396-5896Y1

Spartan Injection Pump with Sentinel
Models 115, 125, 135, and 145

***For Sentinel v 1.3.9and below*, enter the Flow Cal for pul/oz below. Set the Rate using the number of ounces per acre you want. For example, to apply 32 oz/acre, set the rate at 32 gal/acre. The display will read gpa, but it will actually be applying oz/acre. Therefore, the controller thinks it is measuring gallons when it is really measuring ounces.**

***For Sentinel v 1.4.0 and above*, enter the Flow Cal for ppg below. On the Product Setup screen, set the UNITS to OZ. Enter the rate with the number of oz/acre you want to apply. The system will measure and the screen and map will show the applied rate in oz/acre.**

Operating Caution: Pump will produce up to 290 PSI. Limit operating pressure to 80 PSI. Pressure with water will be less than pressure with a thicker, heavier product.

Specifications Voltage: 12 VDC Pump Speed: 0-120 RPM Current: 16.3 Amps

Spartan Injection Pump Model #	**115**	**125**	**135**	**145**
Flow Range (oz/min)	1-10	3-20	6-40	10-80
Flow Cal (pul/oz, see note above; Sentinel 1.3.9 & below)	1700	890	450	220
Flow Cal (ppg; use on Sentinel 1.4.0 & above)	217,600	113,920	57,600	28,160

Setup Tip: **Control Speed**

When using the Flow Cal for ppg (pulses per gallon), set the **Control Speed at 10,000** on the Setup tab.
Future software releases may allow a higher number.
When using the Flow Cal for pulses per oz, set the Control Speed at 100 -250.
In general, if pump seems slow to adjust, increase the Control Speed. If pump won't lock on to rate, decrease the Control Speed.

Troubleshooting Tip:

On the EPD module, the LED in the center above the fins should have a slow steady blink (once per second) when the EPD is receiving power from the battery. When the pump is turned on, this light should go steady red, and there should be a red light (PWM signal) in the corner.

The center light will go off after 5 minutes of inactivity.

Troubleshooting Tip:

Before doing this, disconnect pump outlet hose so high pressure does not cause damage.

If the pump won't run, connect the power and pump connector directly together to give pump full 12 volts directly from battery (bypass the EPD module). This will tell you if the pump is the problem or if something else is wrong. The pump will be running at full speed, so don't leave them connected this way for long.

Settings for SurePoint Spartan injection pump with Sentinel

Typical settings. Adjust as needed for best performance on your system in the field.

SurePoint SENTINEL

Control Speed 100 - 250 (10,000 when using PPG Flow Cal)		PWM Minimum 5 -10
Flow Cal—use pulses/oz	For 32 oz/acre, enter Rate as 32	gpa **(ver. 1.3.9 and below)**
Flow Cal - use PPG	Set UNITS to OZ on Product Setup	**(ver. 1.4.0 and above)**

On Sentinel version 1.4.0 and above, you must use Flow Cal PPG with Rate set to OZ if Sentinel is injecting into another product that is using Row Monitoring and you selected "Injected into Carrier _" in the Spartan setup.

ADJUSTMENTS

Control Speed , PWM Minimum, PWM Maximum, and PWM Startup can be adjusted if needed for best operation in the field.

If pump will not get down to the desired rate, lower the PWM Low Limit. At low output, the pump may run at 5% PWM Duty Cycle or less. At higher outputs, the PWM Low Limit can be raised. Observe the PWM Duty Cycle in the field and adjust as needed. PWM Maximum can be set to a few percentage points above the highest Duty Cycle observed.

If pump oscillates and will not lock on to the rate, decrease the Control Speed. If pump is slow to adjust, increase the Control Speed. If pump is slow to get to rate on startup, raise the PWM Minimum. If the PWM Minimum is too high, the pump will not be able to slow down enough when sections close or when you slow down.

PWM Start may be set to 2 or 3% above normal PWM% for a little quicker startup.

Flow Cal Adjustment

Closely monitor the gallons applied and the acres worked for correct flowmeter adjustment. Adjust the flow cal as needed for best accuracy in the field. (If you need to apply more, increase the flow cal. If you need to apply less, decrease the flow cal.)

IMPORTANT - RINSE AND FLUSH

If using a suspension liquid, use constant agitation and FLUSH when you will be stopped for an hour or more. If it is a product that is sticky or might set up, it can ruin the pump. Install a rinse tank if needed.

OIL

SurePoint uses and recommends Mobil Super 5000 5W-30 oil for the Spartan. **ADD OIL before first use.**

RPM SENSOR, FLOW SWITCH, SIGNAL CONDITIONER

See pages 3 and 4 for important information on these components of the flow-measuring system. ***Flow is measured indirectly by using the pump RPM.*** *The positive displacement pump outputs a known amount for each pump revolution. A floating flow switch verifies that liquid is flowing. If the pump is turning, but the float is down, the display will show NO FLOW.*

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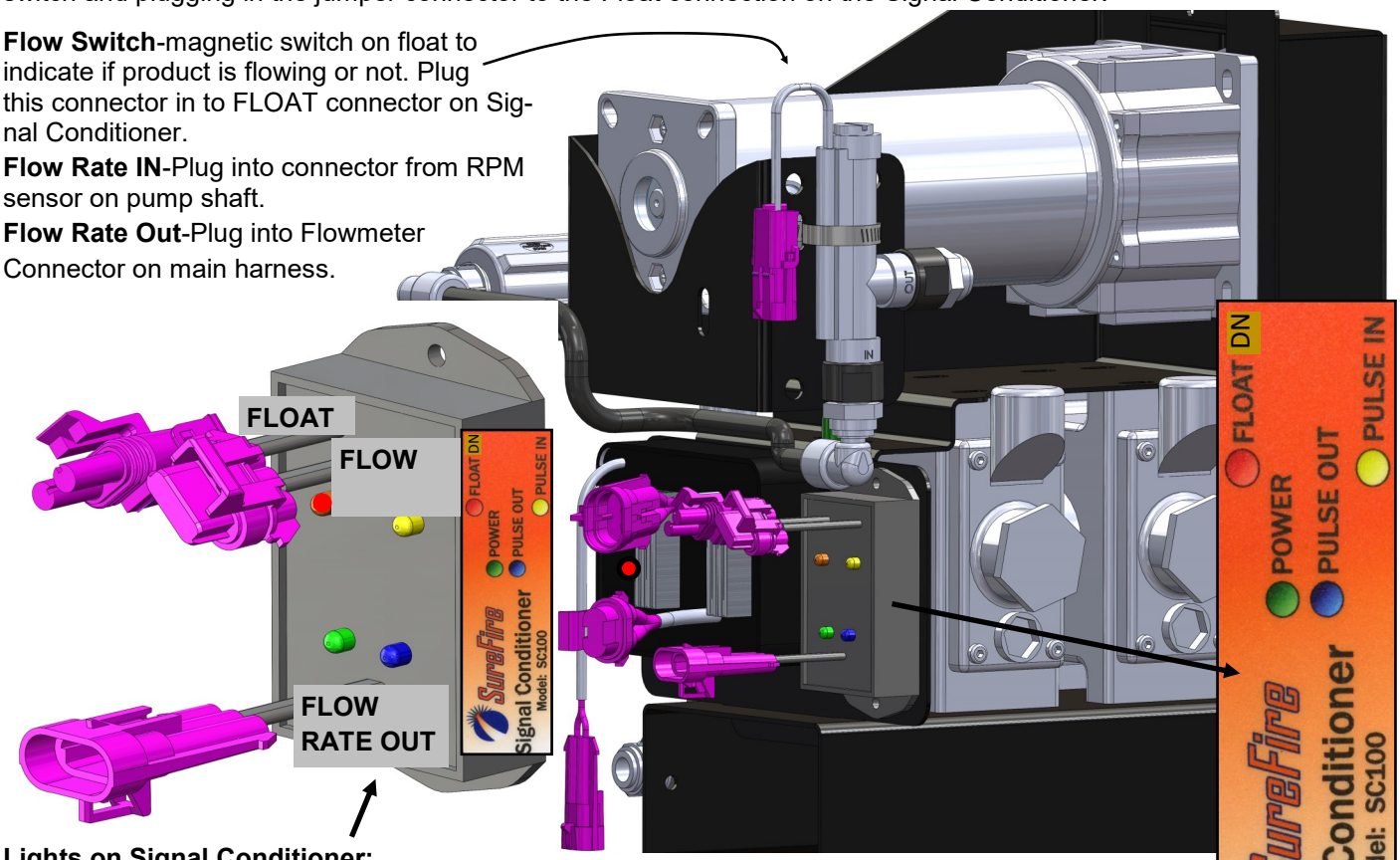
The flowmeter on the Spartan is a pump RPM sensor that is calibrated to convert the pump RPM to flow measured in oz/min. To be certain that liquid is actually flowing, a flow switch with a floating magnetic switch is in the flow line. If the tank is empty, the float will go down, telling the controller that there is no flow. If the flow switch malfunctions and tells the controller there is no flow when there is flow, you can run the system without the flow switch by unplugging the flow switch and plugging in the jumper connector to the Float connection on the Signal Conditioner.

Flow Switch-magnetic switch on float to indicate if product is flowing or not. Plug this connector in to FLOAT connector on Signal Conditioner.

Flow Rate IN-Plug into connector from RPM sensor on pump shaft.

Flow Rate Out-Plug into Flowmeter Connector on main harness.



Lights on Signal Conditioner:

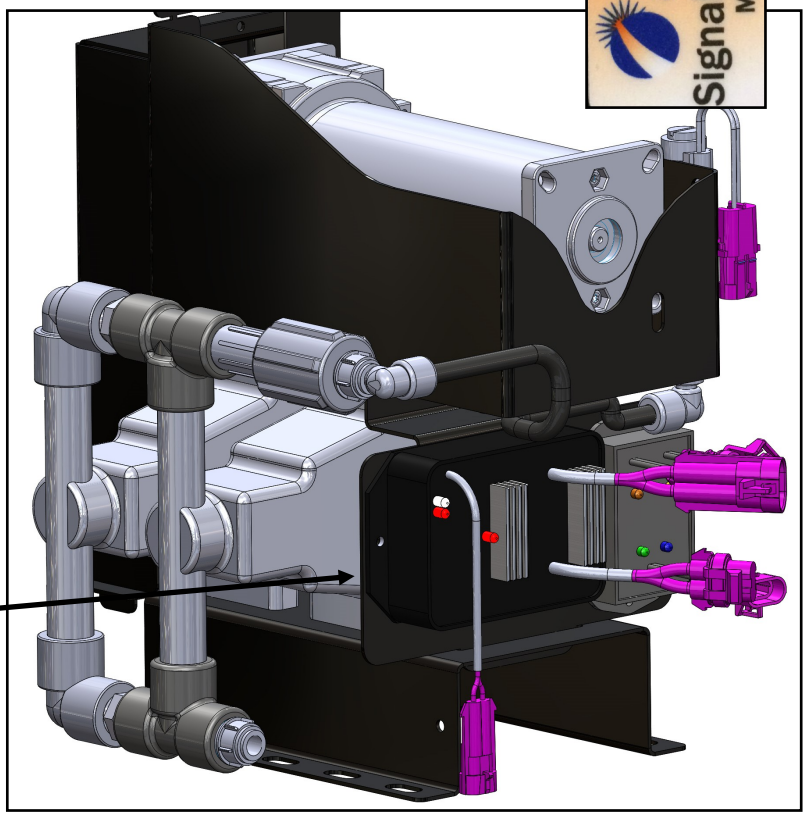
Normal operating mode: Green and Blue steady on. Yellow pulsing quickly.

Green-Steady ON-is receiving power from flowmeter connector on harness.

Blue– should be ON when system is running. Indicates Signal Conditioner is sending out pulses to controller.

Yellow—Quick pulses while system is running indicates it is receiving pulses from the RPM sensor on the pump shaft.

Red-should be OFF. Red light ON indicates that float is down or is malfunctioning if fluid is flowing. Red light ON means no pulses are being sent to the controller. (When Red light first comes ON, pulses will be sent for about 10 seconds). **To bypass the float** (Flow Switch) unplug Flow Switch connector from Float connector on Signal Conditioner, and plug jumper into Float connector. Red light should go out.



Lights on EPD module:

Red light by fins-steady blink (once per second) indicates power from battery. When system is running, this light goes steady red, and red light in corner turns on (maybe not as bright) indicating PWM signal.

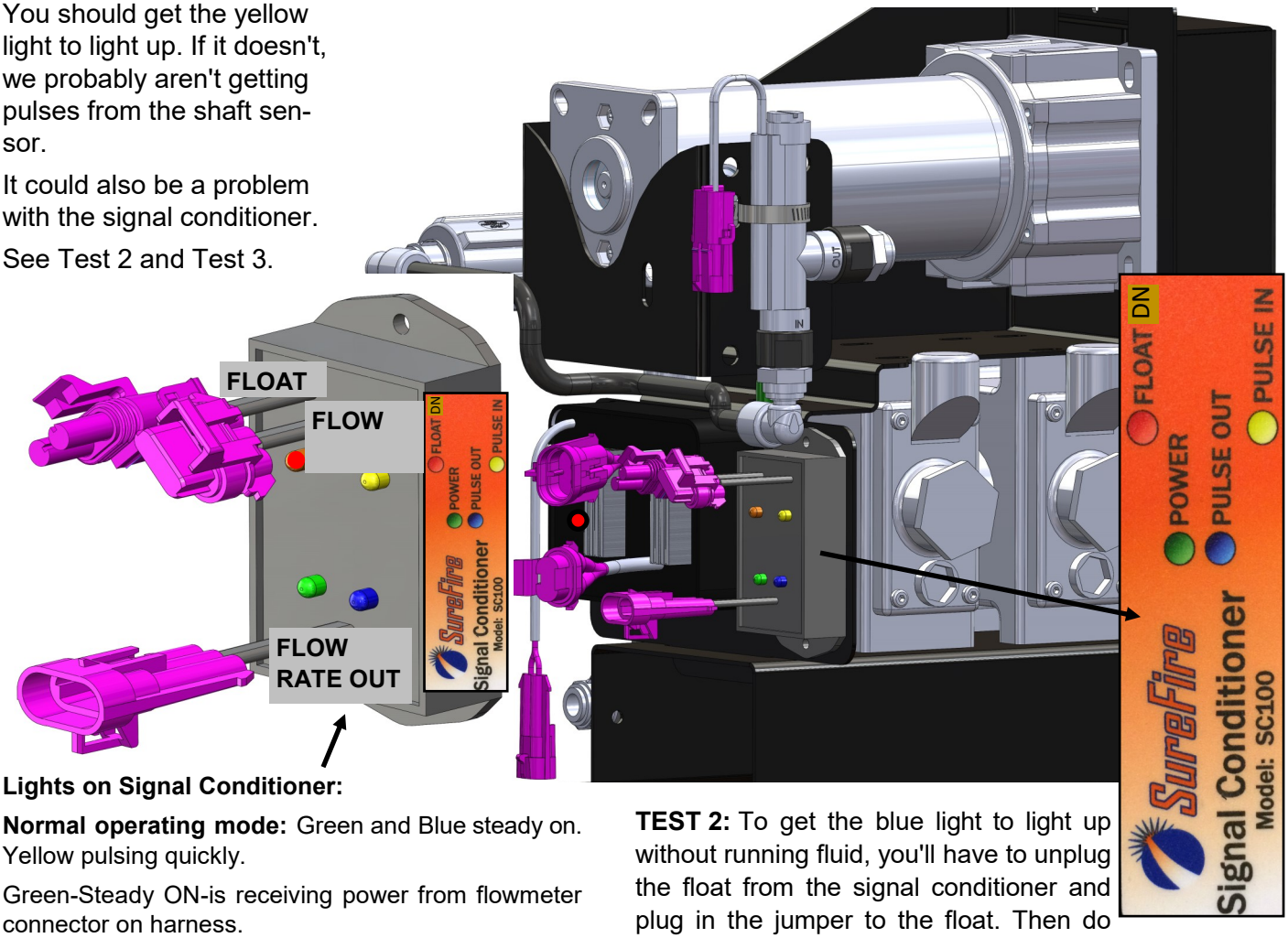
Spartan Tap Test and Signal Conditioner Lights

ISSUE: No yellow or blue lights on Signal Conditioner and No flow reading on display

TEST 1: Unplug the connector where the cable from the shaft sensor plugs into the signal conditioner (Flow rate in). On that Flow Rate In connector take a short wire and tap repeatedly between the two outside pins. You should get the yellow light to light up. If it doesn't, we probably aren't getting pulses from the shaft sensor.

It could also be a problem with the signal conditioner.

See Test 2 and Test 3.



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Lights on EPD module:

Red light by fins-steady blink (once per second) indicates power from battery. When system is running, this light goes steady red, and red light in corner turns on (maybe not as bright) indicating PWM signal.

TEST 2: To get the blue light to light up without running fluid, you'll have to unplug the float from the signal conditioner and plug in the jumper to the float. Then do that tap test, and it should light up the yellow, showing that the conditioner is receiving pulses, and should light up the blue, to show that the conditioner is sending pulses out.

You should be able to see these pulses in this second test on the display. On Sentinel, look at the Diagnostics Tab for Flowmeter Hz.

TEST 3: Plug the flowmeter connector on the pump final harness directly into the connector from the shaft sensor. This bypasses the Signal Conditioner and float. When you run the pump, pulses (flow) should register on the display to verify that the shaft sensor is sending out pulses and that the harnessing can get it to the display. This is a test mode only. The system cannot be run like this.

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