

TRIMBLE FIELD IQ *AgXcel Quick Start Setup*



PLEASE NOTE: YOUR SETUP MAY VARY!

The screenshots in this guide represent a typical AgXcel Liquid Fertilizer System setup. See your equipment operator's manual for safety information and additional setup and operating information. Please ensure you have the latest firmware installed!

MENU STRUCTURE FOR LIQUID RATE CONTROLLER



Home

- Support
- System Information
- Camera



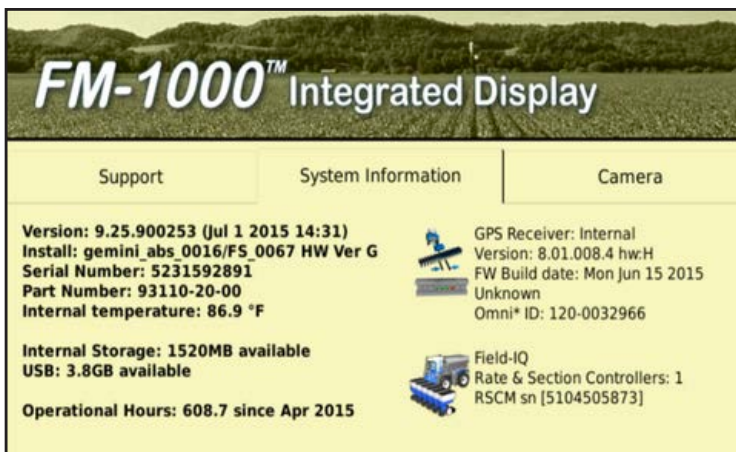
Configuration

- Setup
- Calibrate
- Diagnostics



Config Selection

- Display
- Vehicle
- Implement



System Information

From the home screen, you can select 3 tabs; Support, System Information and Camera. The System Information tab is shown above. This will show what Trimble components are properly connected to your display. If your fertilizer system quits functioning, first check that the Control Module is still recognized on the display. If not, inspect the Trimble wiring harness connections or consult your Trimble dealer.

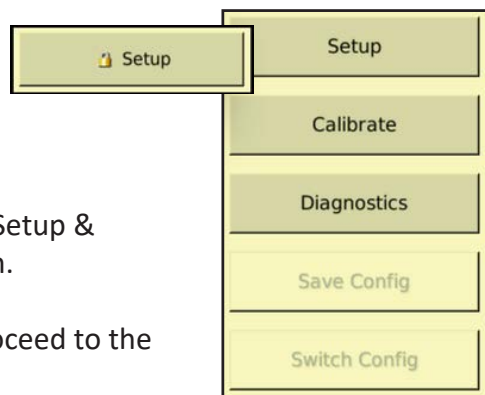
CFX-750 and FM750 Users

Information in this manual is applicable to the 750 except for screen shots shown in the Setup & Operation. The calibration and setup values in this section DO apply to the 750. However, the 750 has a completely different screen layout and menu structure that is not shown in this manual. Use your Trimble manual to navigate, then enter the appropriate numbers from the AgXcel manual.

Configuration – Setup & Calibrate

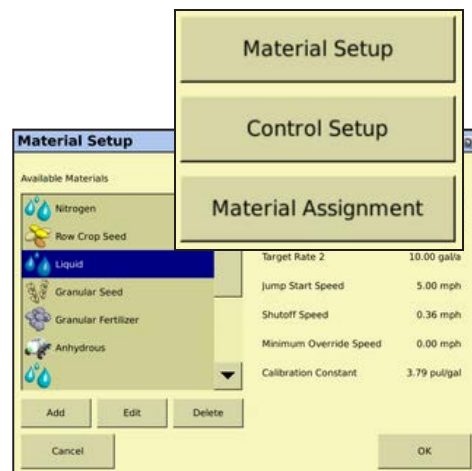
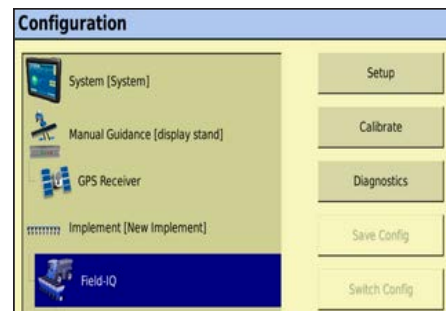
In the Setup & Calibrate menus, you will set the Trimble Field-IQ to work properly with the AgXcel Fertilizer System. Carefully follow these steps to first make sure you have the proper settings. Then, run the tests shown to verify your fertilizer system is ready to go to the field.

- From the home screen, choose **Setup & Diagnostics**.
- The Configuration screen below will appear. Choose **Field-IQ**. The Setup & Calibrate buttons will be locked, shown by a padlock next to them.
- Push **Setup**, then enter “2009”
- After entering the code, the locks will disappear. Push **Setup** to proceed to the next steps.



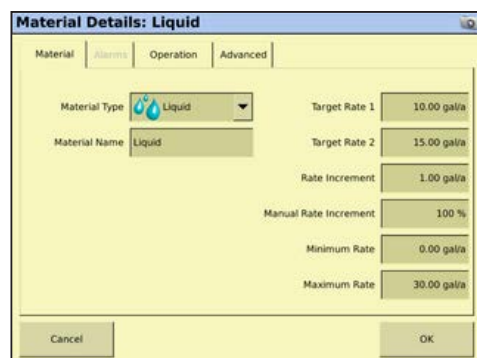
Configuration – Setup cont.

- Select **Field-IQ** and press the **Setup** button.
- The next page will display 3 selections, press the “**Material Setup**” button.
- Select one of the available material profiles or press **Add** to add a new material. Press **Edit** to change any of the parameters of the material selected.
- **Material Type** will need to be set to **Liquid**.
- Give the material a name that makes sense.
- Set **Target Rate 1 & Target Rate 2** as desired.
- Rate Increment increases or decreases your **Target Rates** by this amount each time you press the rate **Adjustment Switch** on the **Master Switch Box**.
- **Manual Rate Increments** work when the **Rate Switch** is in the **Manual Position**. This number controls the speed at which the valve increases or decreases when you press the **Rate Adjustment Switch** on the **Master Switch Box**.
- **Minimum Rate** is typically set at **0**.
- **Maximum Rate** is set at something higher than the maximum rate that will be applied.

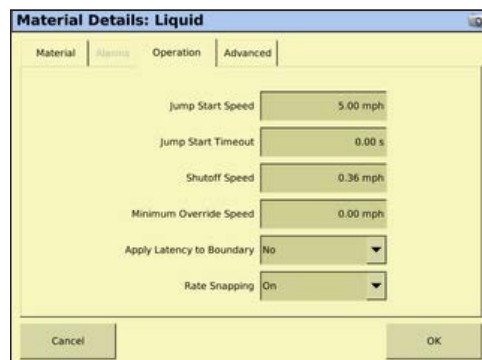


These parameters may be adjusted as desired.

- **Jump Start Speed** is the speed the system will ramp up to when the operator pushes the **Jump Start** button on the **Master Switch Box**. **3.0 – 5.0 mph** is a good setting for this.
- **Jump Start Timeout** allows the **Jump Start Speed** to run for a specific amount of time.
- **Apply Latency to Boundary**: set as needed so the system begins applying when needed.



AgXcel recommends setting the **Rate Snapping** to **On**. This will smooth out the rate fluctuation seen on the screen. If you are within the rate smoothing range, the applied rate will just show your target rate and not small deviations from target rate.



Setup - Control

If this is your first time setting up the **Trimble Control**, there will be **no Locations** entered. In that case, press **Add** and enter the information for a location. If there is a location and material that has been created already, you can select and/or edit.

Material | Layout | Section Control | Rate Control | Sensors

Available Materials

- Nitrogen
- Row Crop Seed
- Liquid**
- Granular Seed
- Granular Fertilizer
- Anhydrous

Material Type: Liquid

Target Rate 1: 10.00 gal/a

Target Rate 2: 15.00 gal/a

Jump Start Speed: 5.00 mph

Shutoff Speed: 0.36 mph

Minimum Override Speed: 0.00 mph

Buttons: Cancel, Set Location Name, Next >>

Control Setup

Location	Material	Module	SN	Status
NE	Liquid	RSCM	5104505873	Master is off

Buttons: Add, Edit, Delete, Cancel, OK

Material

- Select your desired material from the **Available Materials**

Layout

- From the Layout screen, you can enter a **Location Name** such as **Front Tank**, **Rear Tank**, etc. If desired, you can set up the **Bin/Tank Setup** to allow the system to track how much material is left in the tank.
- (**OPTIONAL**) If you would like to let your controller monitor how much material is left and set alarms when the material is getting low, set your values in the **Bin/Tank Setup**.

Material | Layout | Section Control | Rate Control | Sensors

Location: Enabled

Location Name

Bin / Tank Setup

Row Offset Setup

Material Controlled By: Switch Boxes

Buttons: Cancel, Set Location Name, Next >>

Virtual Bin/Tank Setup

Status: On

Capacity Units: Default Units

Bin Capacity: 0.00 gal

Current Volume: 0.00 gal

Partial Refill: 0.00 gal

Warning Level: 0.00 gal

Trip Area: 0.00 a

Buttons: Refill Tank/Bin, Partial Refill Tank/Bin, Reset Trip, Cancel, OK

Section Control

- If you have section control set up on your liquid fertilizer system, enable it by having the Section Control set to **On**
- Press **Setup** next to **Section Control Module Location**

- On the **Section Control Module Setup** Screen, set the **Number of Modules** in your system.
- Select the **Module's Serial Number**.
- Set the number of **Sections** for your system.
- Press **Section Widths**.
- Set the **widths** of your sections

- Press the **Setup** button next to Section Control to take you to the Section Control Setup screen
- Set Section Control Type to: **“Boom Valve”**
- Set **Off When Stopped** to: **“Yes”**
- Press **“Latency”** button to setup latency.
- **On Latency: 0.50 s**
- **Off Latency: 0.00 s**

***Adjust these latency settings as necessary in the field.**

Rate Control

- Select the **Rate Control** tab at the top of the screen.
- Set **Rate Control** to **ON**
- Set **Number of Nozzles** (number of rows)
- Set **No/Low Flow Timeout** to 45 s for troubleshooting so the system does not shut off too quickly.
- Press **Setup** next to **Rate Control Module Location**.
- Set the correct information on the **Rate Control Module Setup** screen.
- Press **OK**

- Trimble will take you back to the screen you see above. On **Drive Setup**, press **Setup**.
- **Rate Control** (Continued)
- Set up the **Valve Setup** as shown:
- Valve Type: **PWM**
- Valve Behavior When Sections Closed: **Close**
- Auxiliary Valve: **Disabled**

(**OPTIONAL:** If using an **Aux/Dump** valve to keep the pump running when application stops so the system will resume applying at the **Target Rate** immediately upon restart, set **Auxiliary Valve to Dump**, then set **Valve Behavior when Sections Closed** to either **Lock in Last Position** or **Lock at Minimum**. This setup requires section valves with an additional dump valve plumbed to return flow to the tank when application stops.)

Press **Feedback Setup** button on the **Drive Setup** page.

Set the Feedback Setup as shown:

- **Flow Meter Type:** Other
- **Flowmeter Calibration:** See AgXcel Flow Meter Guide
- **Minimum Flow:** 0.0 GPM (Can be set to the minimum specification for the flow meter.)

Flow Meter Guide



ORION 2+ MAGNETIC FLOWMETER MODELS

Orion 2+ Magnetic Flowmeters:

- 0.053 - 5.3 GPM.....11355
- 0.53 - 53 GPM.....1135
- 2.11 - 211 GPM.....284

Check the yellow sticker on your manual packet for your flow calibration number or the side of the flowmeter



ORION 3 MAGNETIC FLOWMETER MODELS

Orion 3 Magnetic Flowmeters:

- 0.04 - 1.6 GPM (DN3).....75712
- 0.08 - 3.17 GPM (DN4).....37854
- 0.26 - 10.5 GPM (DN7).....11356
- 0.52 - 21 GPM (DN10).....4245
- 1.45 - 58 GPM (DN17).....2063

Pressure Sensor Setup

Select the Sensor tab

Set up the Sensor setup as shown

Sensor Type: Liquid Pressure

Name: Transducer (or other name)

Alarm: Enabled

Suggested Alarms:

Warn if Below:

GX5 (hydraulic).....0

GX2 (electric).....0

Synergist.....0

Warn if Above:

GX5 (hydraulic).....80

GX2 (electric).....25

Synergist.....35

Sensor Setup will take you to a screen where you can select the Field-IQ Module that is controlling this sensor.

REMINDER: The pressure sensor is for informational purposes only and does not control the system in any way.

To finish the Pressure Sensor setup, it will be necessary to go to **Field-IQ Calibration** and select **Pressure Calibration** and the name of the pressure sensor you set up.

Set the following as shown

Calibrate Type: Point/Slope

Slope: 50 mv/PSI

Add Sensor

Sensor Type: Liquid Pressure

Name: New Sensor

Alarm: Enabled

Warn if below: 0.00 psi

Warn if above: 0.00 psi

Warn after: 3.0 s

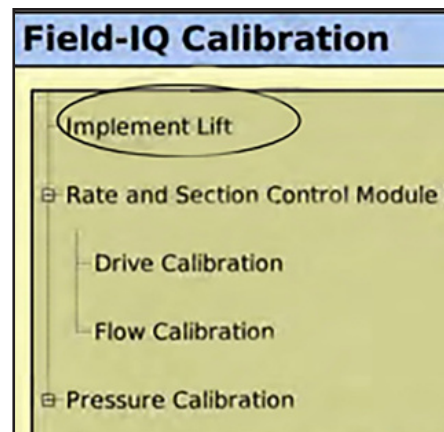
Sensor Setup

Field-IQ Calibration

- [-] Rate and Section Control Module 5104505873
 - Drive Calibration
 - Flow Calibration
- [-] Pressure Calibration
 - New Sensor - Module 5104505873

Implement Lift Switch Calibration

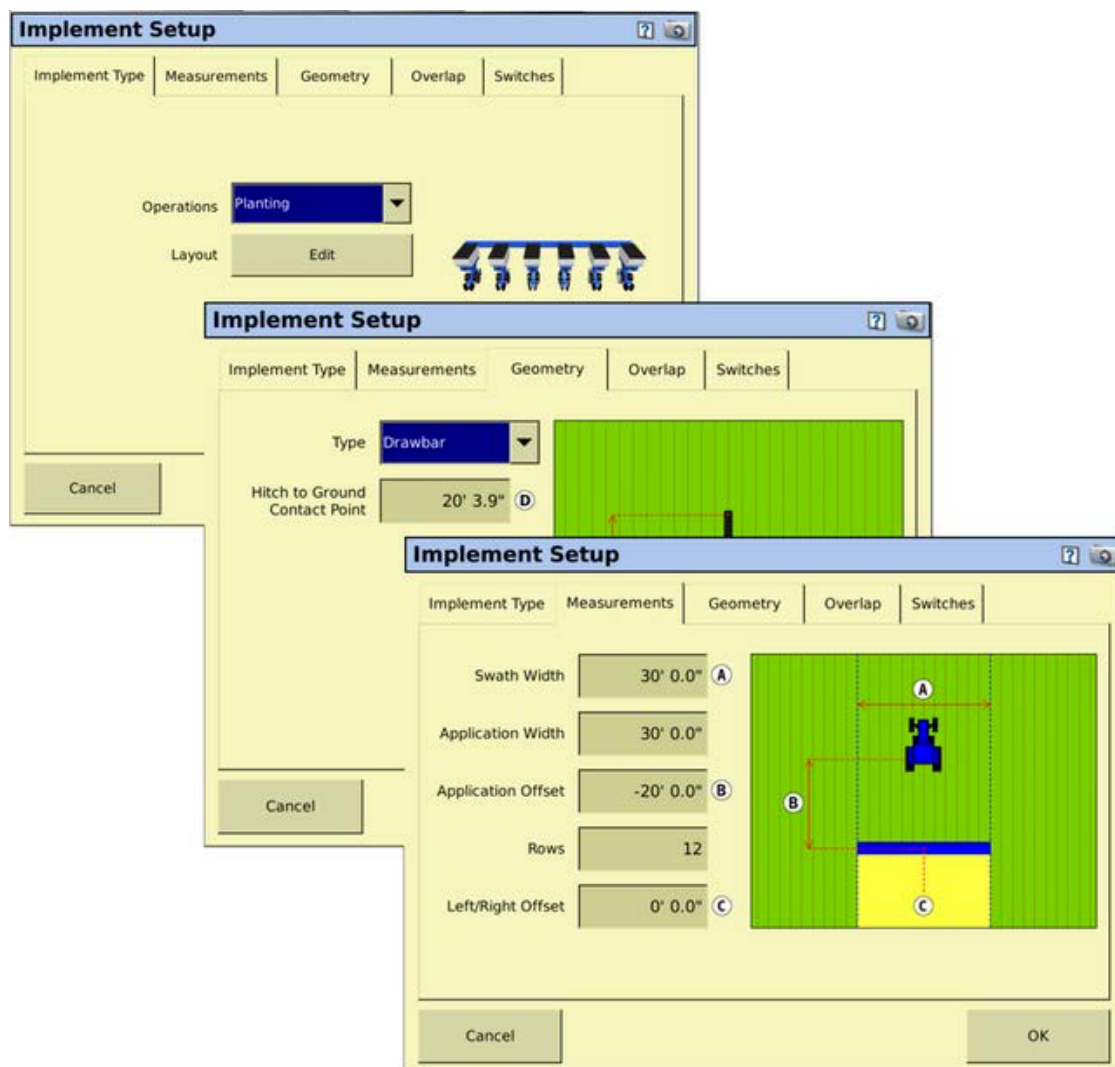
- From the **Field-IQ Calibration** screen, select the **Implement Lift** option
- Raise the implement and then tap **Next**
- Lower the implement and then tap **Next**
- Tap OK to return to the **Field-IQ Calibration** screen



Implement Setup

Implement Setup is where you set the information for the implement you are using. Mainly these settings affect the guidance control. However, if using auto section shutoff, these settings will determine when each section valve shuts off.

Measure your implement carefully and consult with your Trimble dealer for additional assistance with the Implement Setup section.



Field IQ Calibration

- On the Calibration page, select **Field-IQ** then press Calibrate button
- This will bring you to the Field-IQ Configuration screen
- Select **Drive Calibration**
- You can leave **Maximum Flow** set to 0 or enter the **Maximum Flow** rate of your pump in Gal/Min. Then press Next
- Follow the screen instructions to run **Auto Tuning** procedure.
- Press **Next** at the bottom of the screen to go to the **Drive Settings**.
- The settings on the **Drive Settings** screen are all duplicated on the **Advanced Parameters** screen. Press the **Advanced Parameters** button to go to the next screen.
- On the **Advance Tuning** page, set the settings as shown:

Field-IQ Drive Calibration

Drive Limits | Auto-Tuning | Drive Settings | Info

This step of the Auto-calibration allows you to set the maximum flow on your system so it doesn't operate outside its capability.

If the maximum limit of the system is unknown, please leave this setting set to zero to ensure accurate auto tune limits are calibrated.

Maximum Flow: 10.00 gal/min

Back Next

Field-IQ Drive Calibration

Drive Limits | Auto-Tuning | Drive Settings | Info

Turn the Master Switch on and vary between rates to ensure your system performs at the level you require.

Target Speed	5.00 mph	Integral Gain	15.00
Target Rate	10.00 gal/a R1	Minimum Response	0.0 %
Applied Rate	0.00 gal/a	Minimum Position	10.0 %
Master Switch	Off	Allowable Error	1.0 %
		Boost (Feed Forward)	Off

Advanced Parameters

Back Next

Field-IQ Drive Calibration

Advanced Tuning | Advanced PWM

Turn the Master Switch on and vary between rates to ensure your system performs at the level you require.

Target Speed	5.00 mph	Proportional Gain	0.0000
Target Rate	10.00 gal/a R1	Integral Gain	15.00
Applied Rate	0.00 gal/a	Differential Gain	0.0000
Master Switch	Off	Minimum Response	0.0 %
Upper PWM Limit	100.00 Hz	Allowable Error	3.0 %
Lower PWM Limit	0.00 Hz	Process Gain	0.180000
Comparator Limit	100.00 Hz	Smoothing Factor (Flow Filter Time Constant)	10.00 %
Ramp Limit	655.00 Hz	Pre Position Open	0.00
Boost (Feed Forward)	Off	Pre Position Stop	0.00

Cancel Accept

- **Upper PWM Limit:** 100

Lower PWM Limit:

GX5 (hydraulic diaphragm)...25
GX5 (hydraulic centrifugal)...25
GX2 (electric).....0

Proportional Gain: (Adjust as needed)

GX5 (hydraulic diaphragm)...10
GX5 (hydraulic centrifugal)...3
GX2 (electric).....10

Integral Gain: (Adjust as needed)

GX5 (hydraulic diaphragm)...0
GX5 (hydraulic centrifugal)...0
GX2 (electric).....0

Minimum Response: (Adjust as needed)

GX5 (hydraulic diaphragm).....20%
GX5 (hydraulic centrifugal).....20%
GX2.....0%

Allowable Error:

GX5 (hydraulic diaphragm)...1%-3%
GX5 (hydraulic centrifugal)...1%-3%
GX2.....3%

Note: The TMX-2050 and newer versions of the FMX-1000 use Proportional Gain instead of Integral Gain.

Smoothing Factor:

GX5 (hydraulic).....1%-3%
GX2.....3%
Synergist.....1%

Advance PWM Tab

- Press the Advance PWM tab On the Field-IQ Drive Calibration. Set the settings as shown: **Base PWM Frequency**

GX5 (hydraulic diaphragm)...100

GX5 (hydraulic centrifugal)...122

GX2 (electric).....100

Dither Frequency0

Dither Amplitude0

Dither Control:.....Absolute

Flow Calibration

- Select **Field-IQ – Calibrate** on the Calibration screen. This brings up the screen where you can select Flow Calibration.
- The **Flow Calibration** numbers may have already been set in the Drive Setup. You can verify or update the settings here.

Field-IQ Drive Calibration

Advanced Tuning | **Advanced PWM**

Target Speed	5.00 mph	Base PWM Frequency	100 Hz
Target Rate	10.00 gal/a R1	Dither Frequency	0 Hz
Applied Rate	0.00 gal/a	Dither Amplitude	0 %
Master Switch	Off	Dither Control	Absolute

PWMUpper Limit - 100%

PWMLower Limit - 20%

Accept

Field-IQ Calibration

Rate and Section Control Module 5104505873

- Drive Calibration
- Flow Calibration

- After pressing “**Run Calibration**”, a screen that will allow you to input your **Target Rate and Speed**. Enter your typical application rate and field speed. During calibration, the system will run at the correct flow for this rate speed.
- You will need a **stop watch** to measure time. AgXcel recommends running the test for some duration in minutes for simple math. When your containers are in position under multiple fertilizer outlets, press the Start Flow, then turn on the Field IQ master switch and start your timer. The system will begin to run. When your containers are near full, push Stop Flow.
- Now you will need to measure the amount of liquid caught. The number you enter must be in gallons per minute per row.
 - Find total amount caught in ounces.
 - Divide total ounces by number of rows caught.
 - Divide ounces / row by 128 to convert to gallons / row
- After entering the amount caught, the Flow Calibration number will automatically change. If it has changed more than 5%, review your catch test and repeat.

Run Calibration

OK

Target Rate

0.25 gal/a

Speed

10.00 mph

Rate and Section Control Flow Calibration Result

Measured Flow/Nozzle

1.50 oz/min

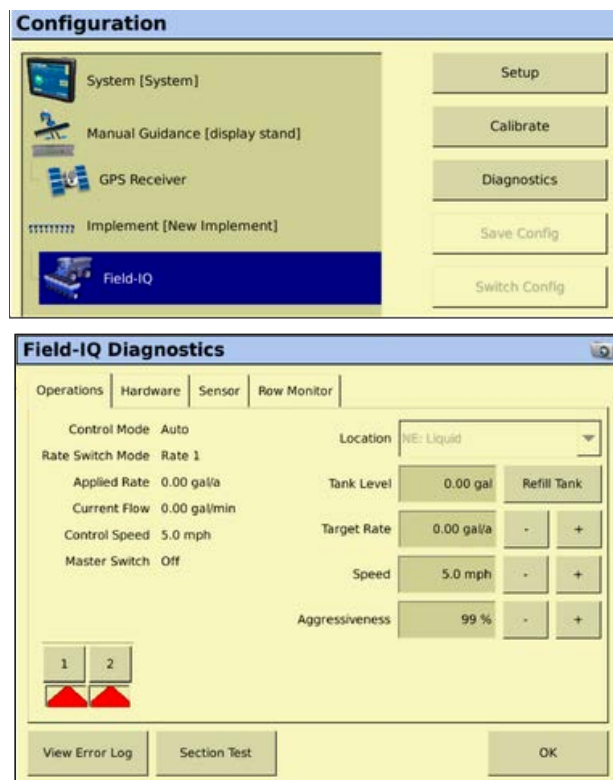
Cancel Arm Pump OK

NOTE: AgXcel recommends running this procedure to verify set up is completed correctly. We recommend changing the flow calibration back to the standard ion flow meter calibration shown on the flow calibration on page.

Initial Operation Instructions

AgXcel highly recommends you perform these exact steps with water to verify system is correctly installed and ready for field use.

- From the **Configuration Screen**, select **Field-IQ**, then **Diagnostics**. (If the Diagnostics tab is grayed out, you probably need to close a Field)
- Make sure that your pump is ready to be tested. Raise the implement and then tap **Next** Press the + next to **Speed** to simulate a **Speed** signal.
- Turn the **Field-IQ** master switch (#5) **On**.
- Push each section valve button and verify each valve is working.
- Turn **Switch #2** to **Manual** and open the section valves. Use **Switch #1** to increase flow. Does “**Current Flow**” display a flow rate? Is it stable after the system is primed? Do the increase & decrease buttons increase & decrease flow?
- Move **Switch #2** to **rate 1** and set speed to your typical field speed.
- The system should begin to pump liquid now in automatic control mode. ***Is the flow in GPM stable? Is it applying the correct rate? (applied rate = target rate?)***
- Change rate using screen buttons or switch #1 to increase/decrease rate or switch #2 to go to rate 2. ***Does applied rate change to equal target?***
- Close 1 section valve, does flow decrease? Does applied rate still equal target rate?***
- Change speed and target rate to minimum and maximum values. ***Does the system perform at these values? Does the system pressure seem reasonable (remember fertilizer will increase pressure over water)?*** Use “Sensor” tab at the top of the page to read pressure sensor value (If equipped).



Running the System with water will create much lower pressure than fertilizer.



TROUBLESHOOTING

Why am I Over-Applying?

- Ensure that your PWM Low Limit setting is lower than the current Duty Cycle. This setting can be found under Field IQ > Calibrate > Drive Calibration. If your PWM Low Limit is set too high, then the liquid controller will not allow the pump to apply at a lower Duty Cycle than the set low limit.
- Ensure that your Minimum Flow Rate is set to 0. This setting can be found under Field IQ > Setup > Rate Control Tab > Drive Setup.
- If you are using the GX5 Hydraulic Pump, ensure that the manual override valve is set in the close position. If the manual override is opened, then the GX5 pump will ignore the commands from your liquid controller and will only apply fluid based off of your hydraulic flow.

Why am I Under-Applying?

- Ensure that the pump system pressure is not too high, such as over 40 PSI. If your pump system pressure is too high, then you may have an obstruction in your pump or in your plumbing after the pump.
- Ensure that your disk orifice or microtube size is not too small. When the weather is colder, fertilizer can become more viscous, meaning that the pump is creating more pressure so the thicker liquid can be pushed through the same smaller size disk orifice or microtube.
- Ensure that your filter is not fully plugged or partially plugged.
- Ensure all ball valves from the tank to the pump are fully opened.
- Ensure you are not pulling in air from anywhere on the pump or before the pump. Ensure that all poly fittings have plumbers tape, all clamps are tight, all gaskets are in place, no poly fittings are cracked or damaged, all filter cups are screwed on tight and the oring is present and not damaged on the cup.
- If you are using a GX5 Hydraulic Pump, ensure you are providing enough hydraulic flow to the GX5 pump.
- Ensure that your PWM High Limit is set at 100. This setting can be found in your System Settings under Control Valve Setup. If your PWM High Limit is set too low, then the liquid controller will not allow the pump to apply at a higher Duty Cycle than the set high limit.
- If you are using the GX5 Hydraulic Pump, ensure that the manual override valve is set in the close position. If the manual override is opened, then the GX5 pump will ignore the commands from your liquid controller and will only apply fluid based off of your hydraulic flow.
- Ensure that your pressure is higher than at least 10 PSI (check valve size dependent). If you are using a 4LB check valve (blue top), then you will need a minimum of 10 PSI to open all of the check valve. If you are using a 10 PSI check valve (black top), then you will need a minimum of 20 PSI to open all of the check valves. Not creating enough pressure can cause uneven flow to each row and also potentially cause your pump system under apply.

TROUBLESHOOTING

Why is my flow rate surging?

- Ensure that the Threshold set at 10%. This can be found under Configuration Setup > Controller Settings > Rate Error Alarm.
- Lower the PWM Gain. This setting can be found in Configuration Setup > Controller Settings > Control Valve Settings. The higher this value is, the more aggressive the pump system will be. The more aggressive the pump system is, the more the pump can surge, but having a higher valve response rate also means that the pump is able to respond faster to changes in your flow rate. But if the PWM Gain is too low, then the pump can become too slow and take too long to reach your target rate.
- Ensure that your pressure is higher than at least 10 PSI (check valve size dependent). If you are using a 4LB check valve (blue top), then you will need a minimum of 10 PSI to open all of the check valve. If you are using a 10 PSI check valve (black top), then you will need a minimum of 20 PSI to open all of the check valves. Not creating enough pressure can cause uneven flow to each row and also potentially cause your pump system under apply.

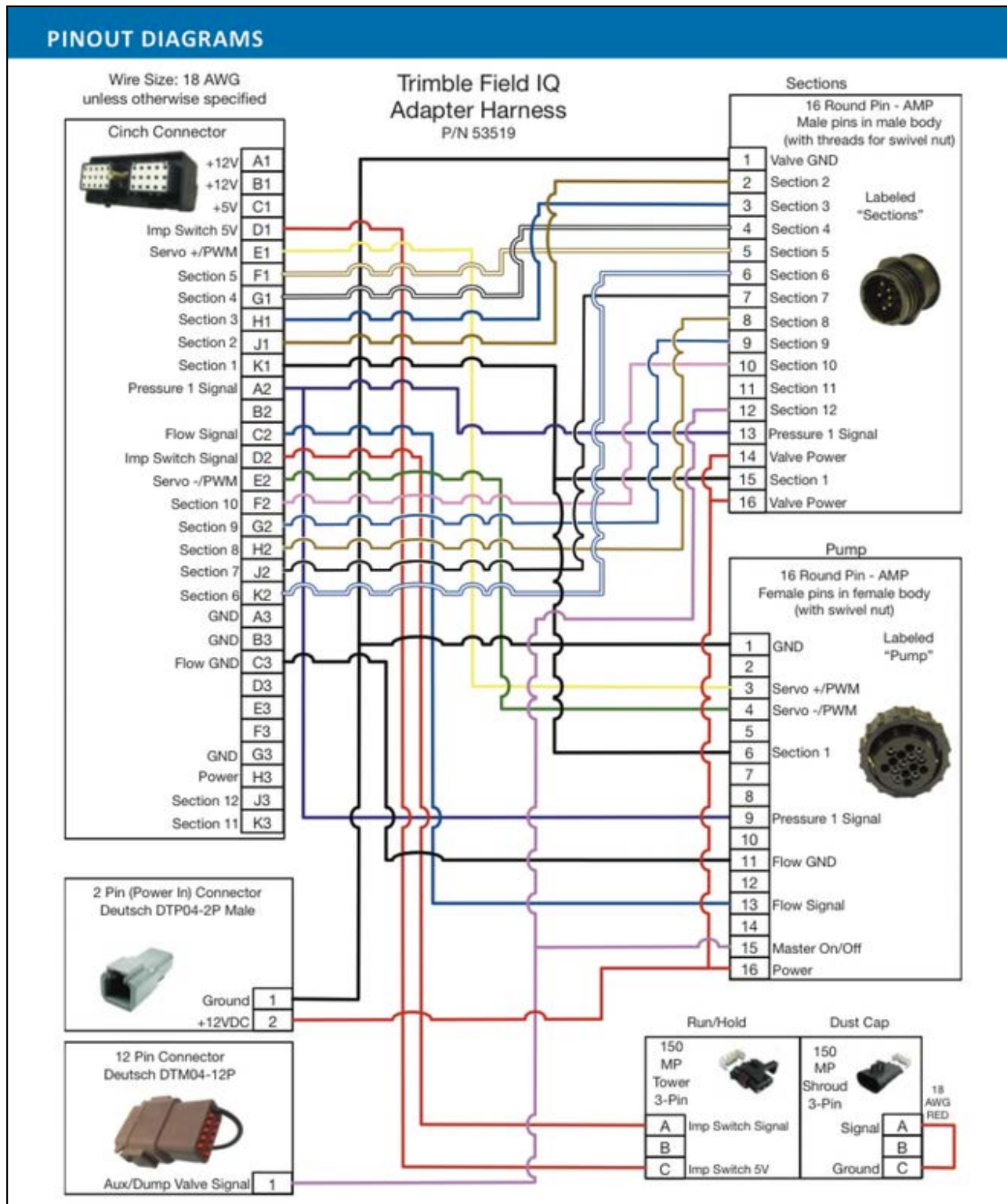
What should my system pressure be?

- AgXcel Pump Systems are not pressure based, especially when they are controlled with a Liquid Rate Controller. However, pressure can affect the performance of the pump system if the pressure is too low or too high. It is recommended to not apply under 10 PSI if you are applying fertilizer infurrow and not above 40 PSI. For a Nitrogen application, it is recommended not to apply below 20 PSI but no need to apply over 60 PSI.

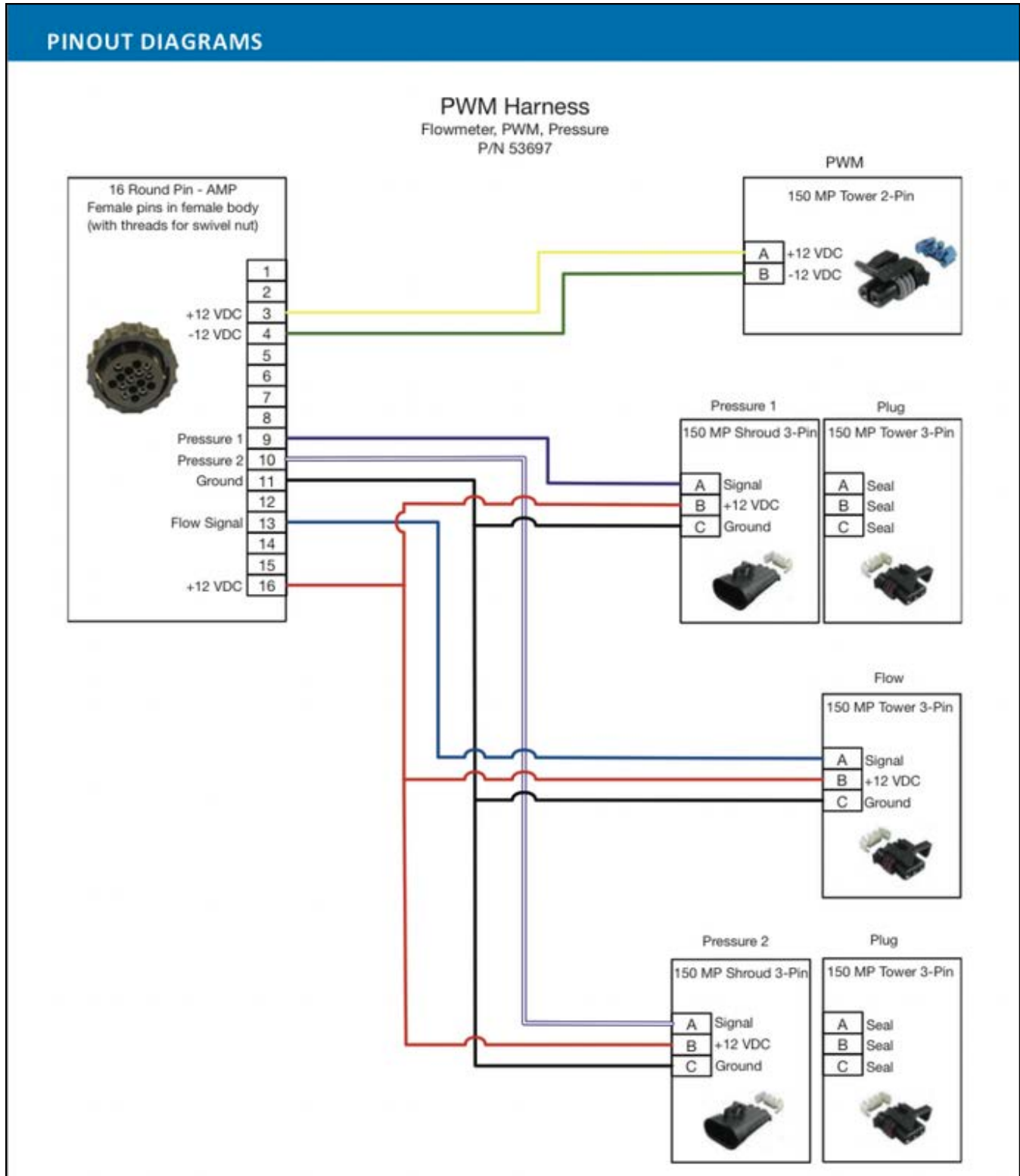
Why is my controller tells me I am applying the correct amount, but I am actually applying more/ less at the rows?

- If your flowmeter calibration number is incorrect, your liquid controller can still tell you that you are applying the correct amount of fertilizer, even though you are actually applying an incorrect amount of fertilizer. Ensure that your flowmeter calibration number is the same as what was provided on your pump system manual. This number will be located on a sticker on the manual.
- If you have the correct flowmeter calibration number entered that was provided by AgXcel, then you will need to manually change the flow calibration number. You can either preform a Catch Test Calibration which can be found in your System Settings under Rate Sensor Setup, or you can manually adjust the flow calibration number yourself. If you raise the flowmeter calibration number, then you will apply more fertilizer. If you lower the flowmeter calibration number, then you will apply less fertilizer.
 - To quickly find what your flowmeter calibration number should be, take the amount of fluid you caught at the row and divide that by the amount of fluid that you should have caught at the row. So if you over applied by 20%, then you can reduce your flowmeter calibration number by 20%. Then do another catch test to ensure you are applying at the correct rate. Or if you under applied by 20%, then you can raise your flowmeter calibration number by 20% and do a catch test to ensure you are applying at the correct rate.

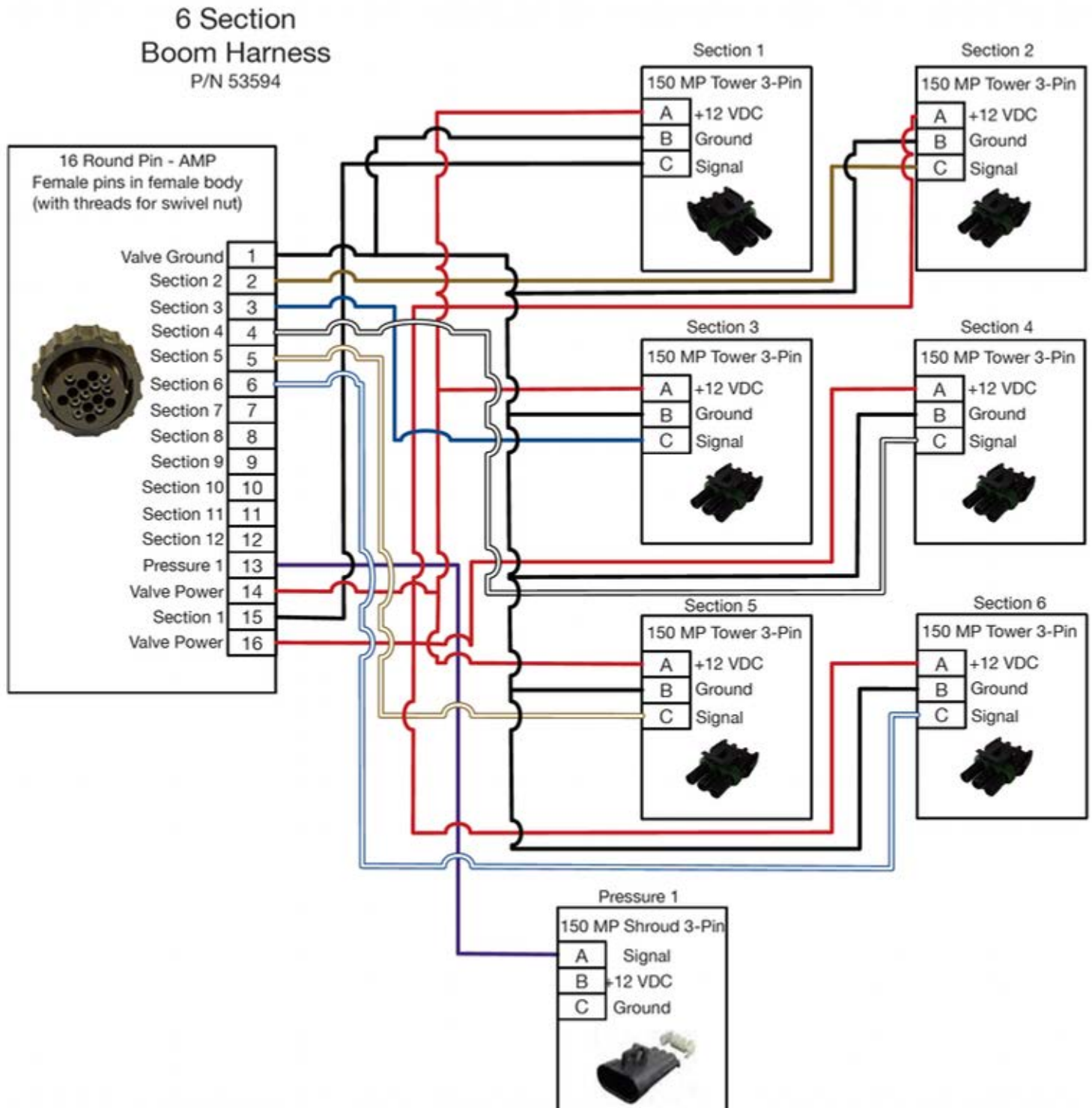
AgXcel Trimble Pinout Diagrams



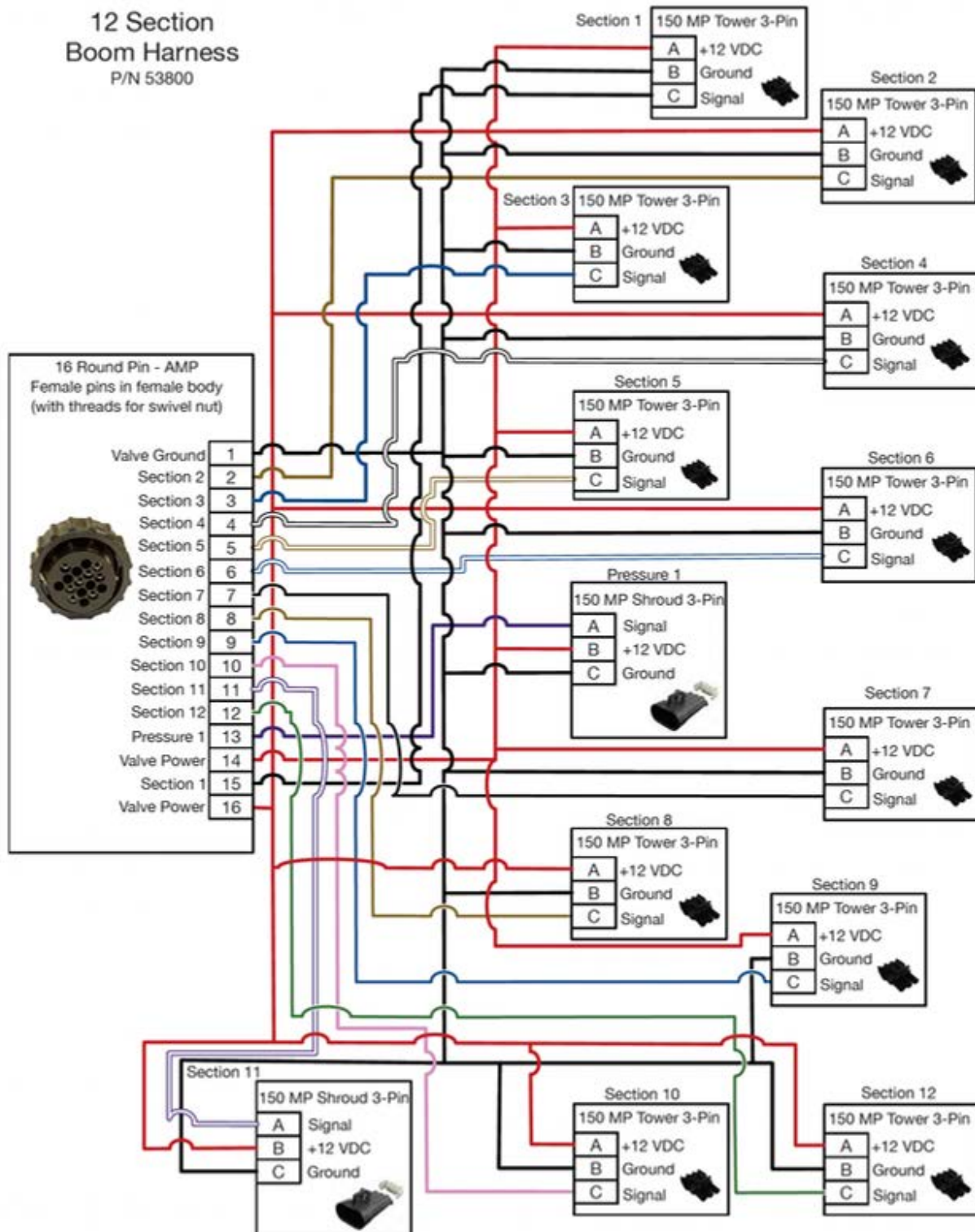
AgXcel Trimble Pinout Diagrams



AgXcel Trimble Pinout Diagrams



AgXcel Trimble Pinout Diagrams





877-218-1981
www.agxcel.com

**2106 F Avenue
Kearney, NE 68847**