Common Troubleshooting Scenarios

https://support.surepointag.com/search/

Search: ***Troubleshooting***

My rate is bouncing all over and won't lock in… 2

Solution Pump Dry 3-4

No Flow reading 5

Section Valves Won't Open and Other Things 6

My rate is too high and won't come down, Testing LiquiShift . 7

Voltage Testing, EPD Lights and Electric Pumps 7

Addressing Sentinel Modules 8

Sentinel harness layout 9

Sentinel Trunklines Pinouts 10

Sentinel Startup Light Sequence 11

Sentinel Flow Adjustment 12

Connector Pinouts 13-16

https://support.surepointag.com

Watch the SurePoint Ag videos on YouTube

396-4035 Sentinel Manual - Click to download

SurePoint Ag Systems

My Rate is Bouncing All Over and Won't Lock In

****Observations to Make:**

Is the flow really changing? Watch the red balls, watch the output at the row, watch the pressure, watch and listen to the pump. Do these observations go along with the bouncing rate that the screen is showing? Each of these observations is important and may lead to a solution.

If you have the ability to do so with your system, watch the PWM Duty Cycle, Pump RPM, Pressure, and Flow on the screen.

(1) (a) Run a manual test such as Calibrate PWM Limits or Section Test (where you can lock in a PWM Duty Cycle). Will the flow lock in with the control valve at a set position? Use the (+) and (-) buttons to try the pump at different speeds. If the flow locks in here, try number 2.

(b) Run a manual test by putting the solenoid valve in manual override position (pop the red knob up) and controlling the pump by adjusting the hydraulic flow in the cab. Begin by starting a test to open the valves. Start with the hydraulic flow at 10% and gradually increase the flow.

(2) Lower the Valve Calibration number, Valve Response, or GAIN setting.

(3) Be sure pressure is high enough that all the check valves are staying open all the time.

(4) If rate is low, or if needed pump output is very low, open the recirculation knob to allow pump to run faster. If the recirculation is open too much, this also can cause rate fluctuation. If recirculating a lot, plumb the recirculation back to the tank.

(5) Tighten ALL the clamps and inspect ALL the fittings from the tank to the pump. It could be a loose clamp, a loose bung or fitting that isn't screwed tight, a strainer housing that is loose or cracked. There could be a loose or cracked fitting on the pump or a bad o-ring. User will insist there are no leaks. Most times there are NOT visible liquid leaks. Pumps have tremendous suction. If there is the slightest place for air to be sucked in, it will be sucked in, and it will make the flowmeter jump all over the place. User will not want to do this, but many times the issue will not be fixed until they do.

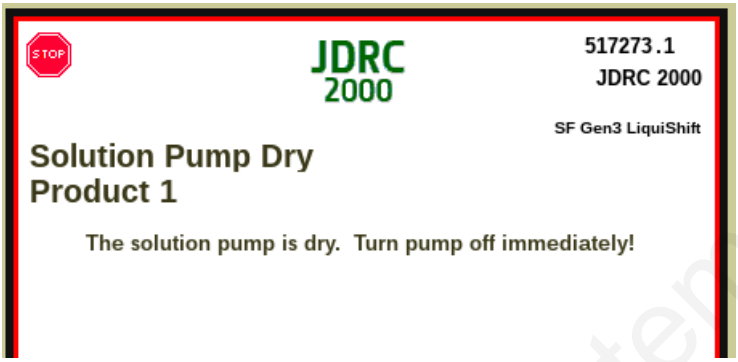
(6) There could be a problem with the flowmeter or with the harnessing from the Rate Controller to the flowmeter. Run a test sitting still and twist and pull on all the connectors from the flowmeter to the rate controller. Take the connectors apart and visually inspect and clean the pins. There can also be unseen corrosion on the strands of wire connected to the pins or terminals. Old flowmeters can also start pulsing erratically.

(7) Don't replace the flowmeter until item #5 above has been done.

(8) Rate bouncing could be caused by a sticky PWM Proportional valve or a bad solenoid on the hydraulic valve block or a bad hydraulic motor on the pump. Consider if it is contaminated oil intermittently plugging the PWM valve. Consider tractor hydraulic issues when everything is running.

Solution Pump Dry

If you've run a John Deere Rate Controller for very long, you've probably seen "Solution Pump Dry", along with the warning, "Turn pump off immediately!



This warning is programmed by Deere to come on if flow is not detected for a couple of seconds. In some cases, the system will be shut down completely a few seconds later.

The warning and shutdown are probably necessary if you are running a centrifugal pump where running dry for a few seconds could burn up the seals or otherwise damage the pump.

Don't worry, though. This is NOT a problem with SurePoint pumps. The SurePoint PumpRight hydraulic pump and the SureFire 12- volt diaphragm pumps used on SureFire Tower systems will NOT be damaged by running dry.

Besides that, the message doesn't actually mean that the pump is not pumping liquid. It means that the controller does not detect liquid flow through the system. Those may be two different things.

On the GreenStar Rate Controller set in Liquid Fert Tool mode this means that the controller is not receiving a signal from the flowmeter indicating that liquid is flowing at a time that the controller is expecting to see flow.

But, on the Rate Controller 2000, the controller looks for evidence of flow from the flowmeter, as well as from a pressure sensor assigned to that product. If the controller doesn't see flow from the flowmeter or pressure from the pressure sensor, it declares SOLTUION PUMP DRY.

The message could mean one of several things:

1) You may have a bad flowmeter or bad wiring or connectors from flowmeter to rate controller, and you actually do have liquid flowing.

Solution Pump Dry (continued)

2) The pump has stopped. On an electric pump system, check the lights on the EPD module. Four quick flashes, followed by a pause, means there has been a low voltage condition from the battery to the EPD.

3) The pump is not getting any liquid (tank is empty, valve closed, strainer plugged)

4) The section valves or A-B LiquiShift valves are not opening.

If the Solution Pump Dry warning appears fairly regularly at the start of a pass:

1) On a **Rate Controller 2000**, increase the PWM Startup setting, and this should go away.

2) On a **GreenStar Rate Controller**, raise the **PWM Low Limit.** The pump will get up to rate faster.

3) Close recirculation as much as possible.

4) Increase the first 2 digits of the Valve Calibration number in PWM Setup.

If these don't fix it, you might consider installing a Flow Return valve and letting the pump run while you turn around.

Repeated Solution Pump Dry warnings at the beginning or at the end of a pass:

Another thing that could cause repeated Solution Pump Dry warnings either at the beginning of the pass or at the end of a pass, could be a situation where the hydraulic pump is plumbed in series with the CCS fan. In this case, the pump will start and stop with the planter. If the fertilizer is set to start with a Height Switch and the planter is operating from another Height Switch, and these two switches are out of sync, the pump, say, at the end of the pass would shut off when the planter switch signaled shutoff, but if the fertilizer height switch has not shut off, the controller is still expecting flow. In this case, sync the height switches or plumb the pump hydraulics differently.

Hopefully, this will cut down some of the Solution Pump Dry warnings. Just remember, though, if you do see one, your SurePoint pump is going to be OK.

Sometimes, the pump stops or flow stops, but the SOLUTION PUMP DRY warning does not show up. This means that the controller is not expecting flow at that time. That's another issue.

SurePoint Ag Systems

If you have NO FLOW reading, but liquid is flowing

This could be a bad flowmeter or it could be a harness issue. On the final pump harness, verify there is 12v between power (red) and ground (black) on the Flowmeter connector. There should be 4-5 between signal (blue) and ground (black). It is best to **check the voltage with a load tester**, if possible. There may be a corroded connection that shows a good voltage check, but it will not run the device under load.

Check all the connectors between the flowmeter and the rate controller. Unplug, visually inspect, clean, push/pull on the wires, plug them back in.

TAP TEST

This will work slightly differently depending on the display and controller in use. The tap test consists of creating a series of quick pulses by tapping repeatedly with a short wire or bent paper clip between the flowmeter signal and ground pins on the flowmeter connector. **(With the SurePoint Tap Tester Tool,** plug the Tap Tester into the flowmeter connector and press the red button repeatedly to send pulses.)

When using **Sentinel Rate Control,** go to the **Diagnostics Tab**. While tapping, observe flow in GPM or Flowmeter Frequency. To get a decent view of GPM, set the Flowmeter Calibration number to 1. If nothing registers on the screen, go back to the next connector and tap there between the signal and ground pins. Do a good visual check on all pin and connectors. Reset the Flow Cal number if you changed it.

On a **JD Rate Controller**, have someone watch the **Delivery System screen at Diagnostics > Readings** while someone taps between the signal and ground wires.

Normally, if the tap test works, the harnessing is good. Occasionally, though, a tap test will work, but there still may be a harness issue, such as corrosion, that degrades the connection so the pulses from the flowmeter do not reach the controller. Sometimes, the corrosion is on the wires that connects to the pins and is not visible unless the connector is taken apart.

If you replace a blue-label flowmeter with a new orange label flowmeter, you need to order a 17842 adapter cable to be able to plug the flowmeter into the older harness.

3-pin AMP SuperSeal

1 - Ground 2 - Power (red) 3 - Signal (blue)

Formula to Adjust Flow Cal Number

(Volume shown on display) / (Volume actually applied) X flow cal number in display = new flow cal

Section Valves Won't Open and other things

1. Is it all the valves or just the even numbered or odd numbered sections? On the 3463 section harness, power and ground for the even and odd come from different pins.
2. Be sure the section harnesses are plugged in correctly. On many setups, there is a connector for Sections 1-6 and a connector for Sections 7-12.
3. On the 3-pin WP Tower section connector, there should be a ***constant 12v*** between pins A & B (Red-12v and Black-ground). If this power is not present, check the voltage while grounding to the frame. If there is no voltage, go back to the next connector and check for voltage there. Some rate control harnesses may have a fuse on the high current power. Check for that. On Deere controllers, go to Diagnostics > Readings > System Voltages > Valve Power should be 12-13 volts. The high current power comes through heavy red and black wires, often to a 2-pin Molex connector. Check that connection and check the voltage there. That power ultimately comes from the battery, through a fuse, through the 9-pin ISO connector on the back of the tractor. Trace back to the battery if needed.
4. On the 3-pin WP Tower section connector, there should be 12v between ***signal (Pin C) and ground*** (Pin B - black) when the valve should be on. Depending on the controller, the signal may show from 0 to 6 volts when OFF. If there is no signal, go back to the next connector and check there. If there is no signal, check the display setup. Does the controller think the section is ON? Turn off Section Control or Task Control or put the sections on Manual Control (Sentinel). When testing with Ag Leader, turn off Auto Swath.
5. If you have 12v constant power and 12v signal, but the valve doesn't open, swap connectors or valves that are close.
6. Remove the actuator from the valve. Test to see if the actuator works. Turn the valve with a wrench to be sure it is free and will turn. Be sure to keep the proper orientation when putting the actuator back. It's possible to get the actuator and valve 180° out of sync, so the valve will actually be closed when the actuator says it is open.

If the valve stays ON (the light stays green) it may be a bad actuator or it may be a mismatch between the actuator board and the controller. Some actuators have a yellow band and some have a black band. See this bulletin: https://support.surepointag.com/documents/1911.

The KZ TX-2 is a 3-way valve. If product will not flow when valve is ON, either move the outlet hose to the other port, or remove actuator and rotate valve ball 180°, and replace actuator.

Wiring Connector:

3-pin WP

Pin A—Red, 12 Volts +

Pin B—Black, Ground -

Pin C—Various, Signal

12V=ON ; 0-6V=OFF

My Rate is Too High and It Won't Come Down

(1) Be sure Minimum Flow Limit is 0 (or low enough -- this is GPM not GPA). (JD > Setup > RATES)

(2) Be sure PWM LOW LIMIT is low enough.

(3) On hydraulic pump, be sure red manual override button on the hydraulic PWM Valve block is down and locked.

(4) Be sure Flowmeter Calibration number and units are correct.

Using Pressure Signal Simulator to test LiquiShift

(checking to see if it will shift from A to B to AB and back)

(1) Plug in the Pressure Signal Simulator (4.5v) to the pressure connector on the final harness in place of the pressure sensor.

(2) Leave the hydraulics turned off. You do not need to run the pump for this.

(3) Start running the system in a test mode. All of the section valves (zip valves) should open. The LiquiShift valves should start with A open. In 3 seconds, it should switch from A to B, and in 3 or 4 seconds more, it should open both A&B.

(4) Unplug the pressure signal simulator. In a few seconds it should shift from AB to B and then to A.

Voltage Testing Tips

If possible use a load-testing voltmeter. This is a device that puts a load on while testing the voltage. Sometimes, a simple voltage test will look OK, but there may be corrosion or other faults in the system so that the wires will not conduct the load needed to operated the device.

If you do not get a voltage reading when testing between the power and ground pins, move your black probe from the ground pin to a grounding place on the implement frame. If this gives a voltage reading, the problem in the harness is with the ground pin/wires.

EPD Lights and Electric Pump Troubleshooting

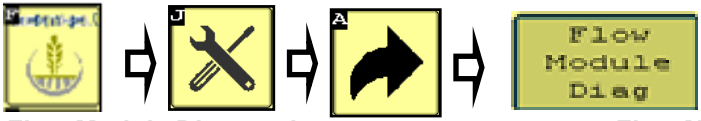
Center Light - Steady 1 blink per second when not running.

When running - Center Light and Top Light (PWM signal)- solid red.

4 quick flashes and a pause - low voltage from battery to EPD. Unplug EPD/battery connection to reset. Try one pump at a time. If pumps won't run, unplug EPD, plug battery power directly to pumps.

Sentinel Flow Module Setup and Configuration

Addressing Sentinel Flow Modules

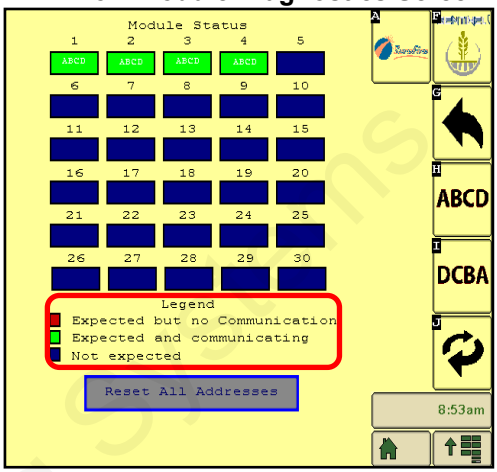


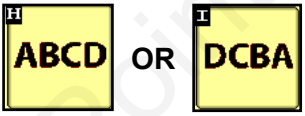
Flow Module Diagnostics

To address the Sentinel flow modules, start by having all the modules plugged in. From this screen, push **Reset All Addresses**. This sends a message to the modules to erase their address. All modules are then unplugged and then plugged back in, in order across the machine (all Prod 1 modules first). As each module is plugged in, Sentinel identifies its location on the machine and the module is then given its new address and it will turn green on the screen. *Have someone watch this screen to be sure each module is recognized as it is plugged in. (Plug in Prod 2 after Prod 1)*

If there is a problem with modules not addressing, be sure the tractor is running to keep the voltage up.

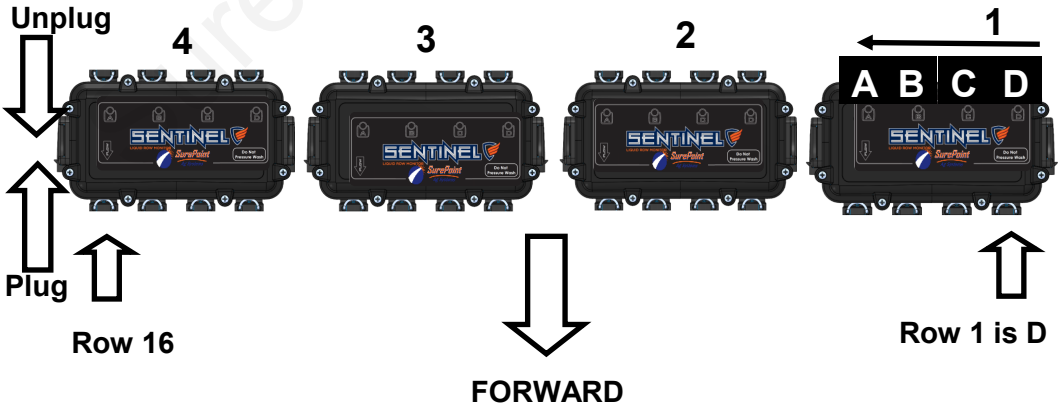
Flow Module Diagnostics Screen





Most machines will have the modules mounted facing forward, causing Row 1 to correspond with row D on the module. Therefore, the orientation DCBA must be selected. Likewise, if the modules are mounted rear-facing, the orientation ABCD will be selected.

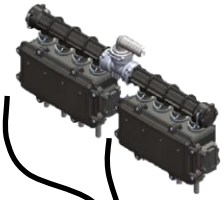
Example 16-Row—D C B A Orientation

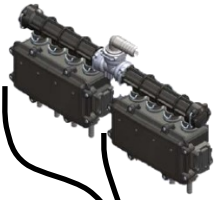


SurePoint Harness Layout for ISO Sentinel

Communication Plug Here

Dust Plug Here





Terminate or connect additional trunklines

Add 4-pin Extension where needed **206-04-XXXX**

The Sentinel flowmeter module is chained together with other modules using the provided trunklines and then later assigned an implement location within the display. The trunkline is connected to the Sentinel module through the port labeled **+12Vdc** while the remaining port is plugged. CAN connections cannot be left open. When a terminator is removed to plug in a trunkline, the terminator must be moved to the end of the trunkline. It is not required to utilize both Bus connections on the main harness. If Meter Bus 2 is not used, plug a terminator in to that connector.

CAN trunkline **208-06-XXXX**

Terminate or connect additional trunklines

Meter Bus 1

Meter Bus 2

Add 4-pin Extension where needed **206-04-XXXX**

CAN/Power in

CAN/Power out (terminate or connect to other ISO device))

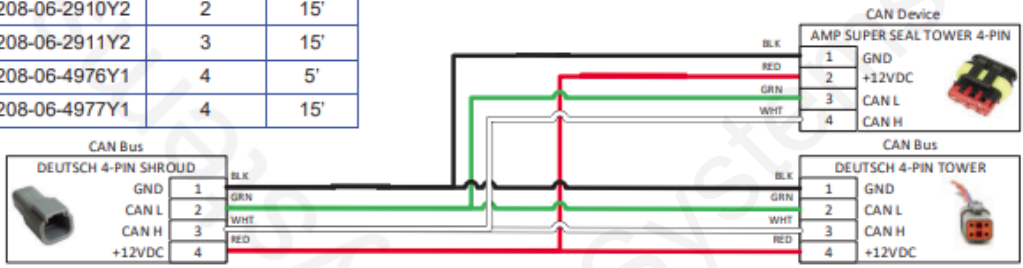
SurePoint Ag Systems

4-Pin Deutsch CAN Trunklines to 4-Pin AMP SuperSeal to connect Sentinel Flowmeter Modules

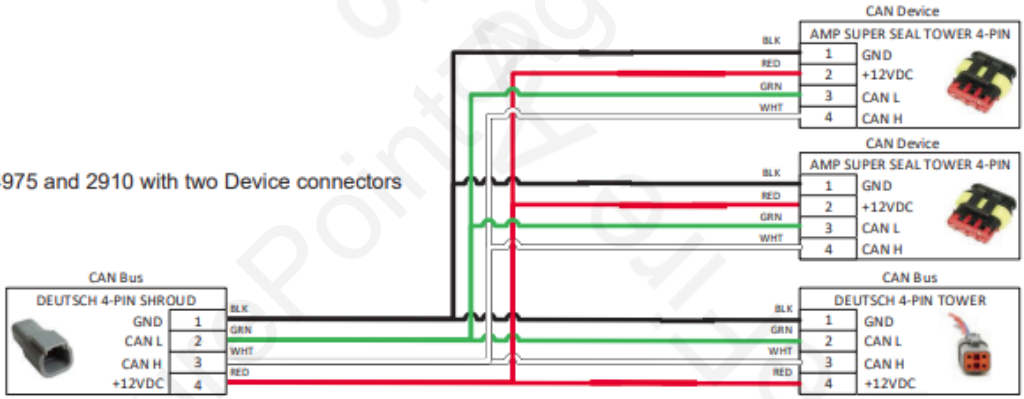
Part #	Number of flowmeter connectors	Length
208-06-2908Y2	1	5'
208-06-2909Y2	1	15'
208-06-4975Y1	2	5'
208-06-2910Y2	2	15'
208-06-2911Y2	3	15'
208-06-4976Y1	4	5'
208-06-4977Y1	4	15'

CAN Device
+ 12v between &1.
1.5 to 2.5 v between 3&1.
+2.5 to 3.5v between &1.

2908 and 2909 with one Device connector



4975 and 2910 with two Device connectors



CAN Bus
+ 12v between 4&1.
+2.5 to 3.5v between 3&1.
+1.5 to 2.5v between 2&1.

2911 is similar to the above, but with three Device connectors.

4976 and 4977 are similar to the above, but with four Device connectors.

The Deutsch 4-pin Tower CAN Bus connector (bottom right of each drawing above) is plugged into another trunkline or, if it is the last trunkline, it is plugged into a Terminator.

Sentinel Startup Light Sequence to identify Sentinel Multiflow Modules

After the Sentinel has been set up, when the Sentinel is turned on there will be some lights that light up on the flowmeter units. The Sentinel Multiflow unit that contains Rows 1-4 (Multiflow 1) should have an alternate flashing of lights A-B and C-D. (A-B, C-D, A-B, C-D,A-B, C-D, A-B, C-D, A-B, C-D). While these lights are flashing on Multiflow 1, Multiflow 2 (Rows 5-8) should have light B lit. Multiflow 3 (Rows 9-12) should have lights A & B on. Multiflow 4 (Rows 13-16) should have light C on.

The address of any module can be confirmed by unplugging it and watching the light pattern as it is plugged in.

Multiflow Module 1 will alternately flash A-B, C-D several times when the Sentinel is turned on.

Multiflow Module 2 will show light B when the Sentinel is turned on.

Multiflow Module 3 will show lights A & B when the Sentinel is turned on.

Multiflow Module 4 will show light C when the Sentinel is turned on.

6 = 2 + 4 7 = 1 + 2 + 4
9 = 1 + 8 10 = 2 + 8 11 = 1 + 2 + 8
12 = 4 + 8 13 = 1 + 4 + 8 14 = 2 + 4 + 8
15 = 1 + 2 + 4 + 8

Module 5 should have lights A & C (1 + 4) come on for 3 seconds when it is plugged in. Unplug the module, watch the lights as you plug it back in.

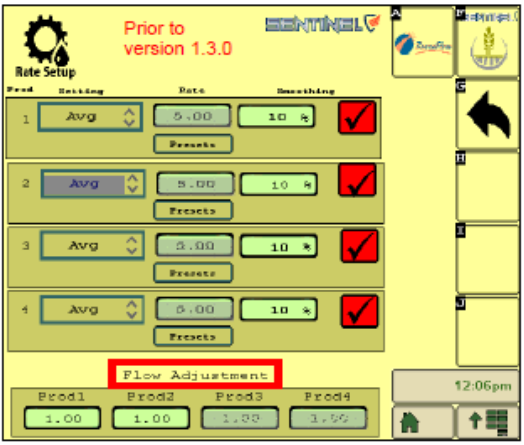
Other LED Signals

When liquid is flowing, there will be a flashing of LEDs on the channels with flowing liquid, with the frequency proportional to the flowrate.

When liquid is not flowing, the LED on each channel will be lit to indicate there is liquid in the unit. (These lights will blink off shortly once every 3 seconds.)

When liquid is not flowing but is present in the flowmeter, if the LED is OFF (with a short blink every 3 seconds), that indicates the flowmeter on that row is not detecting any liquid. If all rows are like this, it could indicate a low conductivity fluid that the units will not read. If one or two rows are like this, it could be a marginally conductive liquid or faulty flowmeter on that channel. Clean the inside tube with a soft cloth.

Sentinel Flow Adjustment - fine-tuning the Sentinel flowmeters



When Sentinel Row Monitoring is being used, at times there may be a slight discrepancy between the flow or rate shown by the main flowmeter on the Rate Control system and the Sentinel flowmeter modules on the row. First, be sure the main flowmeter is measuring accurately.

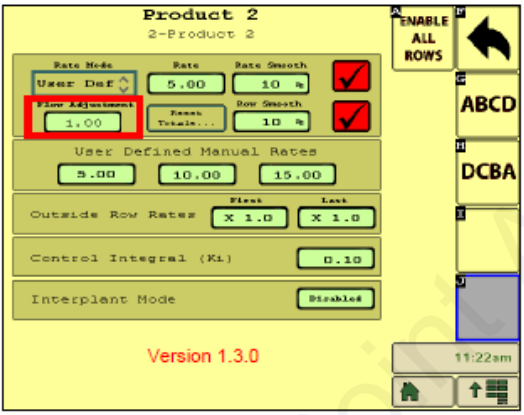
Flow Adjustment - Use this to synchronize the Sentinel flowmeter modules with the main system flowmeter. Once the accuracy of the main flowmeter has been confirmed, change the Flow Adjustment factor as needed to synchronize the Sentinel reading with the main flowmeter reading.

Main Flowmeter GPM (or GPA)

Sentinel Total Flow GPM (or GPA) =

Flow Adjustment Factor

(If different from 1.00, this should not be much different. Generally, will be between 0.95 and 1.05.)



Beginning with version 1.3.0, Sentinel has the ability to fine-tune the flowmeter on each row.

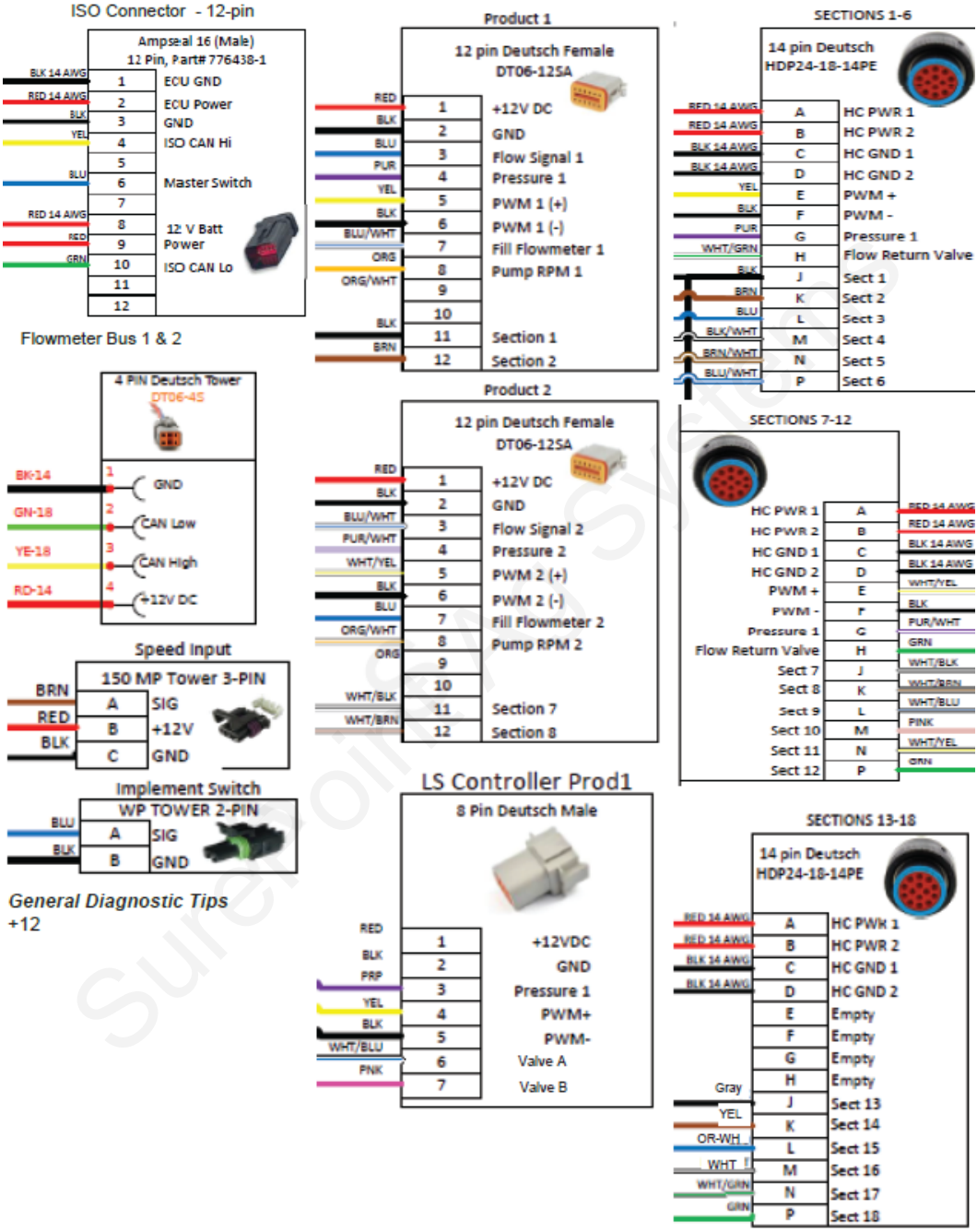
An example might be like this while using **Row Monitoring:**

Row 7 always shows that it is a little low. Do a catch test with Row 7 and several other rows to verify if it is actually low. If it is low, check the plumbing and take steps to increase the flow on that row.

If the catch test shows that Row 7 actually is putting out the same as the other rows, go to the **Row Detail Screen and Pause Row Scan** and use the ***Flow Adj*** feature. Increase the Flow Adj. Factor from 1.00 to 1.05. Adjust as needed to get that Row to display correctly.

For Sentinel Row Control: If catch tests show that a row is not putting out the right amount, go to the **Row Detail Screen, pause Row Scan, and change the Flow Adj number.** ***Increase the number if that row needs to put out more. Decrease the number if that row needs to put out less.***

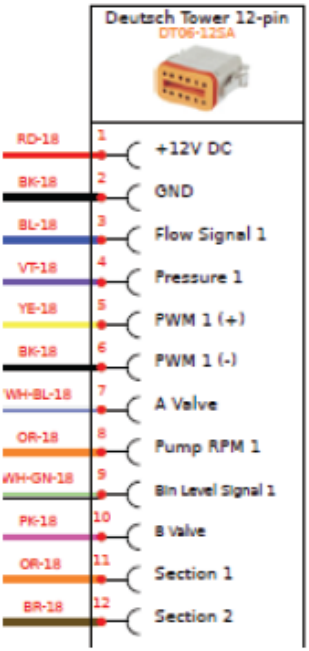
208-06-5022Y1 Connector pinouts for Rate Control and Row Control



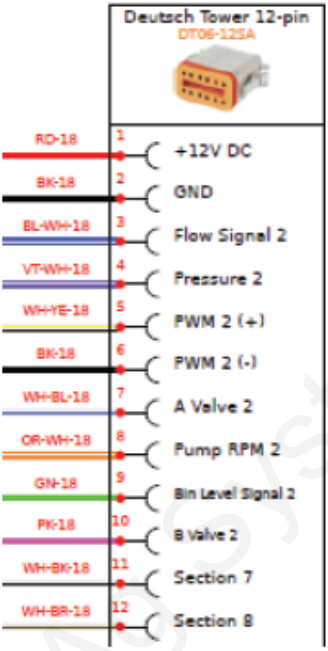
SurePoint Ag Systems

Connector pinouts for Gen3 LiquiShift Rate Control

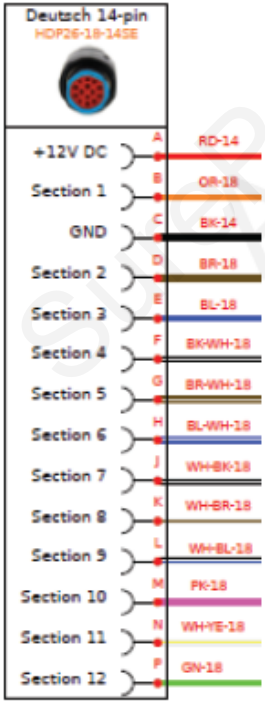
Product 1



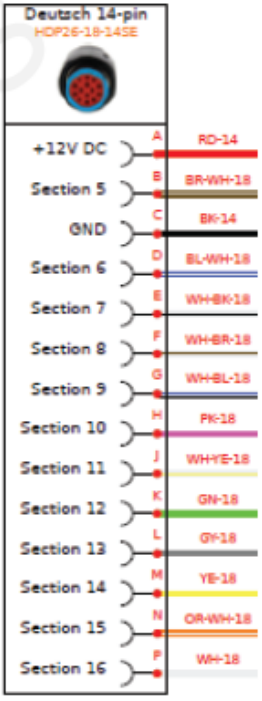
Product 2



Left Sections



Right Sections



396-5806Y1

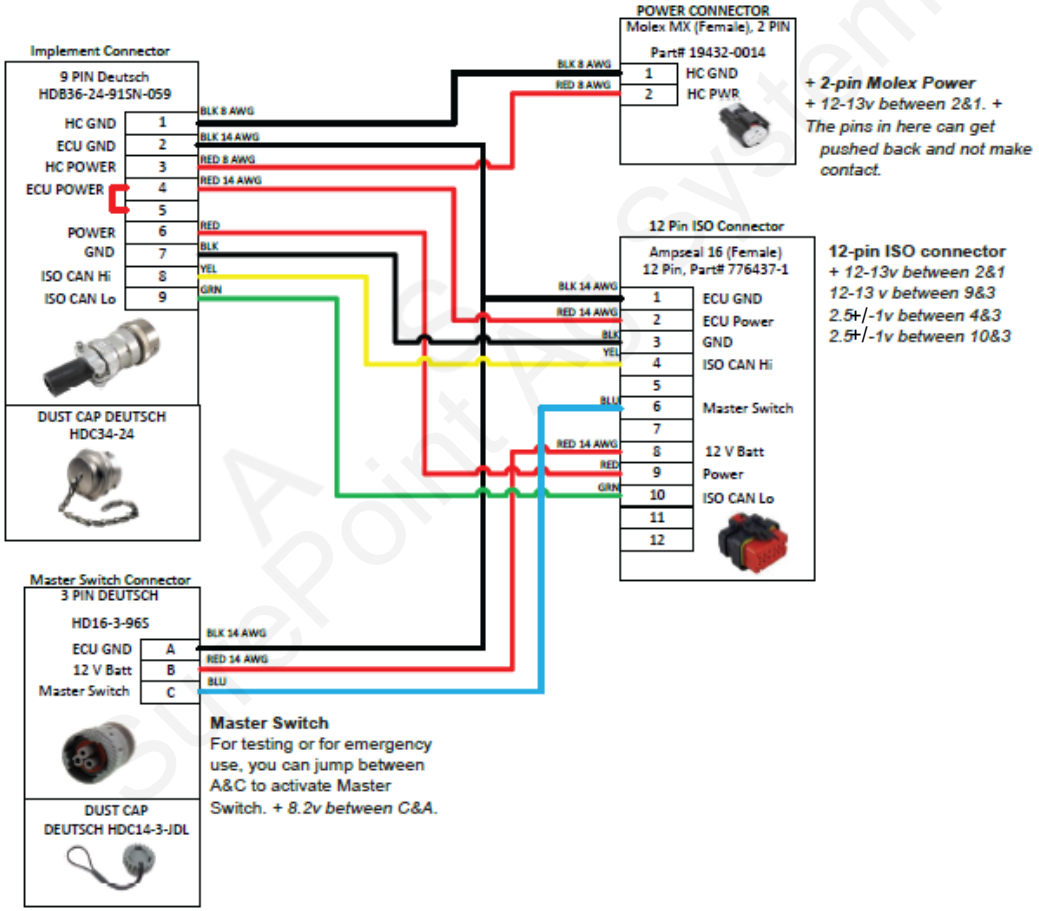
SitePoint Ag Systems

214-00-3553Y1 Thru 214-00-3557Y1

Front Extension Harness – (9-Pin ISO Connector w/ 3-Pin Master Switch & 12-Pin ISO and 2-Pin Molex Power)

Wire 18AWG unless otherwise specified

+ Use this for troubleshooting harnessing, voltage, or communication issues. Some issues may need to be traced back to the 9-pin ISO connector. There is a fuse between the 9-pin ISO connector on the back of the tractor and the battery.



Notes:

Pressure

150 MP Shroud 3-pin

PUR	A	Signal
RED	B	+12V
BLK	C	GND

Include Dust CAP

Final Pump Harness Connector Pinouts

Flowmeter

AMP SUPER SEAL TOWER 3-PIN

BLK	1	GND
RED	2	+12V
BLU	3	Signal

PWM

150 MP Tower 2-PIN

YEL	A	PWM +
BLK	B	PWM -

Pump RPM

WP TOWER 3-PIN

RED	A	+12V
ORG	B	Signal
BLK	C	GND

Include Dust CAP

SurePoint Ag Systems