Click on the Question Mark for helpful information.

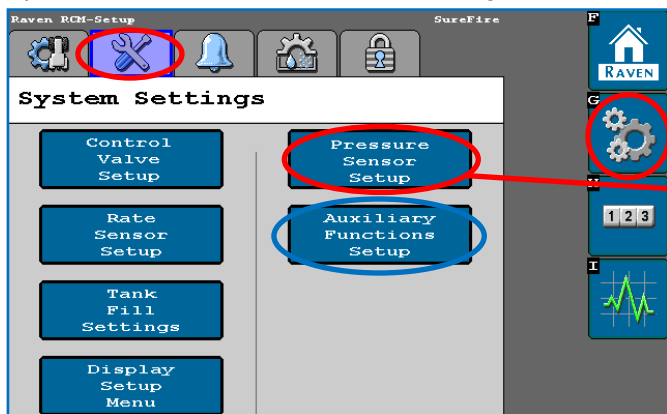
Read the [Raven RCM Operation Manual](#) for safety information and additional setup/operating information.



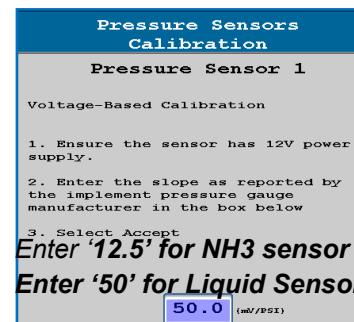
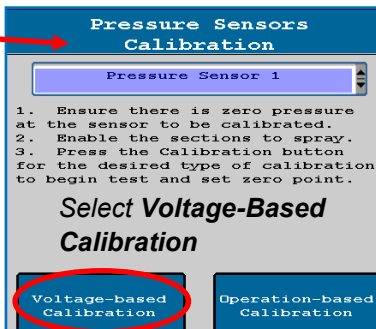
QuickStart setup instructions for Raven RCM and SureFire NH3

Use with SureFire adapter harness: 213-00-3816Y1 NH3 Profile plus Liquid

15. **Pressure Sensors** must be calibrated. See the boxes below for the procedure. *If you have 2 sensors, both must be calibrated. Be sure there is no pressure against the sensor when calibrating. Unplug the sensor during the calibration process. More on Pressure Sensor Diagnostics later.*



SureFire recommends putting the Pressure Sensor reading in your **Display Settings** on the Run Screen (see next page). For complete information on how the sensor is operating, go to **Diagnostics > System Information > Pressure Sensors**. 0 Pressure Voltage should be 0.00 V.



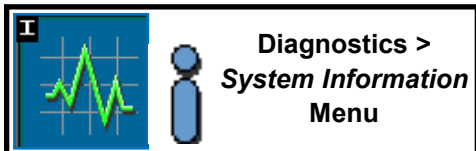
If you are using SureFire pressure sensors: *CUSTOM*

Pressure Sensor 1 (and 2 if using 2 NH3 sensors) is 0-5 v, 0-400 PSI, with 12.5 mv/PSI.

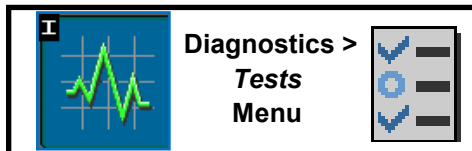
Pressure Sensor 3 is for the Liquid product and is a 0-5 v, 0-100 PSI sensor, with 50 mv/PSI.

Read the [Raven RCM Operation Manual](#) for safety information and additional setup/operating information.

DIAGNOSTICS > SYSTEM INFORMATION and DIAGNOSTICS > TESTS



- Hardware / Software
- Switchbox
- Delivery System
- Section Status
- System Voltages
- Working Parameters
- Switches / Status
- Pressure Sensors
- Bin Level Sensors
- RPM Sensors
- Tank Fill Monitor



- For NH3
- Control Valve Test
 - Energize System
 - Bleed System Test
- For Liquid
- Nozzle Flow Check
 - Rinse Cycle
 - Control / Section Test
 - Calibrate PWM Limits

Go here for important system information and to run system tests.



System Summary



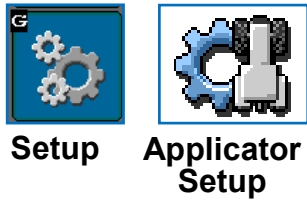
Product Summary



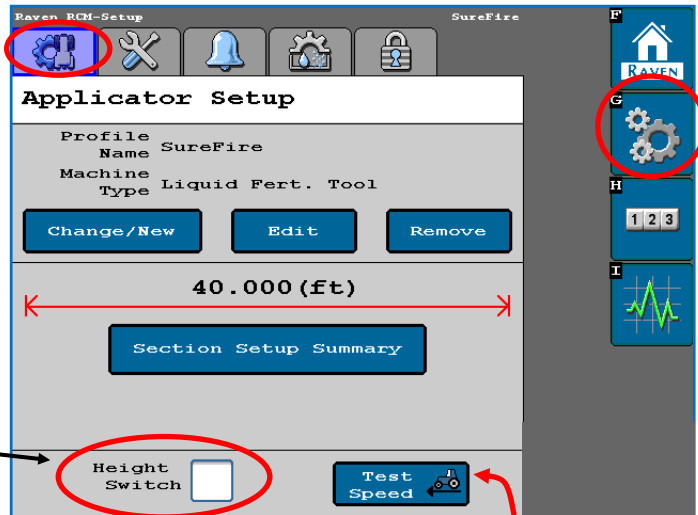
ANHYDROUS AMMONIA IS AN INHALATION HAZARD AND WILL CAUSE SERIOUS INJURY OR DEATH. PLEASE USE EXTREME CAUTION WHEN HANDLING IT OR PERFORMING ANY MAINTENANCE ON EQUIPMENT USED FOR ANHYDROUS AMMONIA.

QuickStart setup instructions for Raven RCM and SureFire NH3

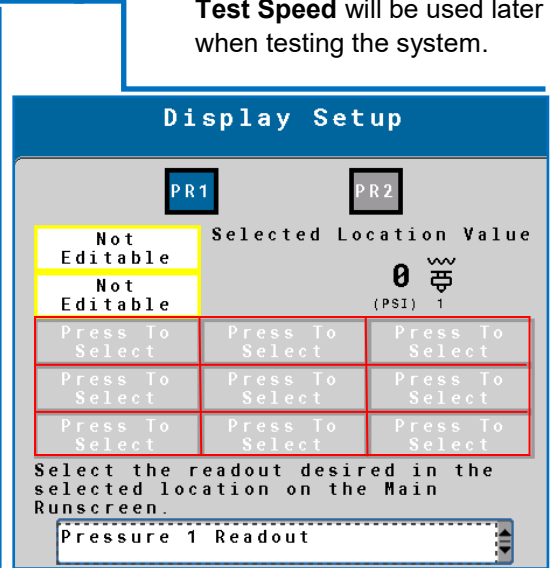
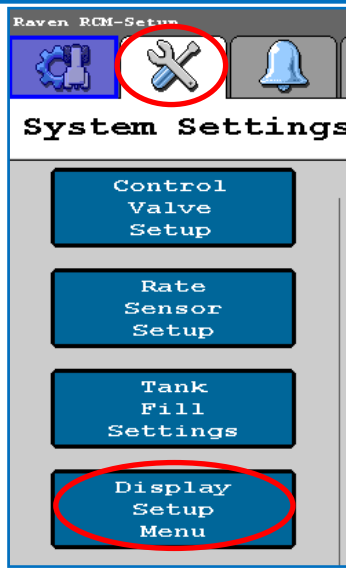
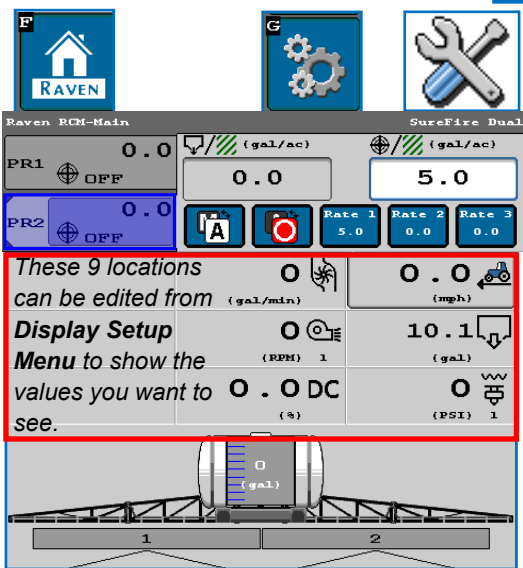
Implement Height Indicator Setup



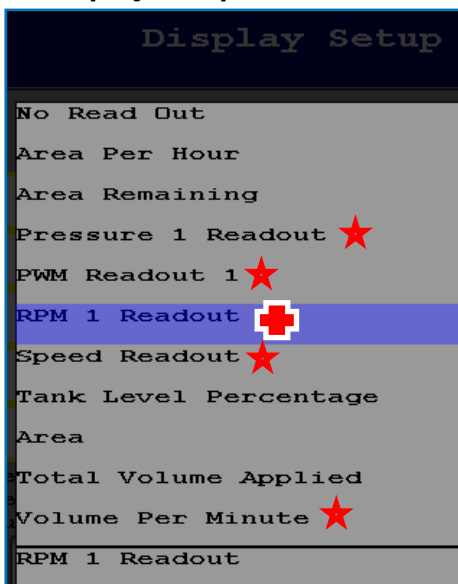
Check the **Height Switch** box if you are using a Mercury Switch or Finger Style Switch for Implement Height Indication.



Run Screen Display Setup



Display Setup Menu



Control Valve Setup Menu

- Valve Response Rate
- Control Deadband
- PWM Setup (Coil Frequency, High Limit, Low Limit, PWM Standby)

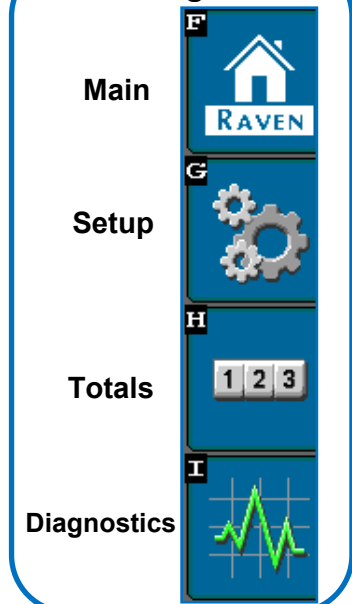
Auxiliary Features Setup Menu

- RPM Calibration Pulse/Rev
- RPM Low Limit
- RPM High Limit
- RPM Sensor Assignment

★ Recommended for all Liquid systems

⊕ Recommended for hydraulic pump systems with Pump RPM sensor

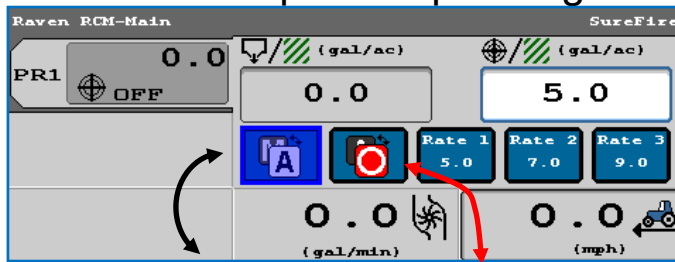
Navigation



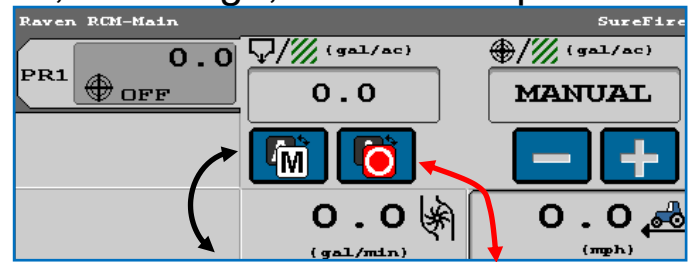
Read the [Raven RCM Operation Manual](#) for safety information and additional setup/operating information.



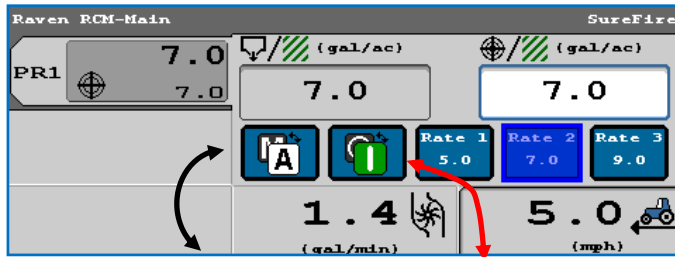
Advanced Setup and Operating Information, Run Page, Initial Startup



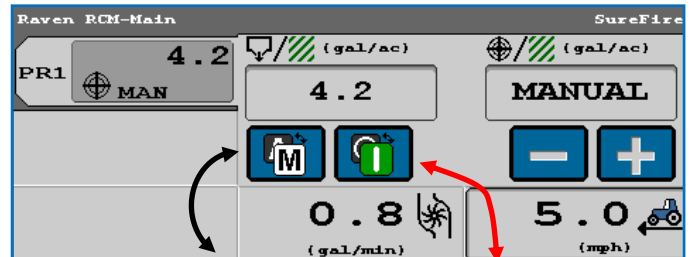
AUTO MODE / DISABLED



MANUAL MODE / DISABLED



AUTO MODE / ENABLED



MANUAL MODE / ENABLED

CRITICAL

Solution Pump Dry

Product 2 Liquid

The solution pump is dry. Turn pump off immediately!

If flow or pressure is not immediately detected, the **Solution Pump Dry** warning will come up and the system will shut down.

Solution Pump Dry is NOT a problem for SureFire electric pumps or for SureFire PumpRight hydraulic diaphragm pumps. It is a problem for centrifugal pumps.

18. LIQUID Product Initial Operation in MANUAL mode: (See Optional Manual Pump Operation below)

1. Fill the system with water. For first time startup, open air bleed valve until a steady stream comes out.
2. Enter a **Test Speed** by pressing on the **Speed (mph)** window or at **Setup > Applicator Setup**.
3. Navigate to **MANUAL MODE** as shown above (toggle between Auto and Manual with the Auto/Manual button).
4. **ENABLE** system (toggle between Enable / Disable with the Enable / Disable button).
5. Height switch must be **DOWN** (or uncheck Height Switch box).
6. Turn on **Master Switch**. Press and hold + to increase flow.
7. Monitor Flow (gal/min), PSI, DC, Pump RPM (if using Hydraulic pump with RPM sensor).
8. Go to **Switch Box**. Turn Sections OFF and ON.
9. Turn Master Switch OFF.



OPTIONAL MANUAL PUMP OPERATION:

Go to **Diagnostics > Tests > Calibrate PWM LIMITS**. Here you can manually run the pump without the system shutting down if it doesn't read flow immediately. Turn on Master Switch, Start the test, hold + button to increase pump speed.

19. LIQUID Product Initial Operation in AUTO mode: (Could also do Nozzle Flow Check).

1. Enter a **Test Speed** by pressing on the **Speed (mph)** window or at **Setup > Applicator Setup**.
2. Toggle system to **AUTO / ENABLED**. Select a Rate.
3. Height switch must be **DOWN** (or uncheck Height Switch box).
4. Turn on **Master Switch**.
5. Monitor Actual Rate (gal/ac), Flow (gal/min), PSI, DC, Pump RPM.
6. Go to **Switch Box** (above). Turn Sections OFF and ON.
7. Turn Master Switch OFF. (NOTE: Pressure will be much less with water than with heavier, thicker fertilizer.)

Read the [Raven RCM Operator's Manual](#) for safety information and additional setup/operating information.



WARNING

Running these tests may release NH3 into the air. Be sure that is what you want to do and that it is safe to do so. Know the wind direction. Follow all safety precautions. Every time.

20. NH3 Initial Operation: FOLLOW ALL SAFETY PRECAUTIONS BEFORE TURNING ON ANHYDROUS AMMONIA

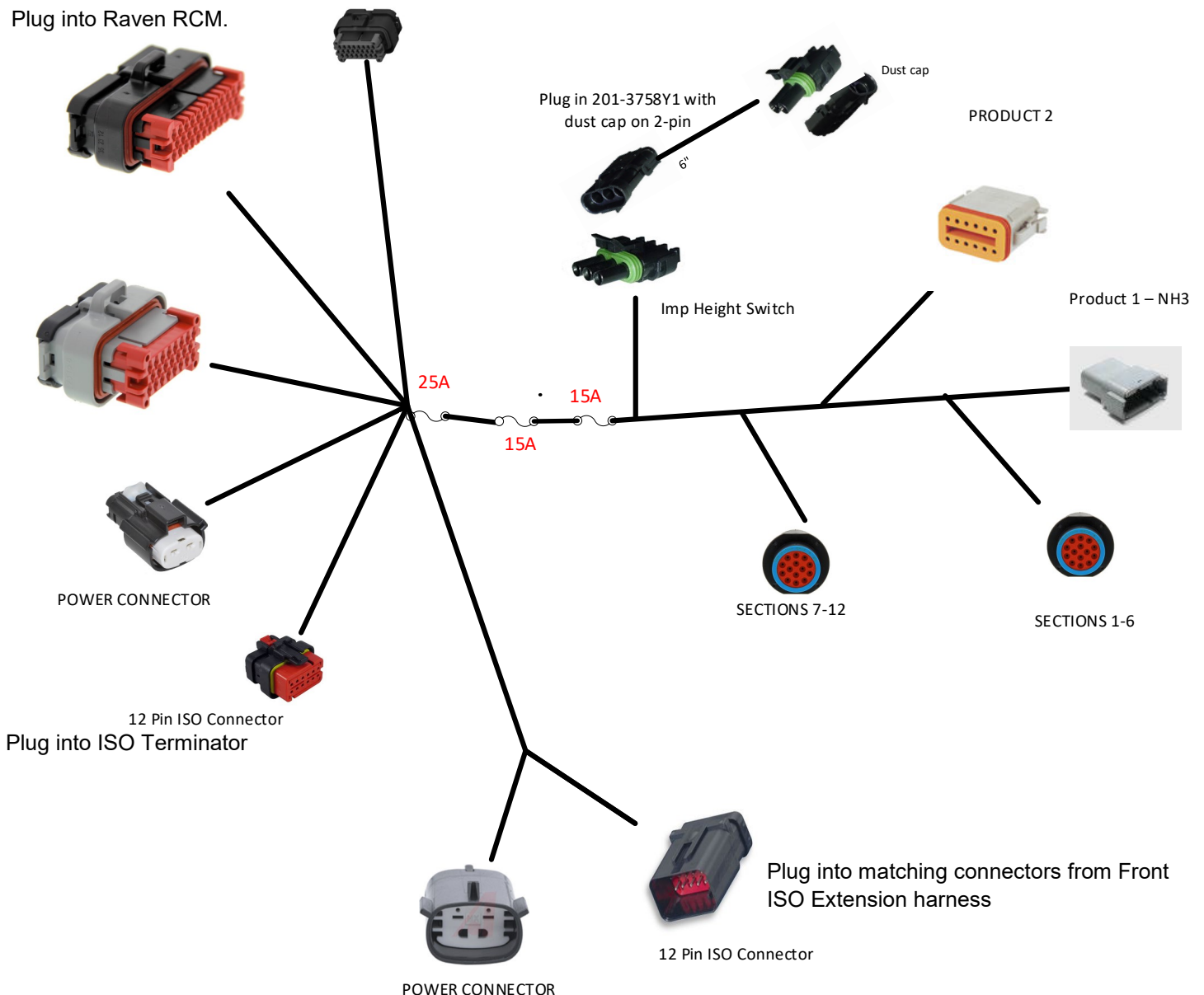
DIAGNOSTICS > TESTS for NH3 Product 1

1. **Before opening nurse tank valve**, check the operation of the control valve: **Diagnostics > Tests > Product 1 > Control Valve Test**. Be sure the control valve is moving in the correct direction.
2. **Before opening nurse tank valve**, run **Energize System Test** to check the operation of the valves.
3. When safe to do so, slowly open the nurse tank valve. Running Energize System test will allow anhydrous ammonia to escape. Be sure it is safe and wind is in the right direction before running this test. Read all safety precautions before starting this test.
4. **Bleed System Test** will open the valves to empty the system. Close the nurse tank valve before running this.
5. Monitor amount applied with first tank or two and check the amount shown on the display against the weigh ticket for the tank. Adjust flowmeter calibration as needed.

Middle 23-pin

213-00-3816Y1 for NH3 and one Liquid/Dry Product

Plug into Raven RCM.



Typical Harness Layout for NH3 with one Liquid

(Your system may be different.)

