



396-3788Y1

QuickStart setup instructions for Raven RCM and SureFire harness for 3 Liquid Products



213-00-3517Y_

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.

The screenshot shows the 'Raven RCM-Setup' main menu with five icons: Setup (gears), System Settings (wrench), Alarm Settings (bell), and Rates (gears with liquid). The 'Setup' icon is circled in red.

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. Start a New Profile. 3. Enter a Profile Name. Machine Type > Generic 4. Number of Products = 3

Step 2: 'Applicator Setup' screen. The 'Change/New' button is circled in red. Below the screen is an hourglass icon with the text: 'You will see this icon at times. Be patient.'

Step 3: 'Name Profile' screen. The 'Profile Name' field contains '3 Products' and the 'Machine Type' dropdown is set to 'Generic'. The 'Enter Width' field is highlighted in red.

Step 4: 'Setup System' screen. The 'Number of Products' field is set to '3'. A help icon (question mark) is circled in red.

A callout box with a question mark icon contains the text: 'Many setup screens have this "?". This will take you to a Help Screen with valuable information.'

5. Fan/Spinner RPM-Use for pump RPM sensor on hydraulic pump. Product 2 uses RPM Sensor # 2 on the SureFire harness.

The screenshot shows the 'Setup Fan/Spinner RPM' screen with instructions: 'Select the number of spinner or fan RPM sensors installed on the Implement used for fan or spinner RPM monitoring or control. Select 0, 1, or 2'. Below, there is a red box around a dropdown menu and a checkbox labeled 'Enable Fan/Spinner RPM Control'.

RPM 2 is on Product 2 connector.
RPM1 is on Prod1 and Prod 3 connector.

6. Select Application Type & Mode

The first screenshot shows the 'Setup Application Type' screen with a table:

Product	Application Type
1	Liquid
2	Liquid
3	Liquid

The second screenshot shows the 'Setup Application Mode' screen for three products, each with 'Liquid' selected in the 'Application Mode' field.

If you are applying a Dry product, one or both products could be set up as Granular Fertilizer, with an appropriate Application Mode for that setup.

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



QuickStart setup instructions for Raven RCM and SureFire: 3 Liquid Products

7. Section Group Setup—Typical setup—Product 1 is Sections 1-6. Product 2 is Sections 7-12. Other setups possible. For a typical dual product setup, you will say NO to sharing section drivers. However, when using a Spartan injection pump that is going into a mixing chamber, say YES to sharing section drivers with the main product.

Setup Section Groups

Are section drivers shared between all products in product harness? ?

Yes No

Product 1 Sections				Product 2 Sections			
15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1	2	3	4	1	2	3	4
Product 2 Sections				Product 2 Sections			
15.00	15.00	15.00	15.00	30.00	30.00		
1	2	3	4	7	8		

Typically NO, but could be YES.

No Yes

Setup Section Harnessing

Section Group	Starting Section Number	Number Of Sections	Equal Section Widths
1	1	4	<input checked="" type="checkbox"/>
2	7	4	<input checked="" type="checkbox"/>

Setup Section Width

Enter the width of the sections

1	10.000	7	10.000
2	10.000	8	10.000
3	10.000	9	10.000
4	10.000	10	10.000
5	0.000		EXAMPLE
6	0.000		

Setup Section Group Assignment

Product	Section Groups
1	Section Group 1
2	Section Group 2

Setup Section Groups

Could be 1, 2, or 3.

Number of Section Groups

Typical setup shown. Many different section setup combinations are possible. The SureFire harness has Sections 1-6 on one connector and Sections 7-12 on another connector. You could set up each product with 12 sections and share section drivers.

8. SureFire Pressure Sensors will be CUSTOM.

Setup Pressure Sensors

Pressure Sensor 1

Pressure Sensor 2

Setup Pressure Assignment

Pressure Sensor 1

Product 1

Product 2

Pressure Sensor 2

Product 1

Product 2

Setup Pressure Alarms

	Min	Max	Alarm?
Pressure 1 (PSI)	0	<input type="text" value="85"/>	<input checked="" type="checkbox"/>
Pressure 2 (PSI)	0	<input type="text" value="85"/>	<input type="checkbox"/>

Checking the Alarm box sets a control limit and the pressure will not go beyond that. With a hydraulic pump or Spartan, set MAX at 85 and check the box.

9. Pump RPM setup-for hydraulic pumps with RPM sensors

Setup Fan/Spinner RPM Calibration

RPM 1 Calibration (Pulse/Revolution) Alarm?

Low Limit (RPM)

High Limit (RPM)

RPM 2 Calibration (Pulse/Revolution) Alarm?

Low Limit (RPM)

High Limit (RPM)

Setup RPM Sensor Assignment

RPM Sensor 1

Product 1

Product 2

RPM 1 can be PR1 or PR3.

Product 3

RPM Sensor 2

Product 1

Product 2

RPM Calibration for SureFire Pump RPM sensor is 15 pulses/rev.

Set up as needed for your system. Product 2 will be RPM Sensor 2 on the SureFire harness.

For hydraulic pump, set **RPM High Limit at 500** and check the box to limit the speed of the pump. This can be raised to 550 if needed.

Important Notes on 3-product harness:
213-00-3517Y_

- When using this harness, the profile **MUST** be set for 3 products (even if you are only using 1 or 2 products). The pinout assignments on the RCM change when you set up a 3-product profile. This harness is pinned out to match the 3-product profile pinout.
- 12-pin Deutsch connectors:
Product 1: Pressure 1
RPM 1
Product 2: Pressure 2
RPM 2
Product 3: Pressure 3
RPM 1
- LiquiShift should not be PR 3.**

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



QuickStart setup instructions for Raven RCM and SureFire: 3 Liquid Products

10. 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) **1**
- Tower (electric) **20**
- Catalyst and Spartan **5**

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**.

Control Deadband: Start at 2

Low Limit (Adjust in field as needed)

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

PWM Startup (Adjust in field as needed)

- PumpRight (hydraulic) 40
- Tower (electric) 20
- Spartan 5

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

11. 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	115	1700
0.6-13	2000	125	890
1.3-26	2000	135	450
2.6-53	2000	1450	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. For high rates, Decimal Shift may be set at 0.

12(a). Tank and Fill Flowmeter setup

OPTIONAL: Use as desired

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

12(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. Not used very often.)

14. Set Off-Rate Alarm as desired.

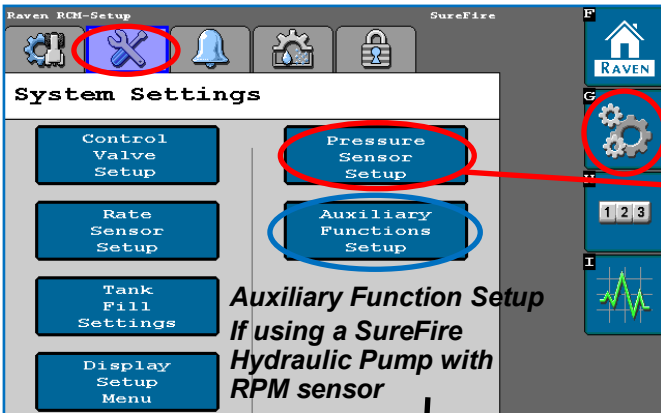
Set up Product 2 & 3 in a similar fashion to the Product 1 setup.

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

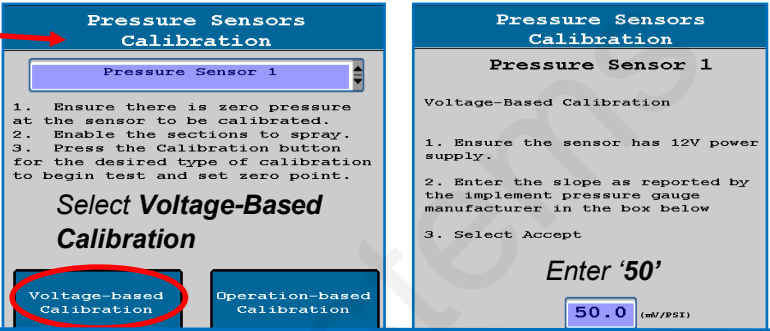


QuickStart setup instructions for 3-Product SureFire Harness 213-00-3517Y_

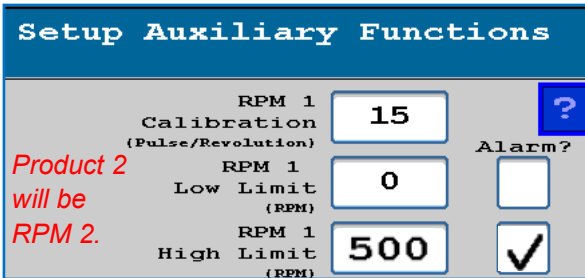
15. **Pressure Sensors** must be calibrated. See the boxes below for the procedure. Enter **50.0 mv/PSI** for SureFire 0-100 PSI sensor. *If you have 2 or 3 sensors, all must be calibrated. Be sure there is no pressure against the sensor when calibrating. Unplug the sensor during the calibration process. 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.



16. If using a Pump RPM sensor on a SureFire PumpRight Hydraulic Pump



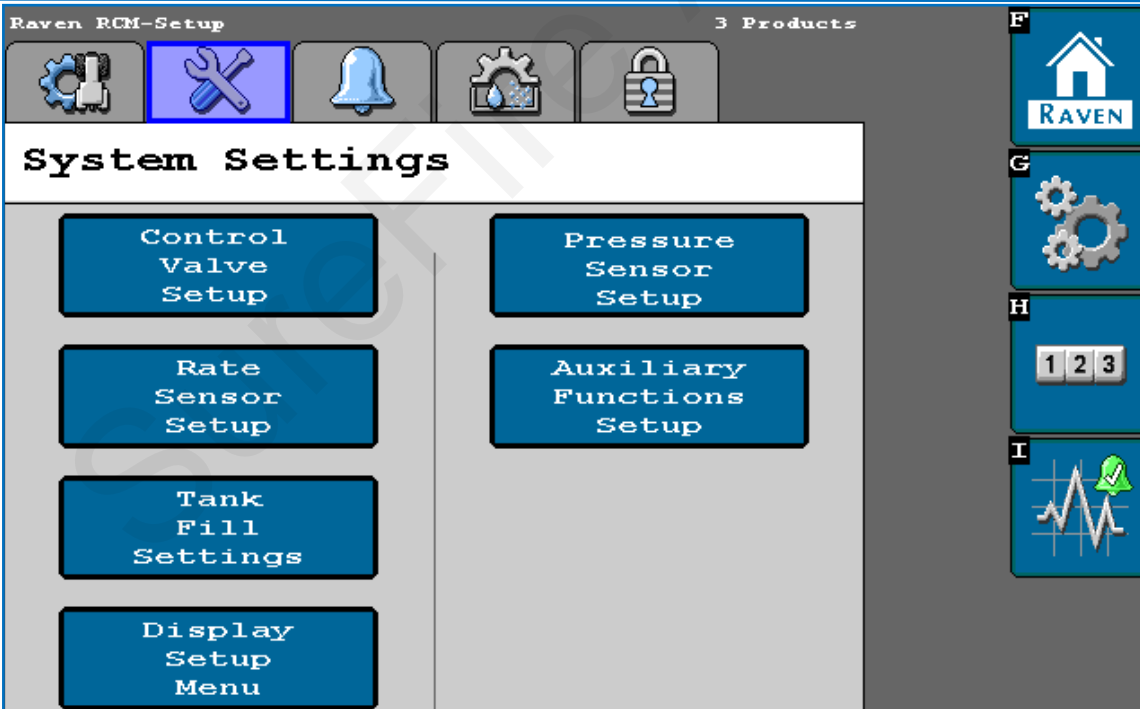
Product 2 will be RPM 2.

(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 Raven RCM are designed for specific operating setups. Pinouts on the Raven 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.



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

QuickStart setup instructions for Raven RCM and SureFire: 3 Liquid Products

Implement Height Indicator Setup

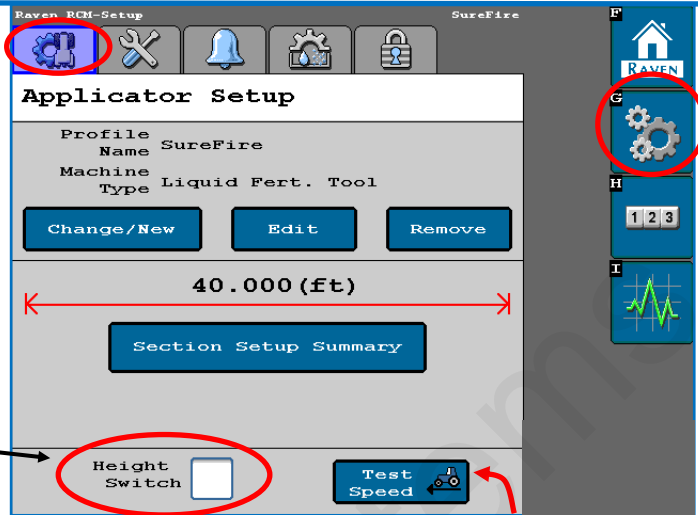


Setup

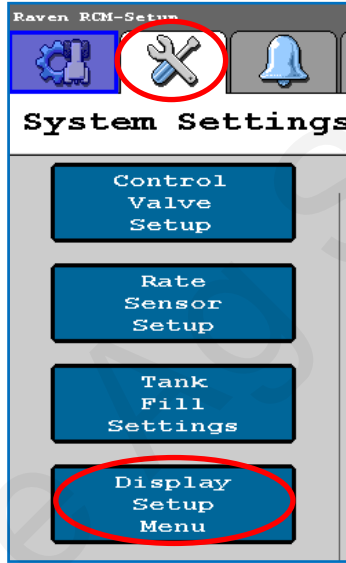
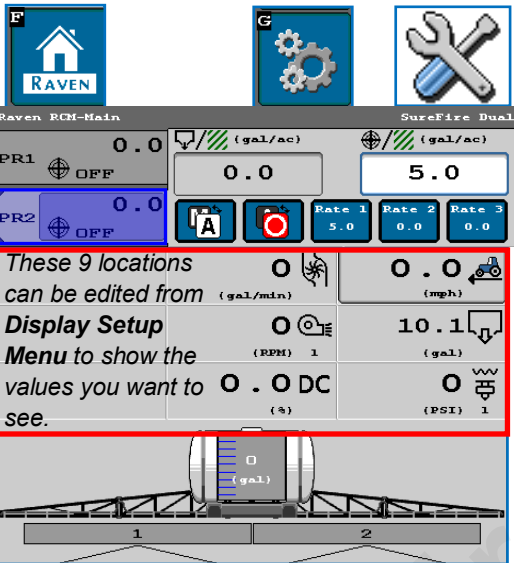


Applicator Setup

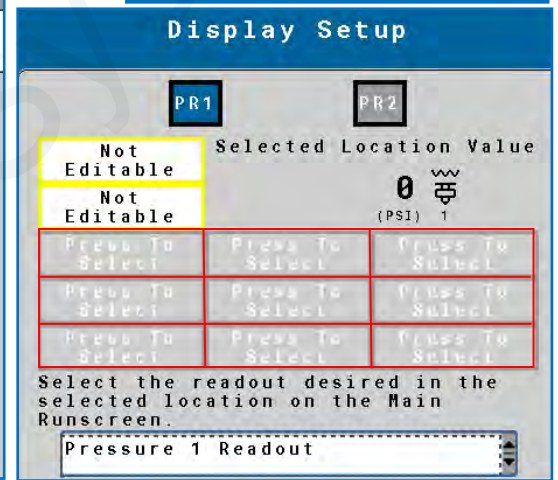
Check the **Height Switch** box if you are using a Mercury Switch or Finger Style Switch for Implement Height Indication.



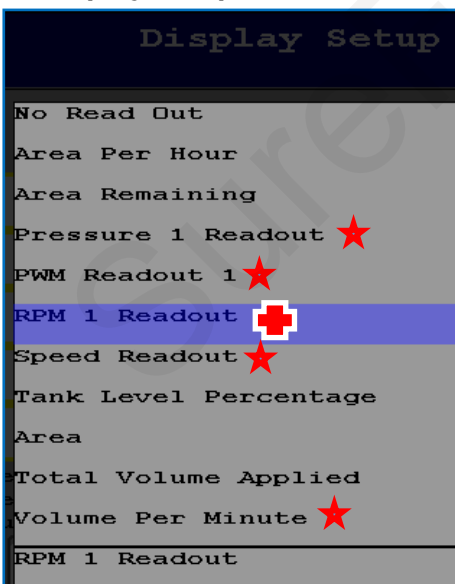
Run Screen Display Setup



Test Speed will be used later when testing the system.



Display Setup Menu



Control Valve Setup Menu

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

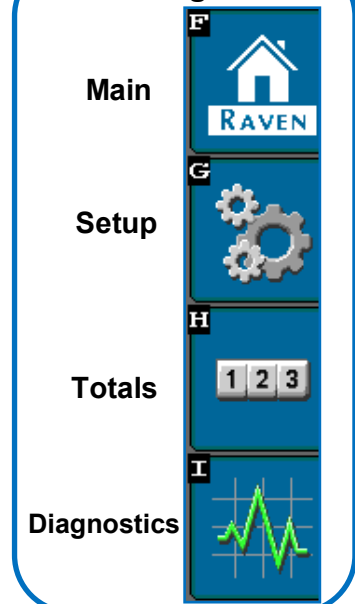
Auxiliary Features Setup Menu

- 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

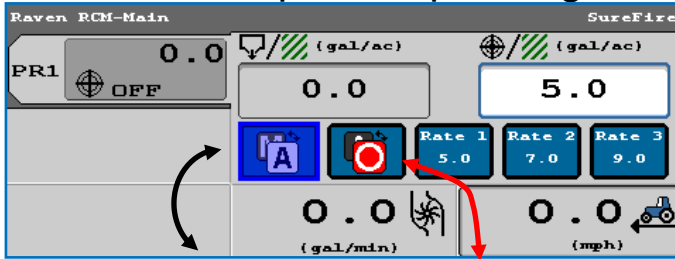
Navigation



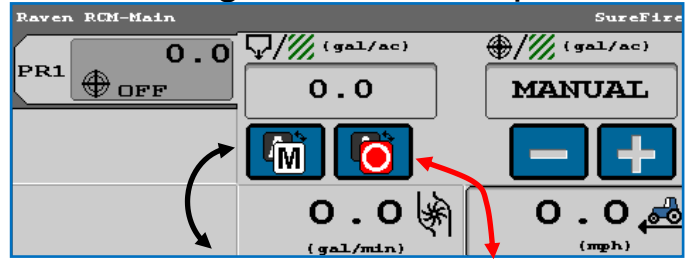
Read the [Raven RCM Operation Manual](#) for safety information and additional setup/operating information.



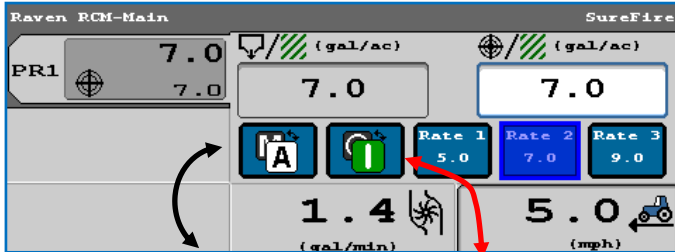
Advanced Setup and Operating Information, Run Page, Initial Startup



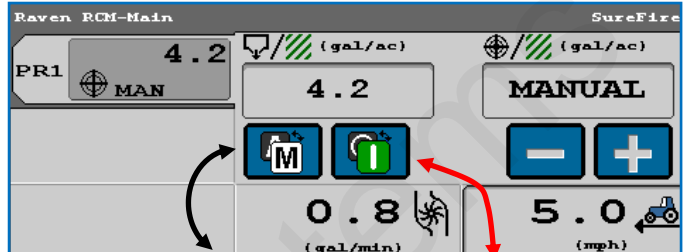
AUTO MODE / DISABLED



MANUAL MODE / DISABLED



AUTO MODE / ENABLED



MANUAL MODE / ENABLED

CRITICAL

Solution Pump Dry

Product 1 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.

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 Diagnostics > Tests > 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.)

When testing with water, there may not be enough pressure to open all the check valves, so all of the rows may not be flowing.

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

Main Screen / Run Page

Raven RCM-Main 3 Products

PR1 0.00 (gal/ac) 10.00 (gal/ac)

PR2 0.00 OFF Rate 1 10.00 Rate 2 0.00 Rate 3 0.00

PR3 0.00 OFF (gal/min) (RPM) 1

(PSI) 2 (RPM) 2

0.0 DC (mph)

1 2 3 4

Master OFF Switch Box

Frequently Used System Information Screens

Diagnostics

Raven RCM-Diagnostics

Diagnostics > System Information Menu

Diagnostics > Tests Menu

- Hardware / Software
- Switchbox
- Delivery System
- Section Status
- System Voltages
- Working Parameters
- Switches / Status
- Pressure Sensors
- Bin Level Sensors
- RPM Sensors
- Tank Fill Monitor
- Nozzle Flow Check
- Rinse Cycle
- Control / Section Test
- Calibrate PWM Limits

System Summary

Product Summary

Pressure Sensor Information

Raven RCM-Diagnostics SureFire

System Information

Pressure Sensors

Pressure Sensor 1

0 Pressure Voltage (V) → 0.00

Should be 0.

Pressure Sensor (V) 0.0

Pressure (PSI) 0

Slope (mV/PSI) 50.0

Delivery System Information

Raven RCM-Diagnostics SureFire

System Information

Delivery System

Application Width (ft) 40.000

Flow Meter (ft/s) 55.0

Flow Rate (gal/min) 1.1

Application Rate (gal/ac) 5.0

PWM Duty Cycle (%) 29.7

Tap Test look here

Set PWM Limits

Tests > Calibrate PWM Limits

- Turn Master Switch ON.
- Press the Start button.
- Adjust setting until minimum acceptable flow/pressure is achieved, and press Set Low Limit.
- Adjust setting until maximum acceptable flow/pressure is achieved, and press Set High Limit.

Note: Turn the Master Switch off to stop product application.

1.2 (gal/min)

Master ON 21 (PSI) 1 31.0 DC (%)

Set High Limit Set Low Limit

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

- Select the section outputs to be activated.
- Turn the Master Switch on.
- Press the Start Button.
- Toggle Sections using the buttons.

Note: Turn the Master Switch off to stop product application.



Start

Press and hold the - or + button to operate the control valve.

Master OFF

When testing with water, the system pressure will be much less than it will be with a fertilizer product. There may not be enough pressure to open all the check valves, so some rows may not flow.

Nozzle Flow Check

Tests > Nozzle Flow Check

- Enter test speed and rate.
- Turn Master Switch ON.
- Press the Start button.

Note: Turn the Master Switch off to stop product application.

Test Speed (mph) 4.0

Rate (gal/ac) 6.0

Master ON 1.9 (gal/min)

0 (PSI) 1 6.0 (gal/ac)

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.

Using the Quick Start button:



Use the Quick Start button to get the system primed and ready to apply when entering a field or starting in a field corner. Turn on the Master Switch, push Quick Start, the system will begin applying as if the Speed is 3 mph. Start driving. The Auto Rate Control will take over when the speed reaches the Minimum Application speed. Quick Start runs for 15 seconds. For additional time, push Quick Start again.

Virtual Terminal (VT), Universal Terminal (UT), and Task Controller (TC)

VT or UT software allows the display to show the ISOBUS Implement (the Raven RCM) on the display screen. This usually comes with the display, but be sure the software is installed if the display has not previously been used as a Virtual Terminal.

Task Controller software is necessary to do Section Control, Variable Rate Application using prescriptions, and/or As-Applied Mapping. Task Controller is typically purchased from the display manufacturer as an Unlock.

See the Task Controller documentation from your display manufacturer for more information on setup and operation.

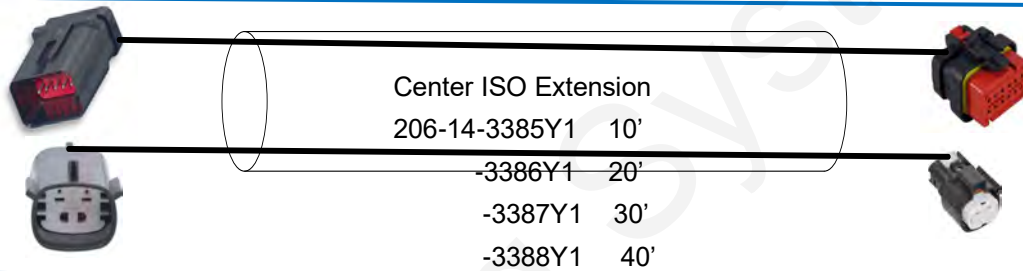
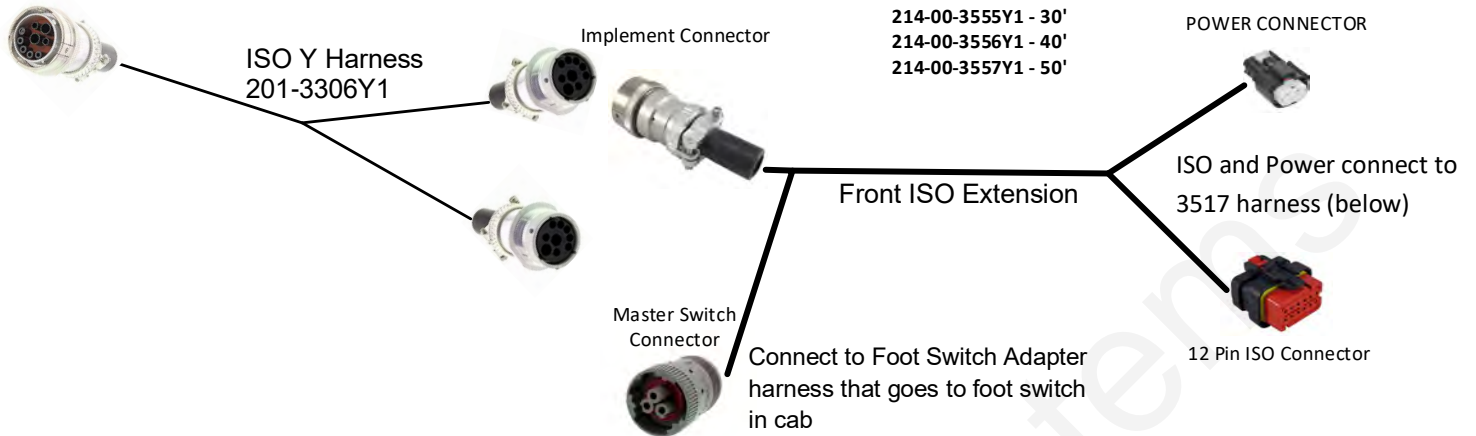
WARNING The operator is responsible for knowing and understanding the safe operation of this equipment. Systems with hydraulic equipment require additional safety precautions to prevent serious injury and/or death. See the full SureFire Manual and the *Raven RCM Operator's Manual* for important safety information and setup and operating instructions. See www.surefireag.com/support for the SureFire manual.

Harness Layout

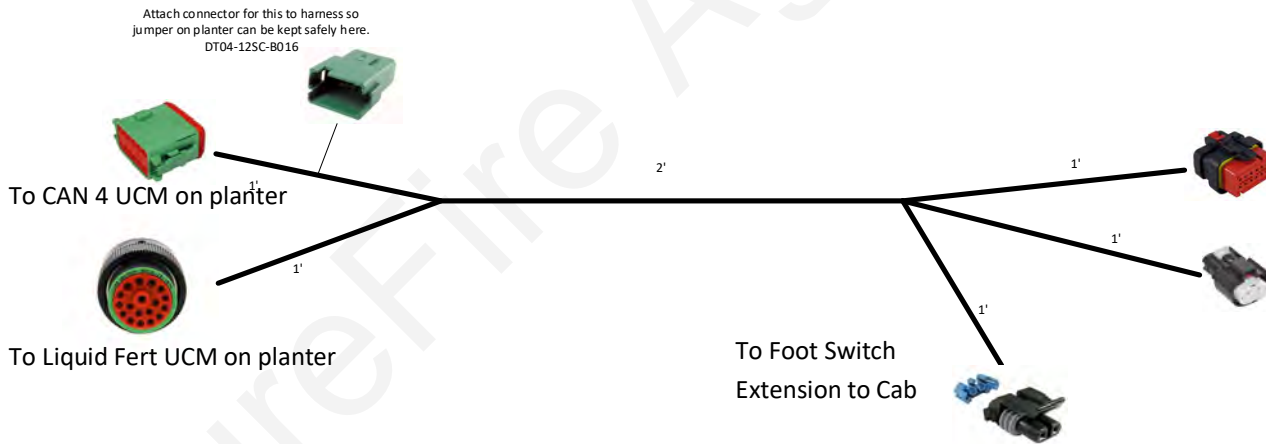
Below and on the next page are the harnesses in a typical setup. Your layout may vary.

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

- 214-00-3553Y1 - 10'
- 214-00-3554Y1 - 20'
- 214-00-3555Y1 - 30'
- 214-00-3556Y1 - 40'
- 214-00-3557Y1 - 50'



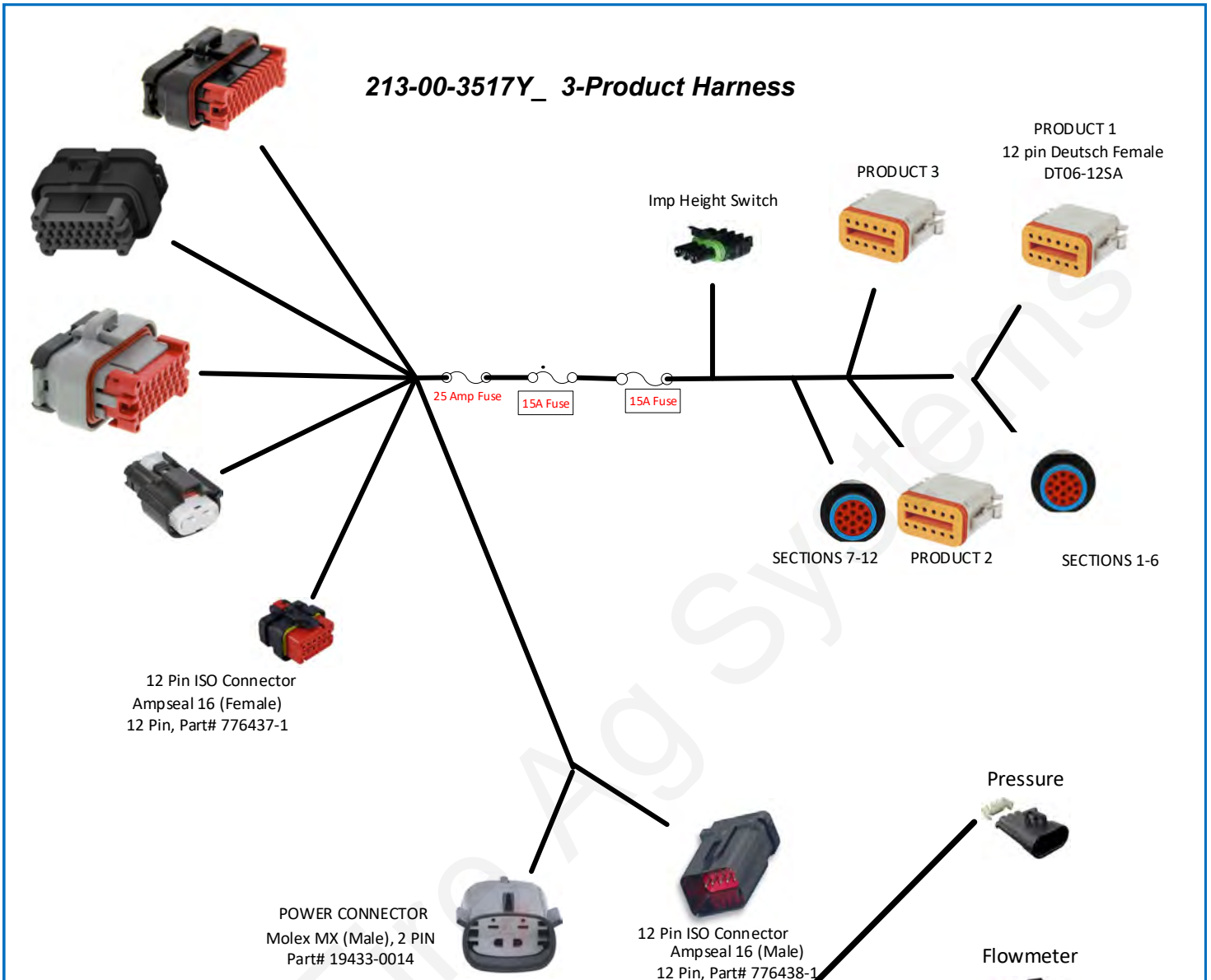
Harness Option for Case 2000 Series Planter to Raven RCM 213-05-3873Y1



Plugging in the Raven RCM:

1. Plug the 35-pin and 23-pin connectors from the SureFire adapter harness (213-00-3517Y_) into the RCM.
2. Plug the 12-pin ISO and 2-pin Power connector on the long leads of the 213-00-3517Y_ harness into the ISO and Power connectors shown above. Plug in an ISO terminator to the short ISO lead, or connect next ISO module.
3. The RCM must have a foot switch in the cab. Make the necessary connections to connect the foot switch.
4. Plug in the Implement Height Switch if it is being used.
5. Plug in the final Product and Section harnesses.

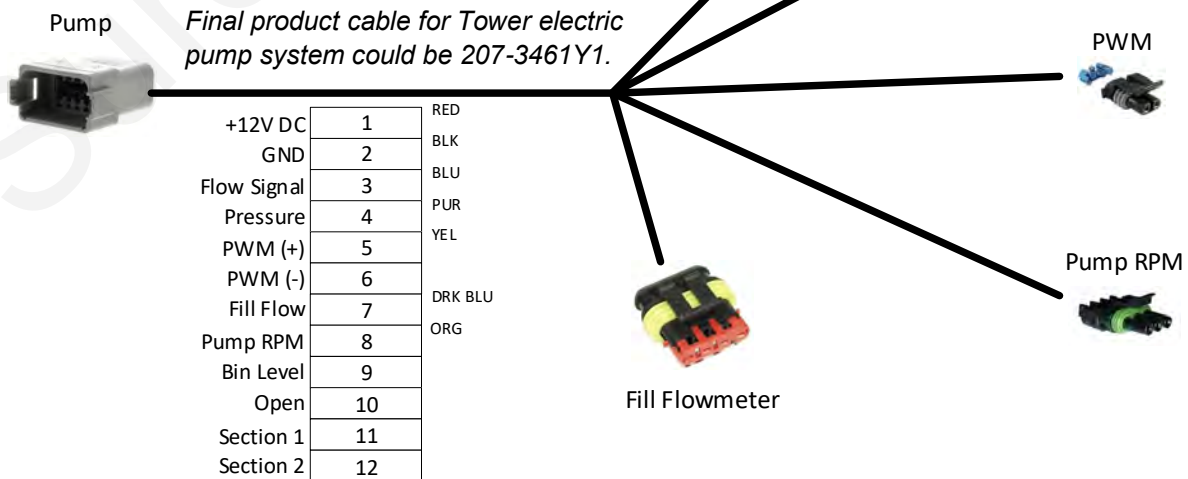
213-00-3517Y_ 3-Product Harness



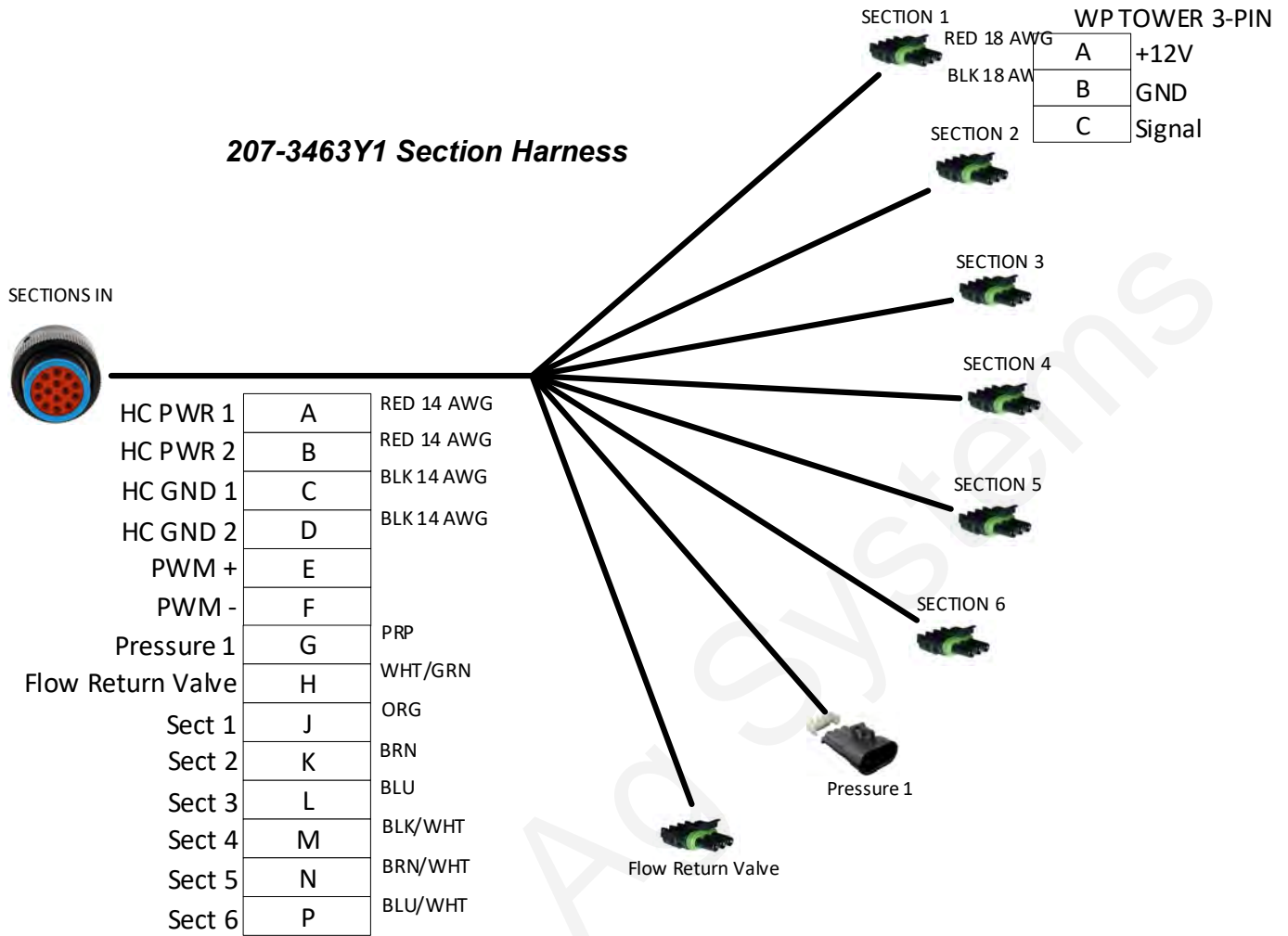
207-3462Y2 Final Product Cable

12-pin Deutsch connector plugs into one of the Product connectors above.

Final product cable for Tower electric pump system could be 207-3461Y1.



207-3463Y1 Section Harness



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

