396-3786Y1

QuickStart setup instructions for Raven RCM and SureFire harness for 1 Liquid Product

213-00-3417Y4

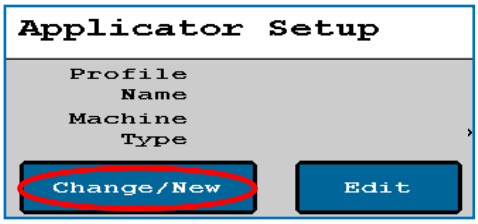
Below are typical SureFire Liquid Fertilizer System setup screens. ***Your setup may vary. Not all screens are shown.***

Read the Raven RCM Operation Manual for safety information and additional setup/operating information.

1. Navigate to the **Setup Wizard**.

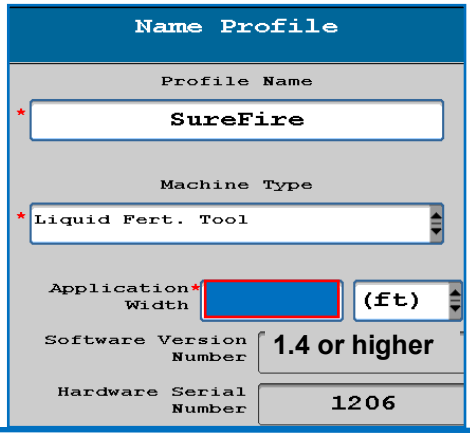
For the initial setup, start a new profile. The Raven RCM allows you to store 8 profiles. Be prepared to wait during this phase of the setup process.

2. Enter a **Profile Name.**

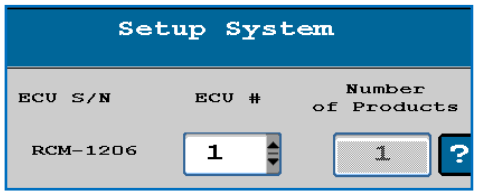


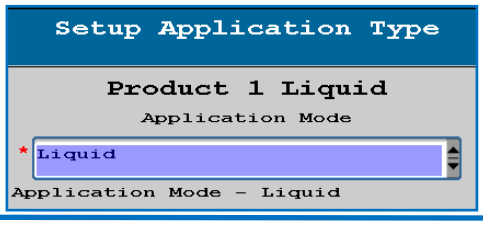
You will see this icon at times. Be patient.

3. **Machine Type > Liquid Fert Tool**

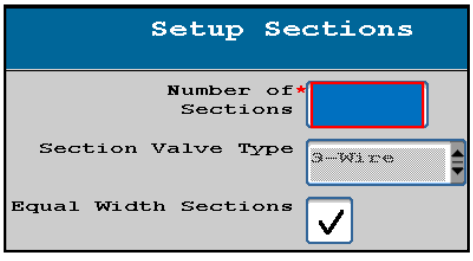


4. **Select Application Mode > Liquid**

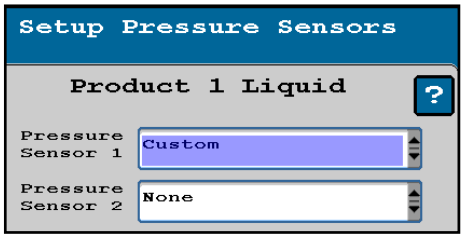


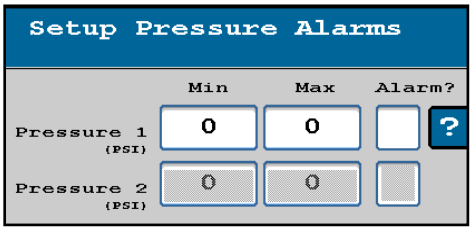


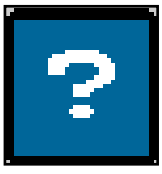
5. Set up Sections as appropriate. Verify widths.



6. The SureFire pressure sensor will be set up as a **Custom** sensor. Calibration will be done later.







Many setup screens have this "?".

This will take you to a Help Screen with valuable information.

	Min	Max	Alarm
Tower-Electric	***0***	***0***	
PumpRight (Hyd)	***0***	***85***	***X***

The PumpRight has a built-in Pressure Relief Valve (PRV) at 100 PSI. Setting the Max Pressure at 85 or 90 may reduce excessive PRV activation. The system normally should not need to operate above 85 or 90 PSI.

NOTICE

Operator should read the full manual before operating the system.

QuickStart setup instructions for Raven RCM and SureFire: 1 Liquid Product

8. Control Valve Setup *(start with the numbers indicated for your system)*

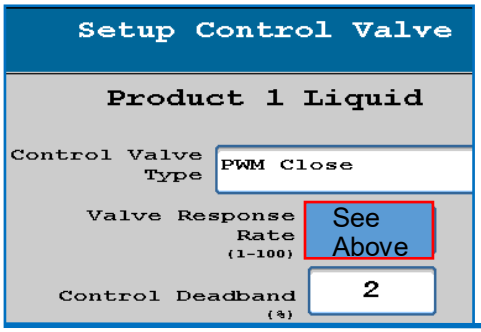
Valve Response Rate: For software 1.4 or higher *(Adjust as needed in field)*

PumpRight (hydraulic)	~~80~~	**1**
Tower (electric)	~~100~~	**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.**

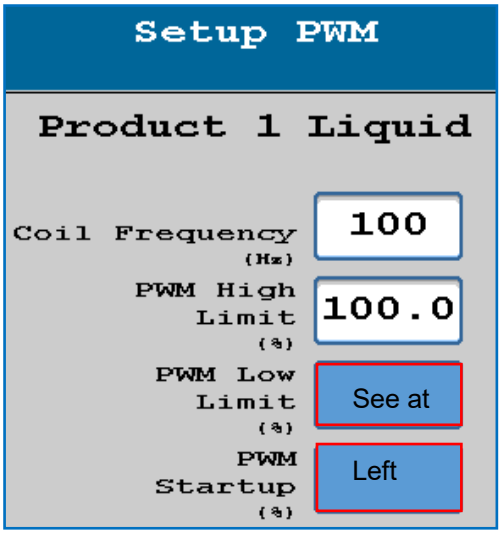


Low Limit (*Adjust in field as needed*)

PumpRight (hydraulic)	25
Tower (electric)	10
Catalyst and Spartan	5

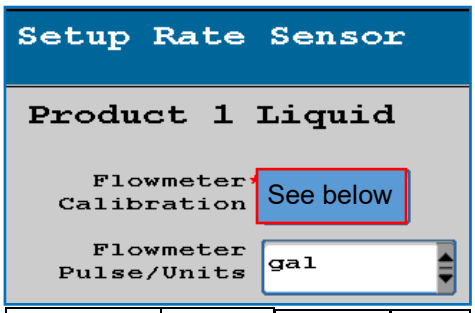
PWM Startup *(Adjust in field as needed)*

PumpRight (hydraulic)	40
Tower (electric)	30
Catalyst and Spartan	10



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

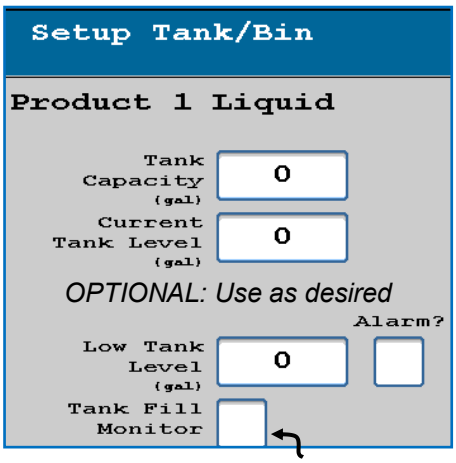
9. Enter appropriate Flowmeter Cal.



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	*110*	*1760*
0.6-13	2000	*120*	*880*
1.3-26	2000	*130*	*440*
2.6-53	2000	*140*	*220*

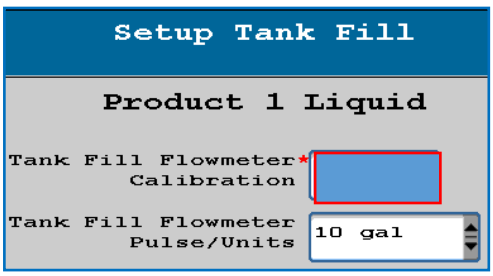
SureFire Electromagnetic Flowmeters. Verify pls/gal on Serial Number label.

10(a). Tank and Fill Flowmeter setup



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

10(b). Fill Flowmeter Cal setup



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 .)

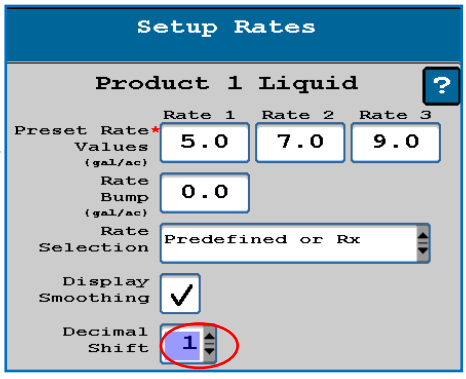
11. Set **Rates** as desired.

You must enter at least one rate.

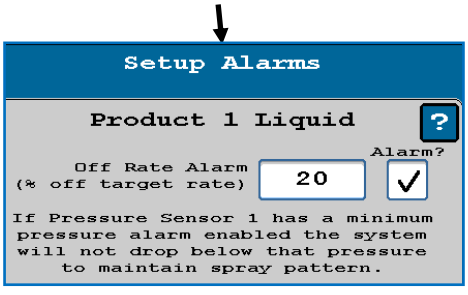
Check **Display Smoothing**

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

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



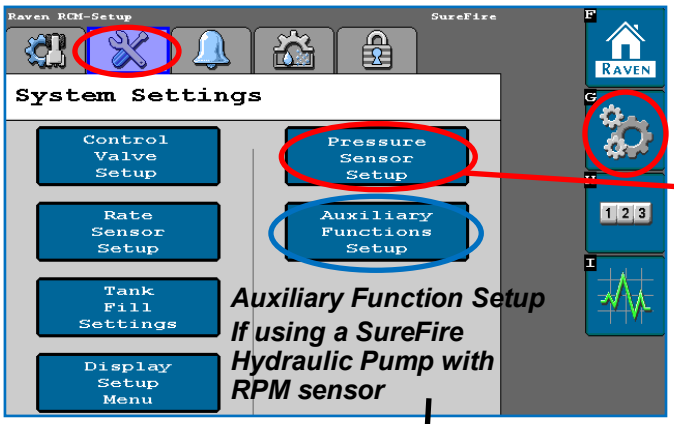
12. Set **Off Rate Alarm** as desired.



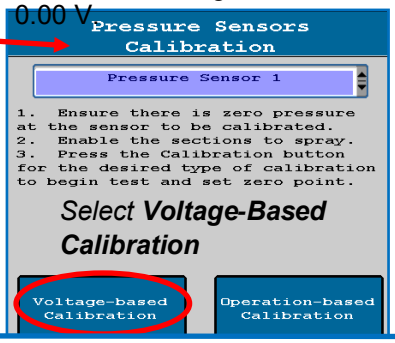
Read the Raven RCM Operation Manual for safety information and additional setup/operating information.

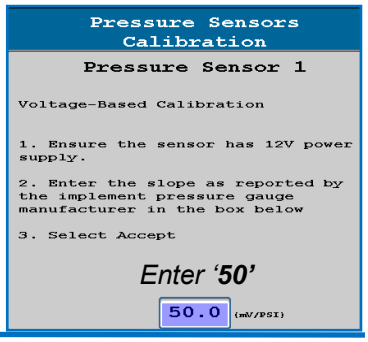
QuickStart setup instructions for SureFire Harness 213-00-3417Y4

13. Pressure Sensor must be calibrated. See the boxes below for the procedure. Enter **50.0 mv/PSI** for SureFire 0-100 PSI sensor. *(Be sure there is no pressure against the sensor when calibrating. Unplug the sensor during the calibration process. More on Pressure Sensor Diagnostics later.)*

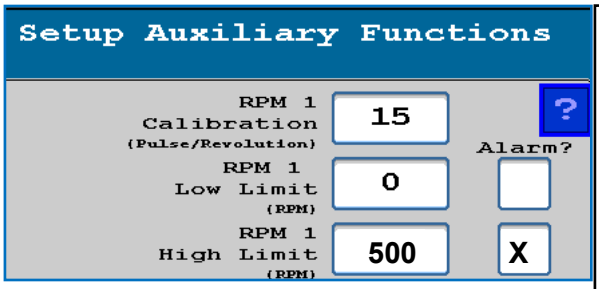


SureFire recommends putting the Pressure Sensor reading in your Display Settings on the Run Screen (see next page). For complete information on how the sensor is operating, go to **Diagnostics > System Information > Pressure Sensors.** 0 Pressure Voltage should be 0.00 V.





14. If using a Pump RPM sensor on a SureFire PumpRight Hydraulic Pump set RPM High Limit at 500 to 550.

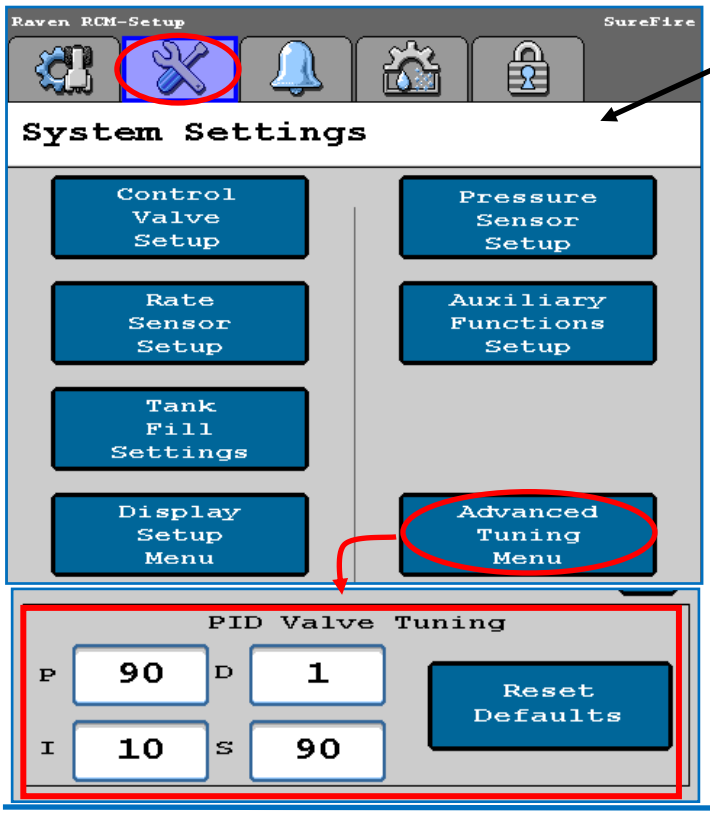


(The SureFire hydraulic pump with an RPM Sensor is 15 pulses/rev as shown above.

This QuickStart sheet does not cover every possible setup. Your setup may be different. See the Raven RCM Operation Manual for safety information and complete setup and operating instructions.

SureFire harnesses for the RCM are designed for specific operating setups. Pinouts on the RCM change depending on the Profile Setup and the number of products. See the wiring harness diagram for your harness.

More information is available at www.surefireag.com/support.



DO THIS for SureFire electric pump systems ONLY IF USING SOFTWARE 1.3 or lower

15. Advanced Tuning

On SureFire **electric pump systems**, it will be necessary to use the **Advanced Tuning** feature in addition to the regular Control Valve Calibration. To activate **Advanced Tuning**, **press and hold** the  **Settings tab** for about 8 seconds.

On **electric pump** systems, set the PID Valve Tuning parameters as shown (below left). Press the "?" for an explanation of what each of these values does.

Fine-tuning of the system may require some adjustment of these numbers along with the Valve Response Rate on the Control Valve Setup.

(For quickest response of the Tower 110 system, set P = 100 and S = 100.)

For SureFire hydraulic pumps start with the Default values for the PID Valve Tuning.

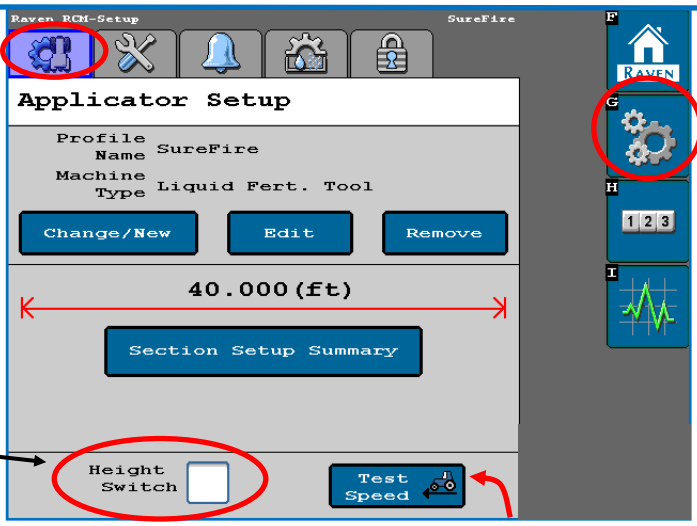
Read the Raven RCM Operation Manual for safety information and additional setup/operating information.

QuickStart setup instructions for Raven RCM and SureFire: 1 Liquid Product

Implement Height Indicator Setup

Setup

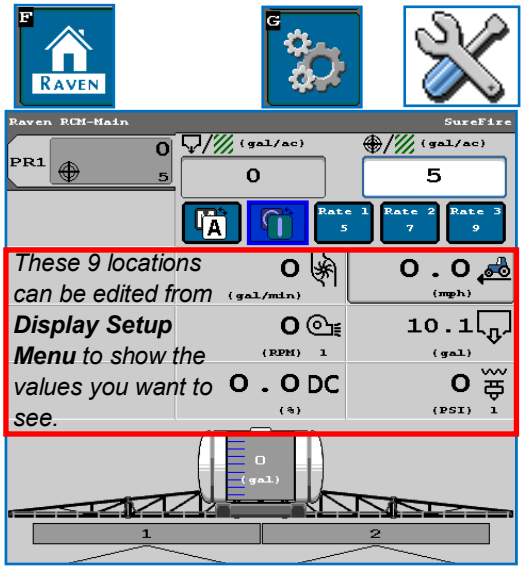
Applicator Setup

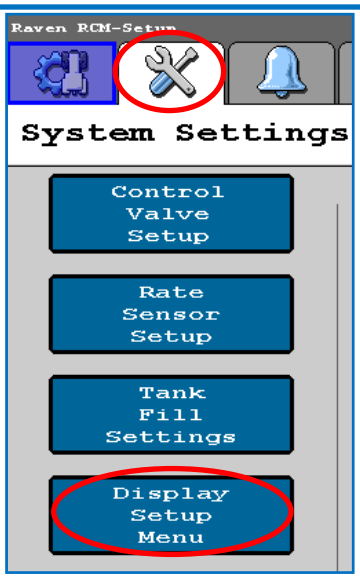


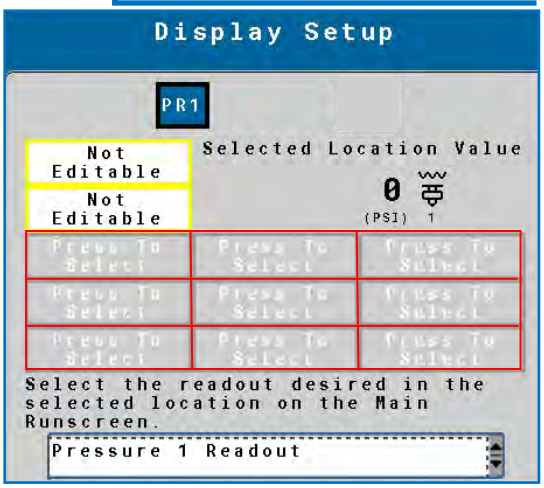
Check the **Height Switch** box if you are using a Mercury Switch or Finger Style Switch for Implement Height Indication.

Test Speed will be used later when testing the system.

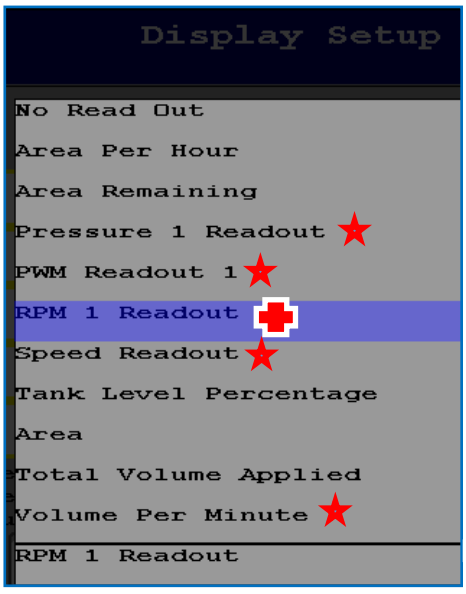
Run Screen Display Setup







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 systems*

✚ *Recommended for hydraulic pump systems with Pump RPM sensor*

Navigation

Main

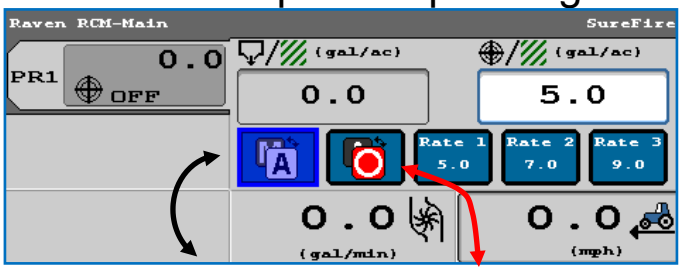
Setup

Totals

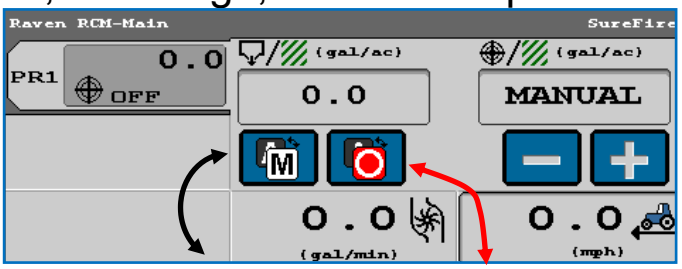
Diagnostics

Read the Raven RCM Operation Manual for safety information and additional setup/operating information.

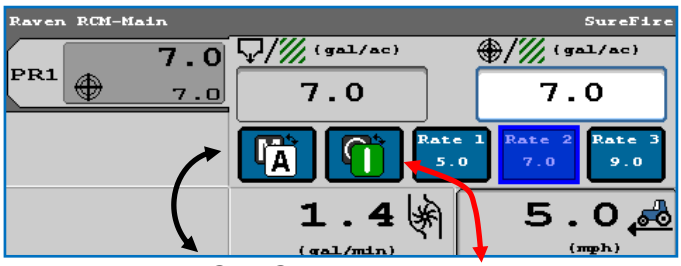
Advanced Setup and Operating Information, Run Page, Initial Startup



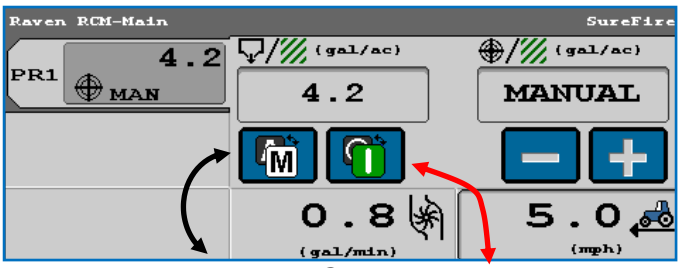
AUTO MODE / DISABLED



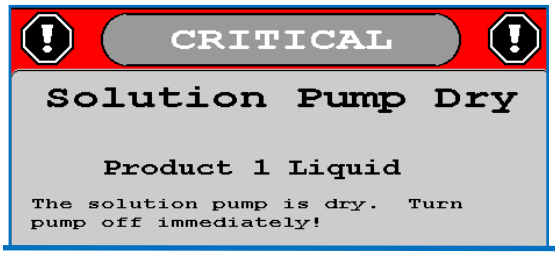
MANUAL MODE / DISABLED



AUTO MODE / ENABLED



MANUAL MODE / ENABLED



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.*

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:

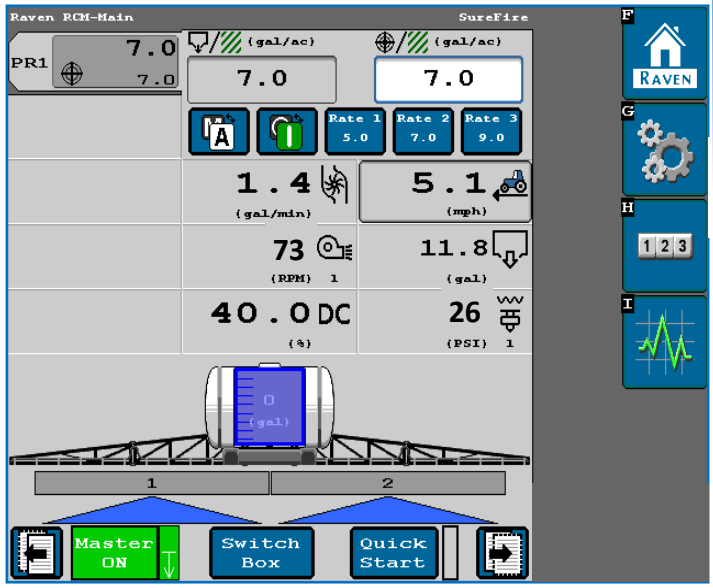
Go to Diagnostics > Tests > Calibrate PWM LIMITS. Here you can manually run the pump without the system shutting down if it doesn't read flow immediately. Turn on Master Switch, Start the test, hold + button to increase pump speed.

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.

Main Screen / Run Page



Diagnostics

Diagnostics > *System Information* Menu

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

Diagnostics > *Tests* Menu

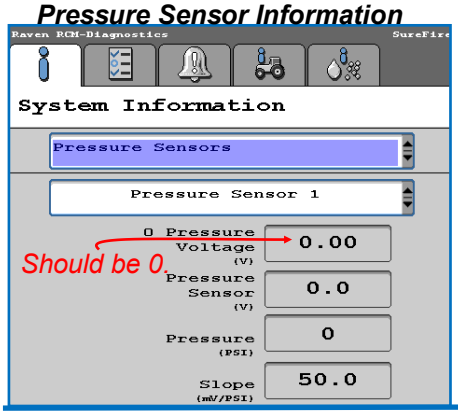
- Nozzle Flow Check
- Rinse Cycle
- Control / Section Test
- Calibrate PWM Limits

System Summary

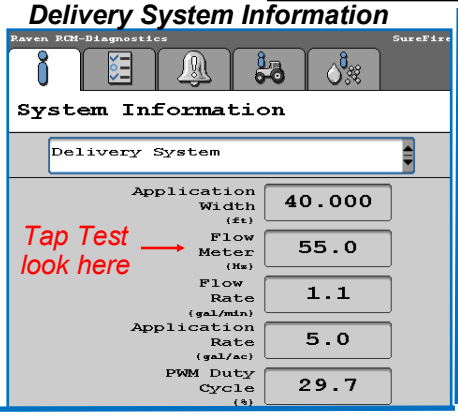
Product Summary

Frequently Used System Information Screens

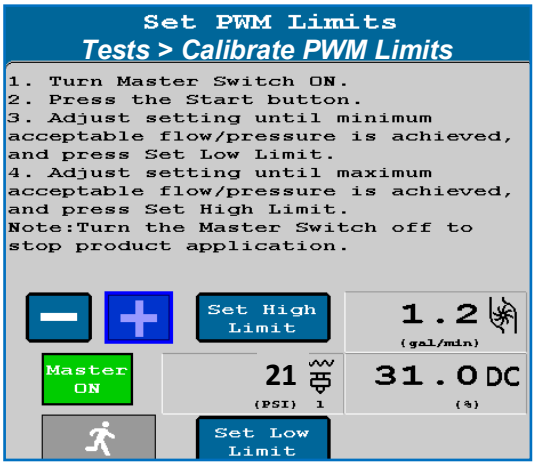
Pressure Sensor Information



Delivery System Information

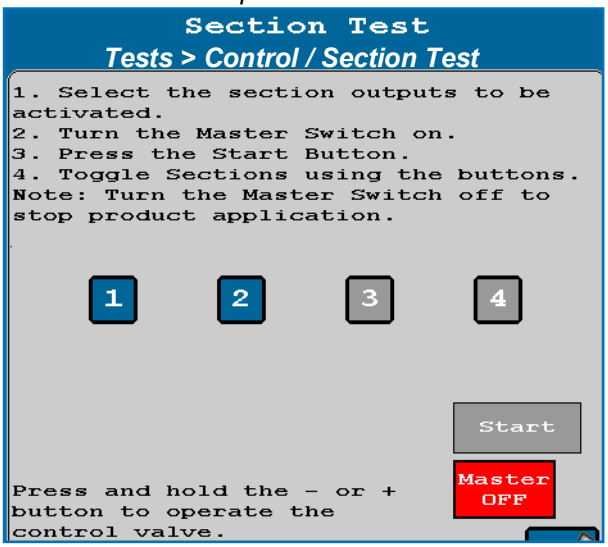


Set PWM Limits
Tests > Calibrate PWM Limits



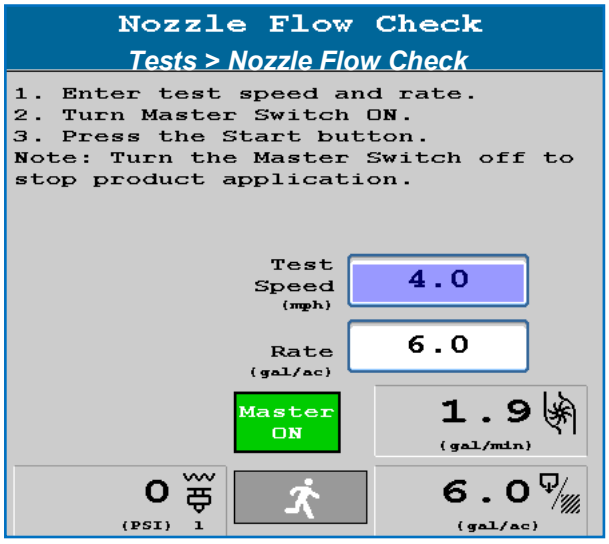
These tests can be run at initial system startup or for troubleshooting. Similar tests can also be run from the Run Page using Manual and Auto Mode with a Test Speed.

Section Test
Tests > Control / Section Test



When testing with water, the system pressure will be much less than it will be with a fertilizer product. If the pressure is too low, some check valves may not open. There will be no flow from those rows.

Nozzle Flow Check
Tests > Nozzle Flow Check



Read the Raven RCM Operator's Manual for safety information and additional setup/operating information.

TROUBLESHOOTING TIPS:

1. Pump Won't Run—Start the Calibrate PWM Limits Test. Press (+) to run the PWM Duty Cycle (DC) to 100%. With a voltmeter check voltage at the 2-pin PWM connector at the EPD or hydraulic valve solenoid. You should have 12-13 volts. If there is voltage here, but the pump won't run, check the pump using the following tests:

Electric Pump—Start Calibrate PWM Limits Test to open Section Valves. Unplug the two big connectors that plug into the black EPD module on the pump tower. Plug these together. This will take power from the battery directly to the pump(s). The pump(s) should run full speed.

Hydraulic Pump—On the hydraulic valve block, pop up the Manual Override button (red knob on top of solenoid). If unit has been in the field, you may need to loosen the dirt to move the knob. In cab, turn hydraulic flow to very low. Start Calibrate PWM Limits Test to open Section Valves. Engage hydraulics. Pump should begin turning. Slowly increase hydraulic flow to speed up pump.

2. Pump runs and liquid flows, but display is not reading flow. Unplug the flowmeter. With a voltmeter, check for 12 volts between pins 1 (black) and 2 (red) of the connector that plugs into the flowmeter. (You may have to remove the red keeper to get access to the pins with your voltmeter. Be careful not to break the sides of the red keeper.) You should also have 4-5 volts between pins 1 (black) and 3 (red).

If the voltage is OK, conduct a tap test. Have one person on the display go to Diagnostics > System Information > Delivery System, watching Flow Meter (Hz). The second person will tap repeatedly between pins 1 and 3 on the flowmeter connector with a bent paper clip or short piece of wire. As the person taps, the display should show some numbers on Flow Meter (Hz).

If the voltages are good, and the tap test shows on the display, but the system does not read flow when liquid is flowing, the flowmeter is not working.

3. PWM Startup—For best startup performance, set the PWM Startup at or slightly above the DC% that the system will be running at in the field.

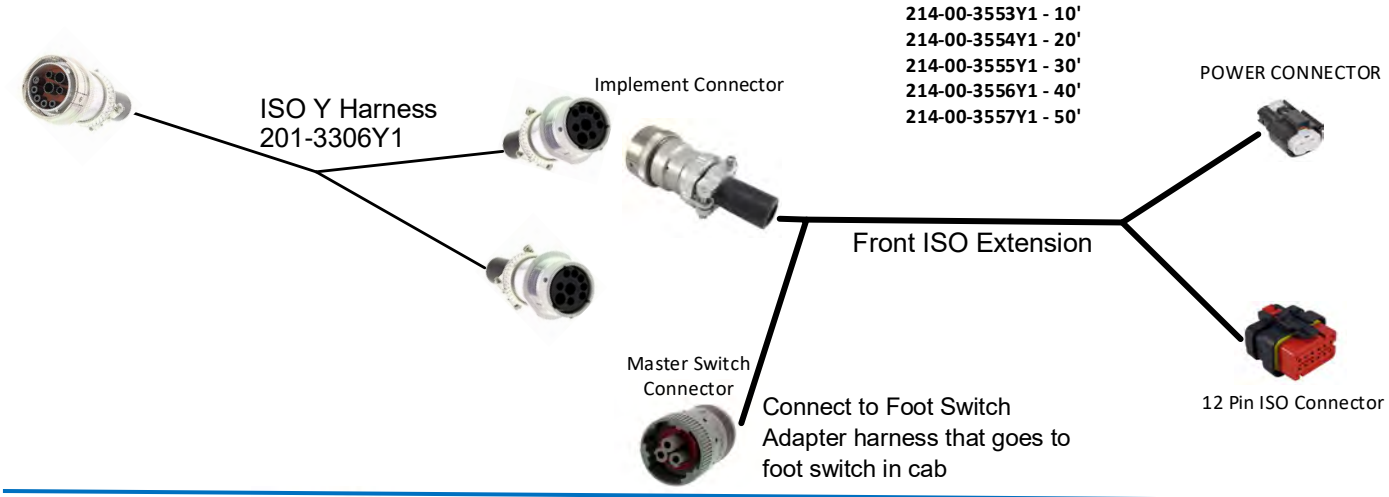
For more information, see the SureFire Manual for your Raven RCM system at www.surefireag.com/support.

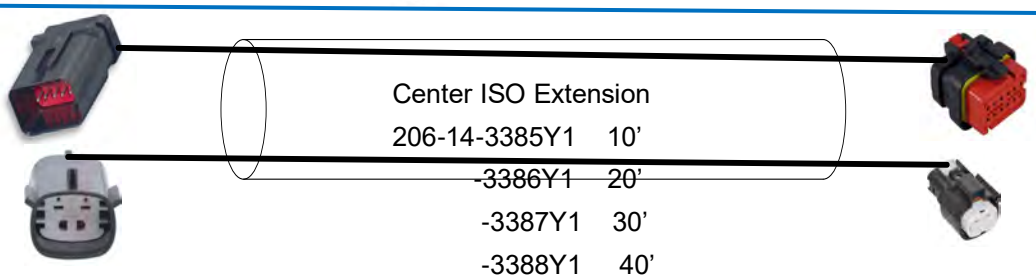
Read the Raven RCM Operator's Manual for safety information and additional setup/operating information.

Harness Layout

Below and on the next page are the harnesses in a typical setup. Your layout may vary.

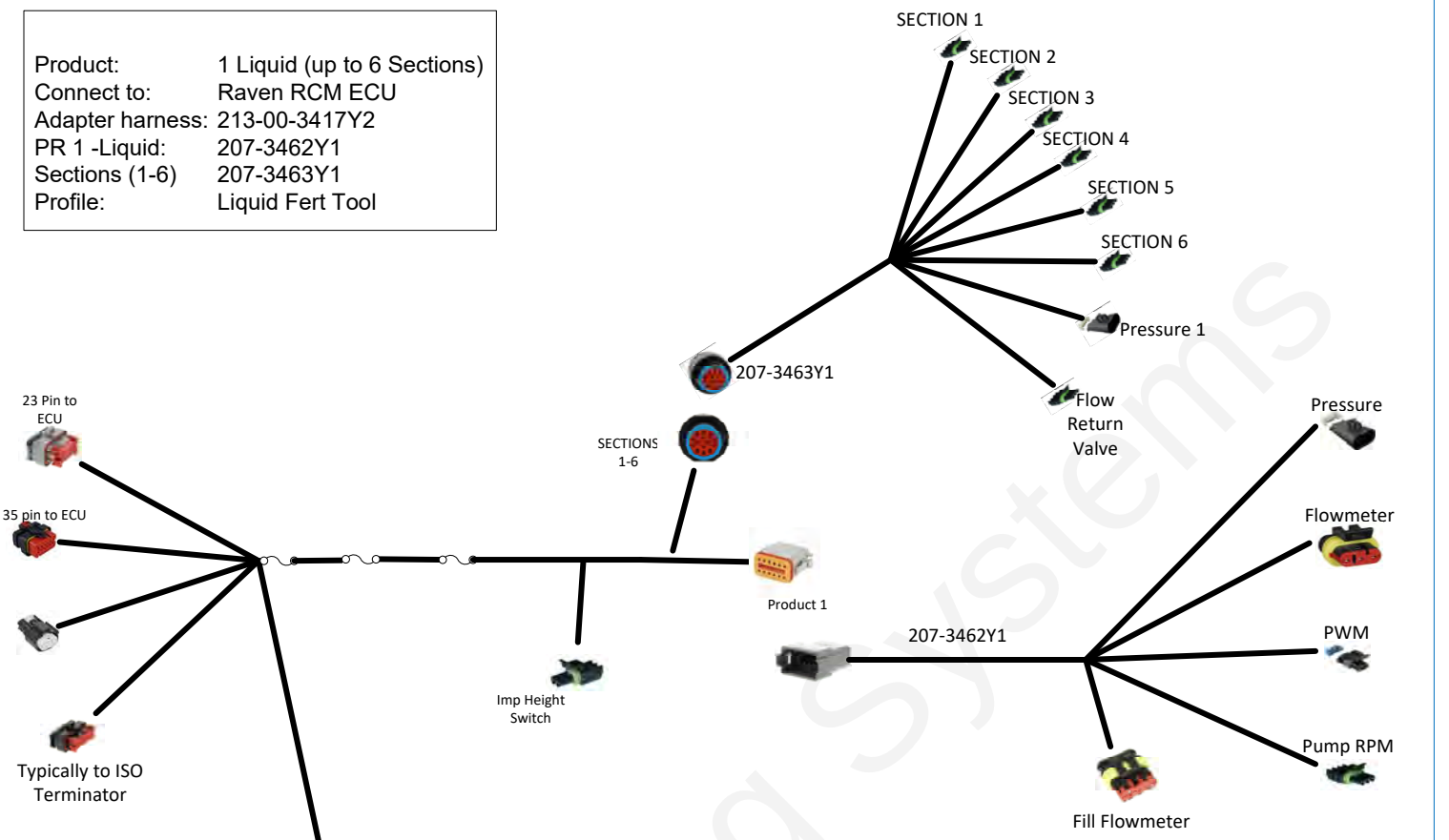
A layout could begin with a Center ISO Extension if there is a connection for that on the implement.





SureFire Ag Systems and Raven RCM Harnessing Layout

Product:	1 Liquid (up to 6 Sections)
Connect to:	Raven RCM ECU
Adapter harness:	213-00-3417Y2
PR 1 -Liquid:	207-3462Y1
Sections (1-6)	207-3463Y1
Profile:	Liquid Fert Tool



If the system only has 1 or 2 sections, use 207-3461Y1 Final harness and DO NOT use section harness 207-3463Y1.
207-3461Y1 does NOT have a Pump RPM connector.

Plug ISO and Power Connector into Front or Center ISO Extension or to ISO connector on Implement

LiquiShift system harness layout—Instead of the section harness shown above (207-3463Y1) connect the following harnessing for the LiqiuShift system