Precision Liquid Fertilizer Solutions

www.agxcel.com
where precision meets the soil...
877.218.1981

Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

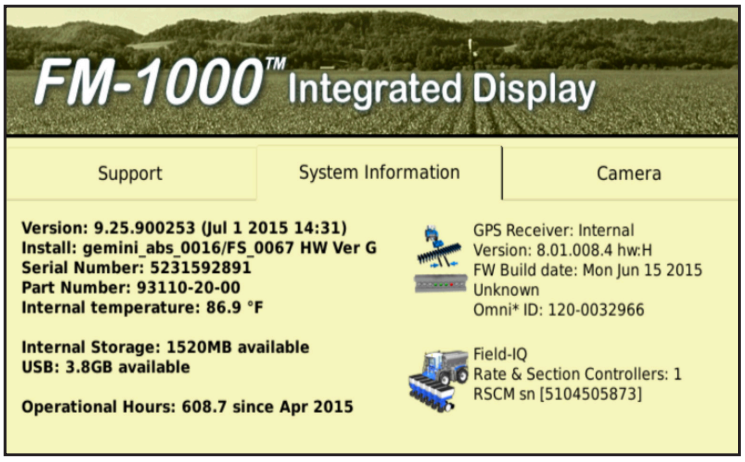
PLEASE NOTE: ***Your setup may vary.*** Not all screens are shown. See Trimble's Operator's Manual for safety information and additional setup/operating information. ***Please ensure you have the latest firmware installed!***

MENU STRUCTURE FOR LIQUID RATE CONTROLLER

Home
- **Support**
- **System Information**
- **Camera**

Configuration
- **Setup**
- **Calibrate**
- **Diagnostics**

Config Selection
- **Display**
- **Vehicle**
- **Implement**



System Information

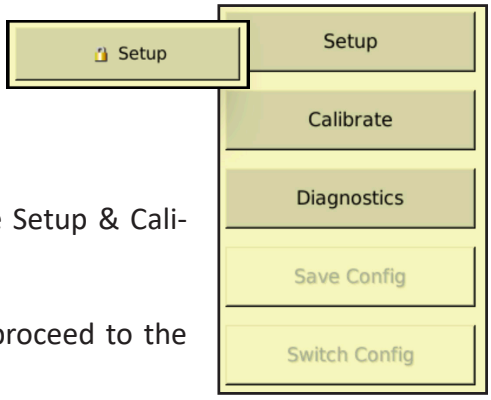
From the home screen, you can select 3 tabs; Support, System Information and Camera. The System Information tab is shown above. This will show what Trimble components are properly connected to your display. If your fertilizer system quits functioning, first check that the Control Module is still recognized 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.

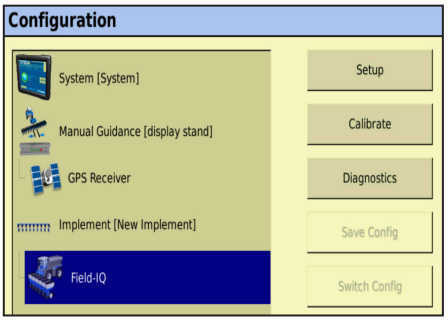


- From the home screen, choose **Setup & Diagnostics**.
- The Configuration screen below will appear. Choose **Field-IQ**. The Setup & Calibrate buttons will be locked, shown by a padlock next to them.
- Push **Setup**, then enter "**2009**"
- After entering the code, the locks will disappear. Push **Setup**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

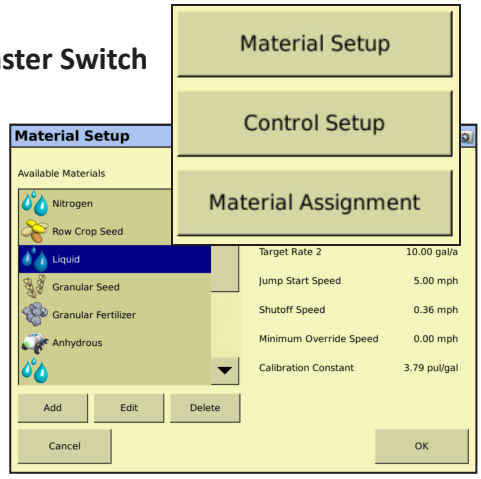
PO Box 1611
Kearney, NE 68848
877.218.1981
www.agxcel.com

Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

Configuration – Setup cont.

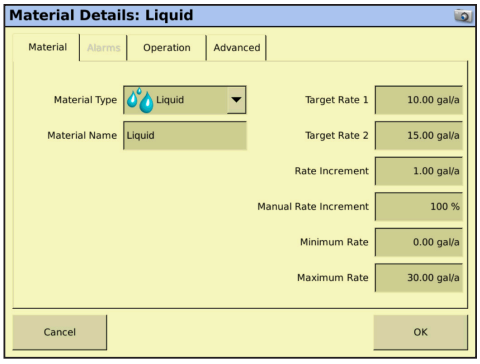


- Select **Field-IQ** and press the **Setup** button.
- The next page will display 3 selections, press the "**Material Setup**" button.
- Select one of the available material profiles or press **Add** to add a new material. Press **Edit** to change any of the parameters of the material selected.
- **Material 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.

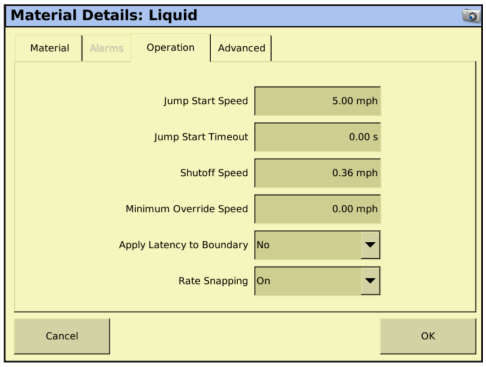


These parameters may be adjusted as desired.

- **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.



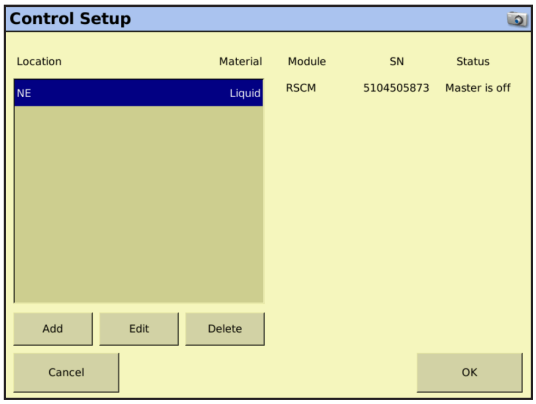
AgXcel recommends setting the **Rate Snapping** to **On**. This will smooth out the rate fluctuation seen on the screen. If you are within the rate smoothing range, the applied rate will just show your target rate and not small deviations from target rate.

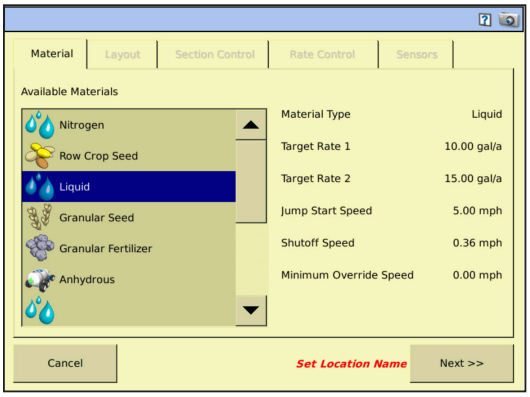


Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

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.



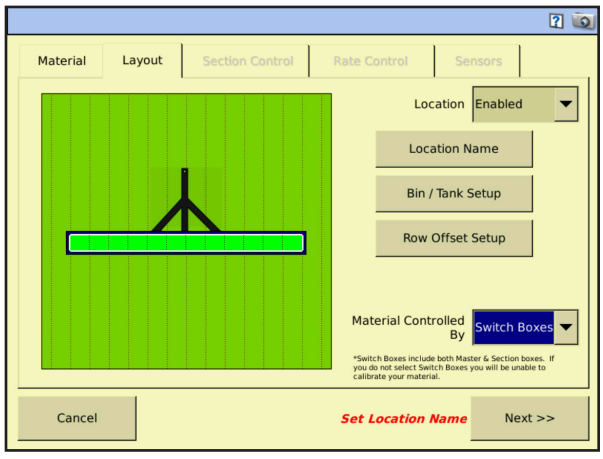


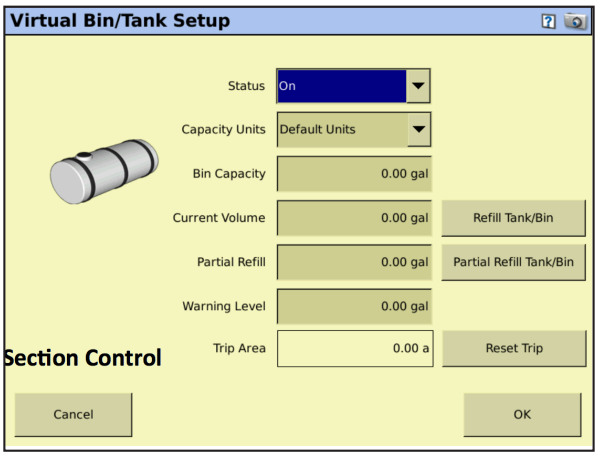
Material

- 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**.

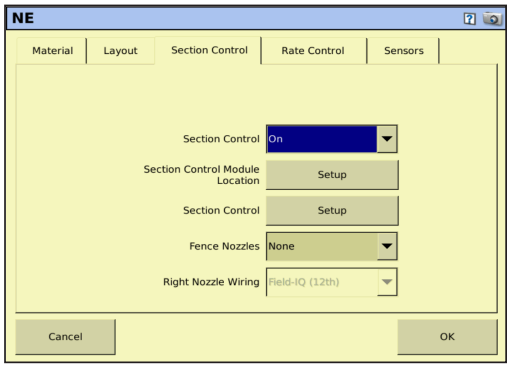




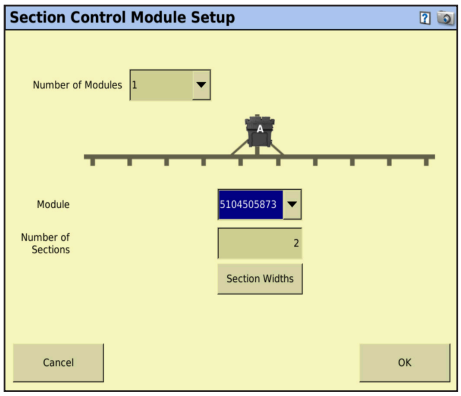
Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

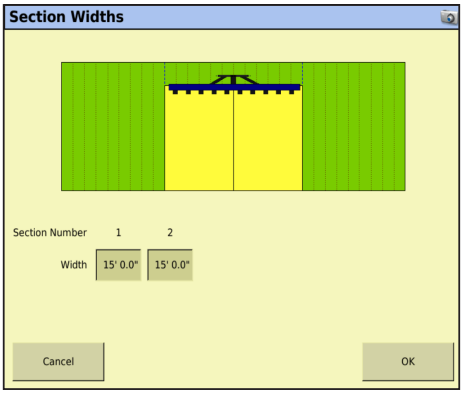
Section Control

- 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**



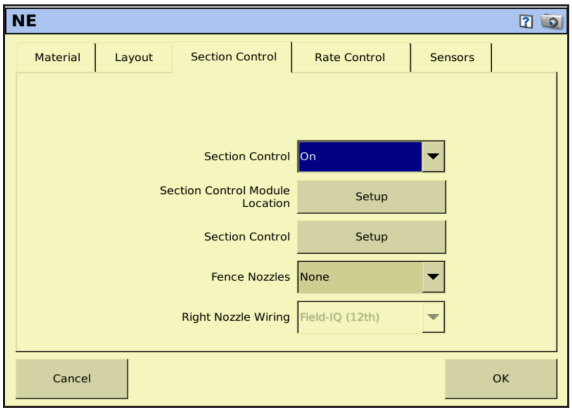
- On the **Section Control Module Setup Screen**, set the **Number of Modules** in your system.
- Select the **Module's Serial Number**.
- Set the number of **Sections** for your system.
- Press **Section Widths**.
- Set the **widths** of your sections

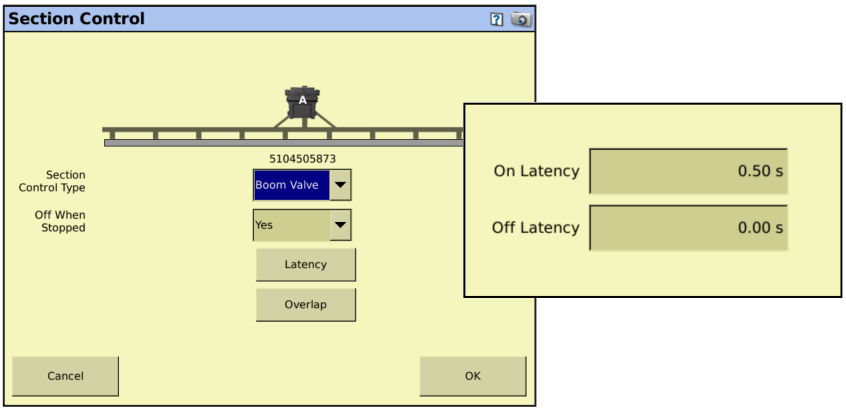




- Press the **Setup** button next to Section Control to take you to the Section Control Setup screen
- Set Section Control Type to: "**Boom Valve**"
- Set **Off** When Stopped to: "**Yes**"
- Press **"Latency"** button to setup latency.
- **On Latency: 0.50 s**
- **Off Latency: 0.00 s**

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

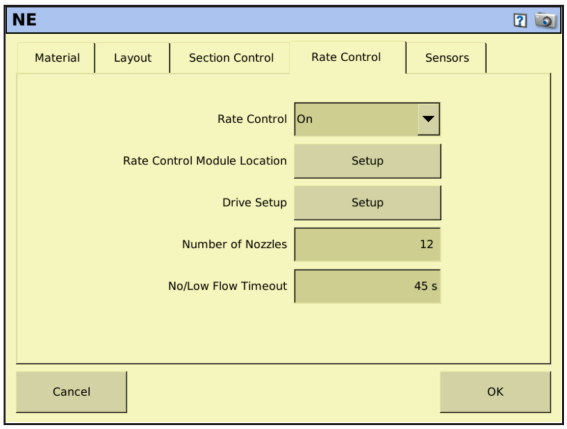


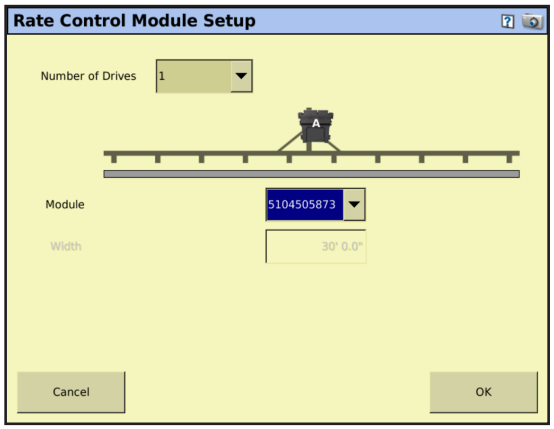


Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

Rate Control

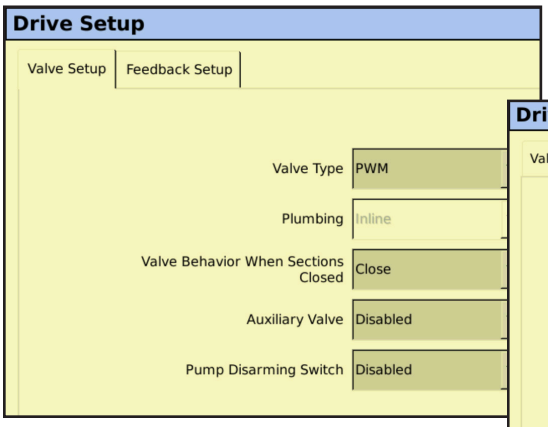
- Select the **Rate Control** tab at the top of the screen.
- Set **Rate Control** to **ON**
- Set **Number of Nozzles** (number of rows)
- Set **No/Low Flow Timeout** to 45 s for troubleshooting so the system does not shut off too quickly.
- Press **Setup** next to **Rate Control Module Location**.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

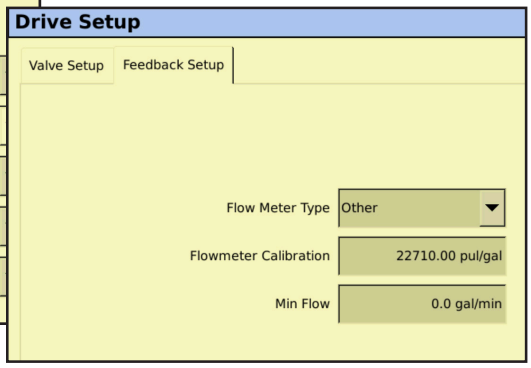




- Trimble will take you back to the screen you see above. On **Drive Setup**, press **Setup**.
- **Rate Control** (Continued)
- Set up the **Valve Setup** as shown:
- Valve Type: **PWM**
- Valve Behavior When Sections Closed: **Close**
- Auxiliary Valve: **Disabled**

(**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.)

Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

Flow Meter Guide

AGXCEL FLOW METER CALIBRATION NUMBERS	
MODEL / RATE	Pulses Per Gallon
0.08 - 1.6	22710
0.13 - 2.6	22710
0.3 - 5	11355
0.6 - 13	4542
1.3 - 26	2271
2.6 - 53	1135

Turbine Flowmeters

FM750 Reg
Micro-Trak Cal Number - 145 (SprayMate, Auto-X)
Pulses Per Gallon - 72.50 (JD, AGL, Trimble)
Pulses Per 10 Gallon - 725 (Raven)

FM750 LF
Micro-Trak Cal Number - 466 (Spraymate, Auto-X)
Pulses Per Gallon - 233 (JD, AGL, Trimble)
Pulses Per 10 Gallon - 2330 (Raven)

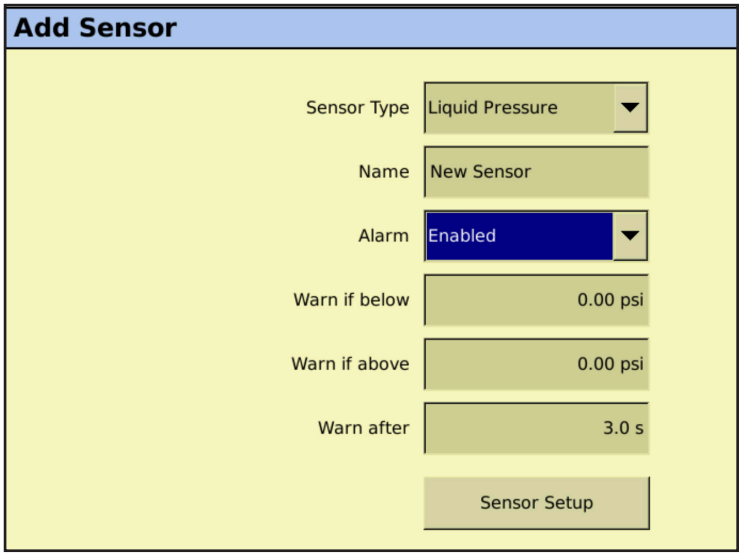
Pressure Sensor Setup

Select the Sensor tab
Set up the Sensor setup as shown

Sensor Type: Liquid Pressure
Name: Transducer (or other name)
Alarm: Enabled
Suggested Alarms:

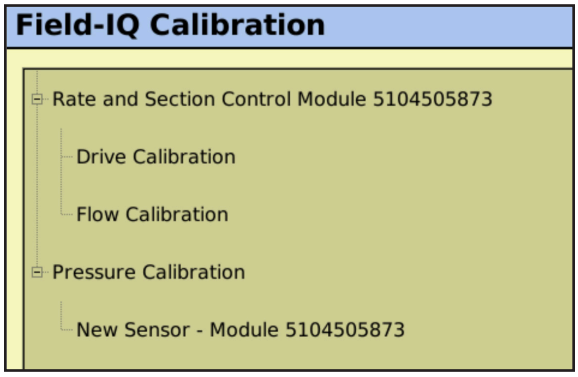
Warn if Below:
GX5 (hydraulic).....0
GX2 (electric).....0
Synergist.....0

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.

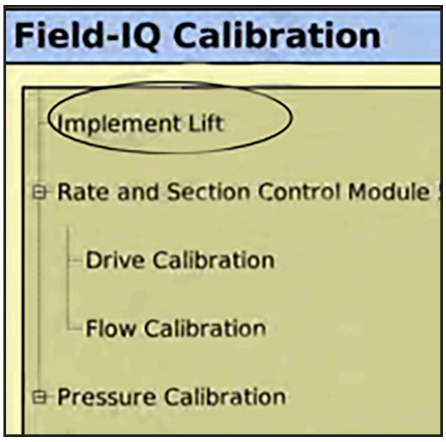
REMINDER: The pressure sensor is for informational purposes only and does not control the system in any way.



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

Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

Implement Lift Switch Calibration

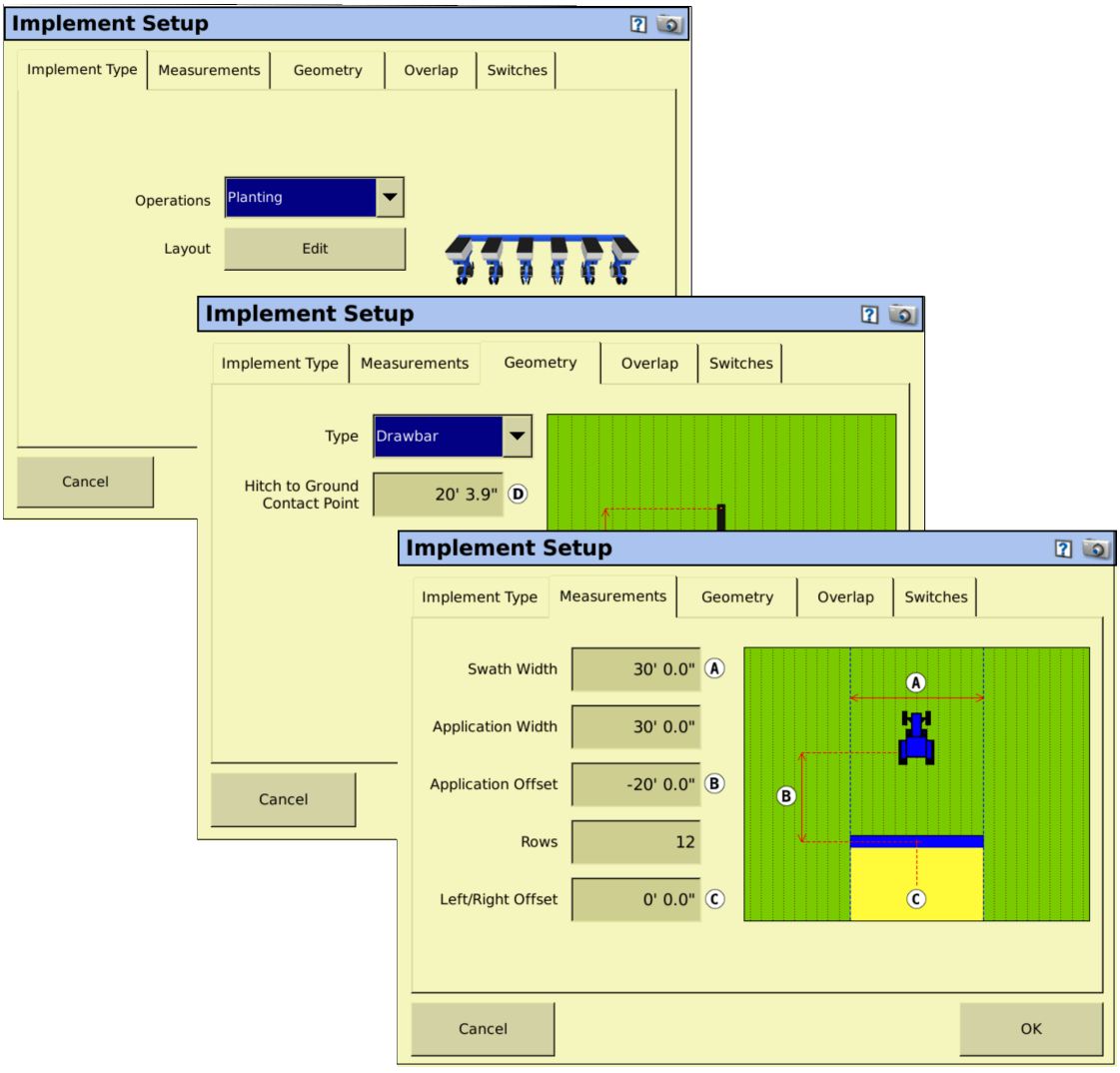


- From the **Field-IQ Calibration** screen, select the **Implement Lift** option
- Raise the implement and then tap **Next**
- Lower the implement and then tap **Next**
- Tap OK to return to the **Field-IQ Calibration** screen

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.

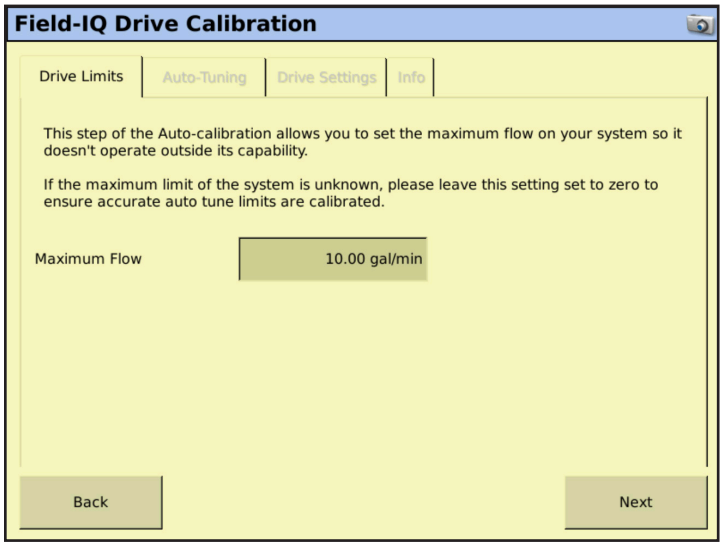
Measure your implement carefully and consult with your Trimble dealer for additional assistance with the Implement Setup section.

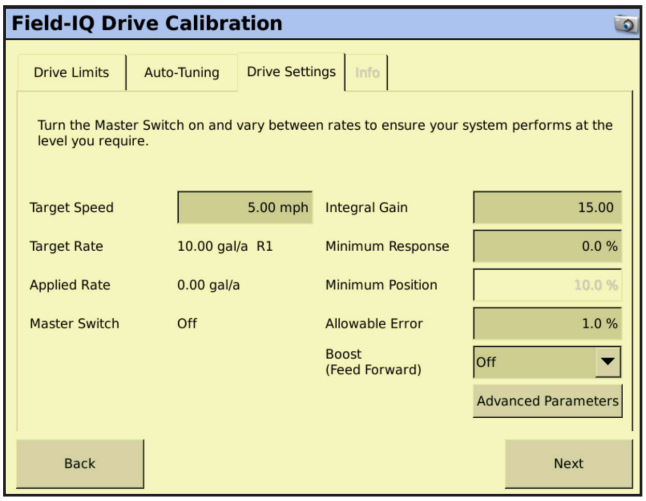


Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

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:





- **Upper PWM Limit:** 100

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

Lower PWM Limit:
- **GX5 (hydraulic diaphragm)…25**
- **GX5 (hydraulic centrifugal)…25**
- **GX2 (electric)……0**

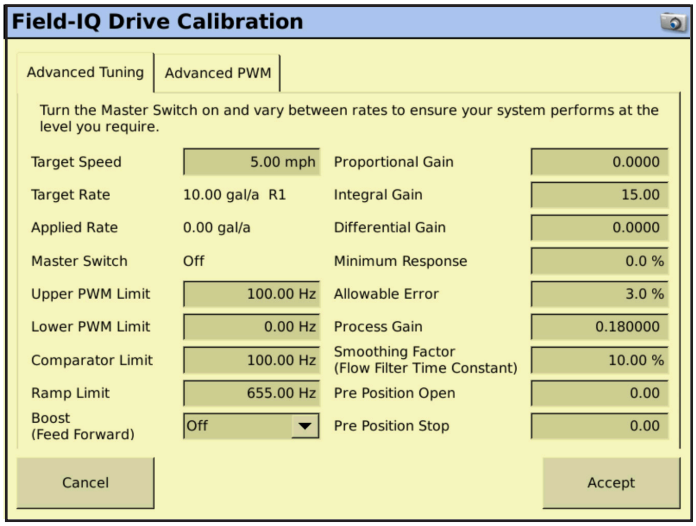
Proportional Gain: (Adjust as needed)
- **GX5 (hydraulic diaphragm)…10**
- **GX5 (hydraulic centrifugal)…3**
- **GX2 (electric)……10**

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%**

Smoothing Factor:
- **GX5 (hydraulic)……1%-3%**
- **GX2……3%**
- **Synergist……1%**



Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

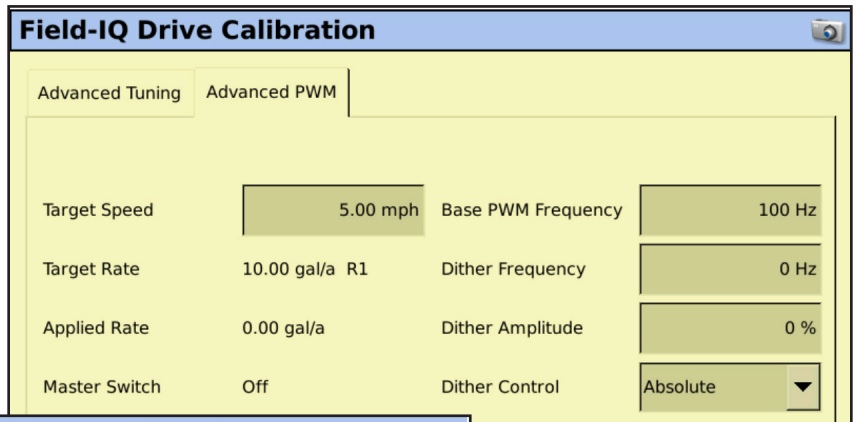
Advance PWM Tab

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

   Base PWM Frequency

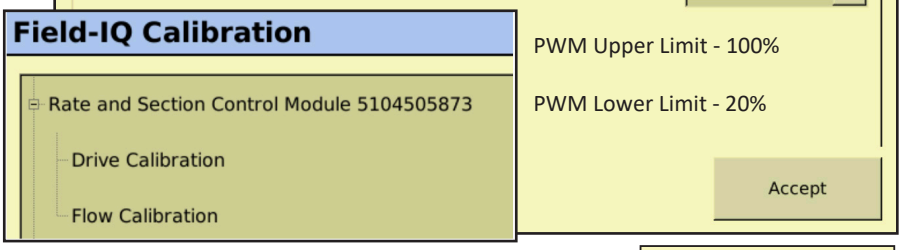
   GX5 (hydraulic diaphragm)…100
   GX5 (hydraulic centrifugal)…122
   GX2 (electric)……100

   Dither Frequency…… 0
   Dither Amplitude…… 0
   Dither Control:…… Absolute



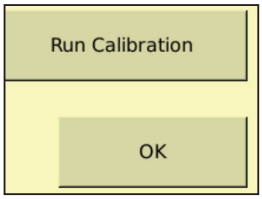
Flow Calibration

2. Select **Field-IQ – Calibrate** on the Calibration screen. This brings up the screen where you can select **Flow Calibration**.

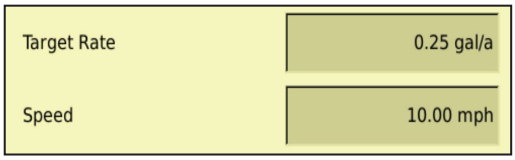


3. The **Flow Calibration** numbers may have already been set in the **Drive Setup**. You can verify or update the settings here.

4. 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.

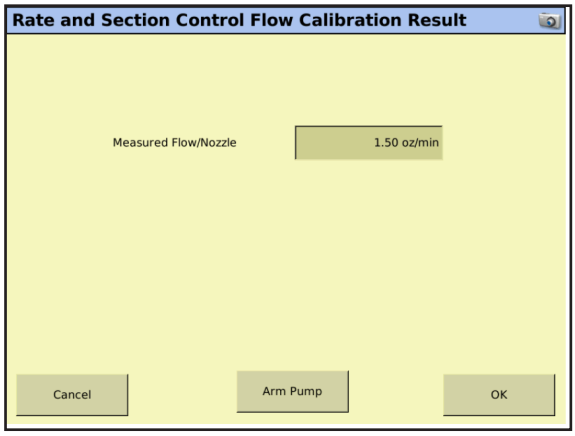


5. You will need a **stop watch** to measure time. AgXcel recommends running the test for some duration in minutes for simple math. When your containers are in position under multiple fertilizer outlets, press the Start Flow, then turn on the Field IQ master switch and start your timer. The system will begin to run. When your containers are near full, push Stop Flow.



6. 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**



7. 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.

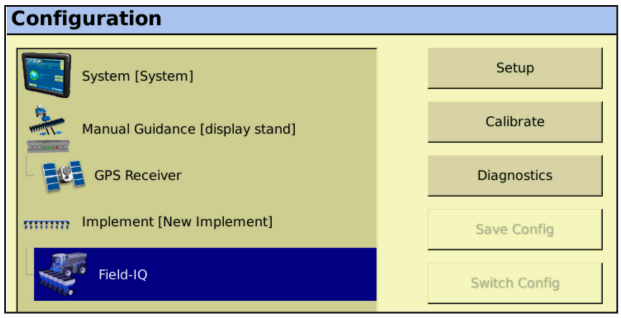
NOTE: ***AgXcel recommends running this procedure to verify set up is completed correctly. We recommend changing the flow calibration back to the standard ion flow meter calibration shown on the flow calibration on page 6.***

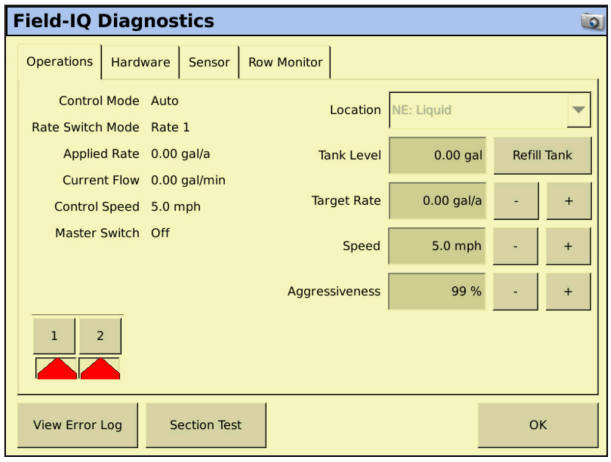
Quick Start Setup Instructions for Trimble's FM 750, FM1000, FMX Rate Controller

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.

AgXcel Liquid System
Frequency Asked Questions (FAQ)

I am trying to achieve 5 GPA but my system will not go lower than 9 GPA.

- Make sure your PWM Low Limit is set to a number that is lower than your required lowest rate. This can be found in your Valve Control PWM settings on your console. If the PWM Low Limit is set too high you will not be able to achieve the lowest rate possible if set other than 10. Many times setting the Low Limit to 0 will work just fine especially when running lower rates.
- With an AgXcel System always make sure your Minimum Flow rate is set to 0.0 GPM or your system will not drop below this rate. For example if the Minimum flow rate is set to 3 GPM your system will not drop below this setting so if your required GPA requires 2.1 GPM then your system will not achieve this rate given that you have set the Minimum Flow rate to 3 GPM.
- When using an AgXcel GX5 Hydraulic system, make sure the AgXcel silver hyd valve is NOT in manual override. Check to ensure that the RED knob on top of the valve is pressed down by turning the knob clockwise while pressing the RED knob down. This will lock the PWM valve down so that the electronic solenoid can control the hyd flow.

I am trying to achieve 12 GPA but my system will only go up to 8 GPA on my GX5 Hydraulic system or I am trying to achieve 8GPA and can only achieve 5 GPA on my GX2 electric system

AgXcel GX2 Electric System

- What is your system pressure? If system pressure is too high (50PSI or above) this will prevent you from achieving your highest rate possible. High system pressure with an electric system can put the electric pump head into bypass mode and will not allow for full flow.
- **Check the following areas to lower your pressure**
  1. Select a larger orifice or Micro Tube with a larger hole, this will allow for easier flow of liquid through the system and can increase over all flow and GPA
  2. Check your system filters and make sure they are clean. This should be a practice each morning before using the system
- AgXcel GX2 Electric Systems can achieve up to about 5.9 GPM with dual electric pumps. Check your total GPM requirements and ensure that you are within range
- When using a Dual Pump System – unplug 1 pump and ensure that the other pump is working. Perform this test with both pumps and if one pump sounds weak replace it immediately
- Ensure that your PWM High Limit is set to 100. Many times an Auto Tune will set this to a lower number so make sure this is set to 100
- If you controller has this option, make sure the PWM Duty Cycle is within range
- Check all your boom widths and make sure that all are set correctly

AgXcel GX5 Hyd System

- What is your system pressure? If system pressure is too high (90PSI or above) this will prevent you from achieving your highest rate possible. High system pressure with a hydraulic system set 100 PSI bypass spike valve to open and you could begin to lose volume
- **Check the following areas to lower your pressure**
  1. Select a larger orifice or Micro Tube with a larger hole, this will allow for easier flow of liquid through the system and can increase over all flow and GPA
  2. Check your system filters and make sure they are clean. This should be a practice each morning before using the system
- Check your total GPM requirements and ensure that you are within range of the GX5 hyd pumps recommended GPM
- Ensure that your PWM High Limit is set to 100. Many times an Auto Tune will set this to a lower number so make sure this is set to 100
- If you controller has this option, make sure the PWM Duty Cycle is within range
- Check all your boom widths and make sure that all are set correctly

AgXcel Liquid System
Frequency Asked Questions (FAQ)

AgXcel Liquid System Frequency Asked Questions (FAQ) cont....

My rate is fluctuating and is almost locking in but is jumping around

- Make sure that your Rate Smoothing is checked and set to 10. You can typically find this setting under your System Controller settings. Rate Smoothing allows the system to lock into the rate if the rate is within 10% of the required rate. Many times liquid temperature can affect the performance of the system.
- Make sure your pressure is enough to fully OPEN every check valve on the implement. A good rule of thumb is to ensure that pressure is higher than 15 PSI when using 4lb, 5lb and especially 10lb check valves

How do I know where my pressure should be?

- AgXcel systems are not pressure based especially when they are controlled with a Liquid Rate Control Module. HOWEVER, pressure can affect the performance of the system if the pressure is too low or too high. Many users feel that the higher the pressure then the less chance they have to plug an orifice. Although this statement holds value it can also have a major effect on system performance
- **Low pressure – RECOMMENDED 15PSI is the lowest**
    1. Can affect the performance of the pump and may cause it to surge which affect the accuracy of your flow
    2. Can affect the performance of your system check valves, not enough pressure and all your check valves may not OPEN and this may affect the accuracy of your system
- **High Pressure – RECOMMENDED – GX2 Electric = 25PSI GX5 Hyd = 70PSI**
    1. Too high of pressure can also affect the performance of your system as this can cause too much restriction in the manifold tubes and too much resistance will slow the rate down
- **RULE OF THUMB FOR PRESSURE**
    - AgXcel GX2 systems = 15PSI – 25 PSI
    - AgXcel GX5 Hyd systems
        - Low Range = 15PSI – 40 PSI
        - Medium Range = 20PSI – 50PSI
        - High Range = 40PSI – 80PSI
    - All these ranges are OK for the AgXcel GX5 system
    - For High Speed Planters check out the AgXcel GX30i VRT Solution

How do I raise and lower my pressure when required

- If your pressure is too HIGH then increase the size of your orifice and or Micro Tube to a larger hole size
- If your pressure is too LOW then change the size of your orifice or Micro Tube to a smaller hole

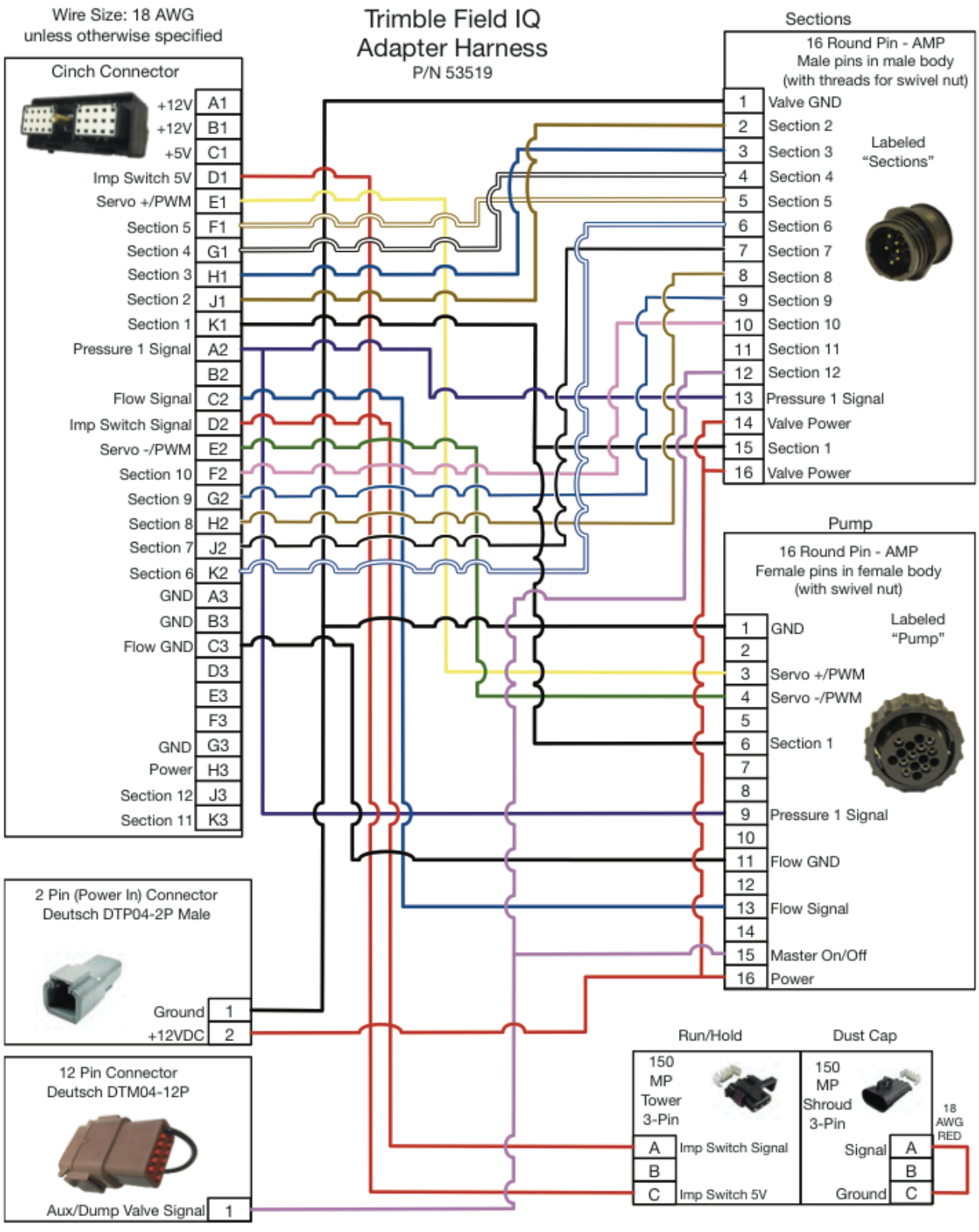
TIP - Many times the system may have difficulty priming, or if a flow meter has not detected flow and you want the system to continue running so as to prime. Go to Diagnostics > Tests > Calibrate PWM Limits

1. Time for Auto Mode Testing -
2. Once again, enter a Test Speed
3. Press the AUTO button
4. Ensure that the height switch is down or unchecked
5. Turn the Master ON
6. You can now monitor system flow vitals and ensure that all outlets of liquid are flowing
7. Once again, check sections if sections are being used
8. System testing is complete - Turn OFF the Master Switch

AgXcel System Performance Settings - To ensure the best performance of your AgXcel system especially at Start Up, setting the PWM Start Up % can be fine tuned. PWM Start Up % sends voltage to the pumps at the % that has been set. This can assist in the priming cycle to get the pumps running quicker. Once the pumps jump up to the % set, then it will begin its cycle to lock into the required target rate setting.

AgXcel Trimble Pinout Diagrams

PINOUT DIAGRAMS

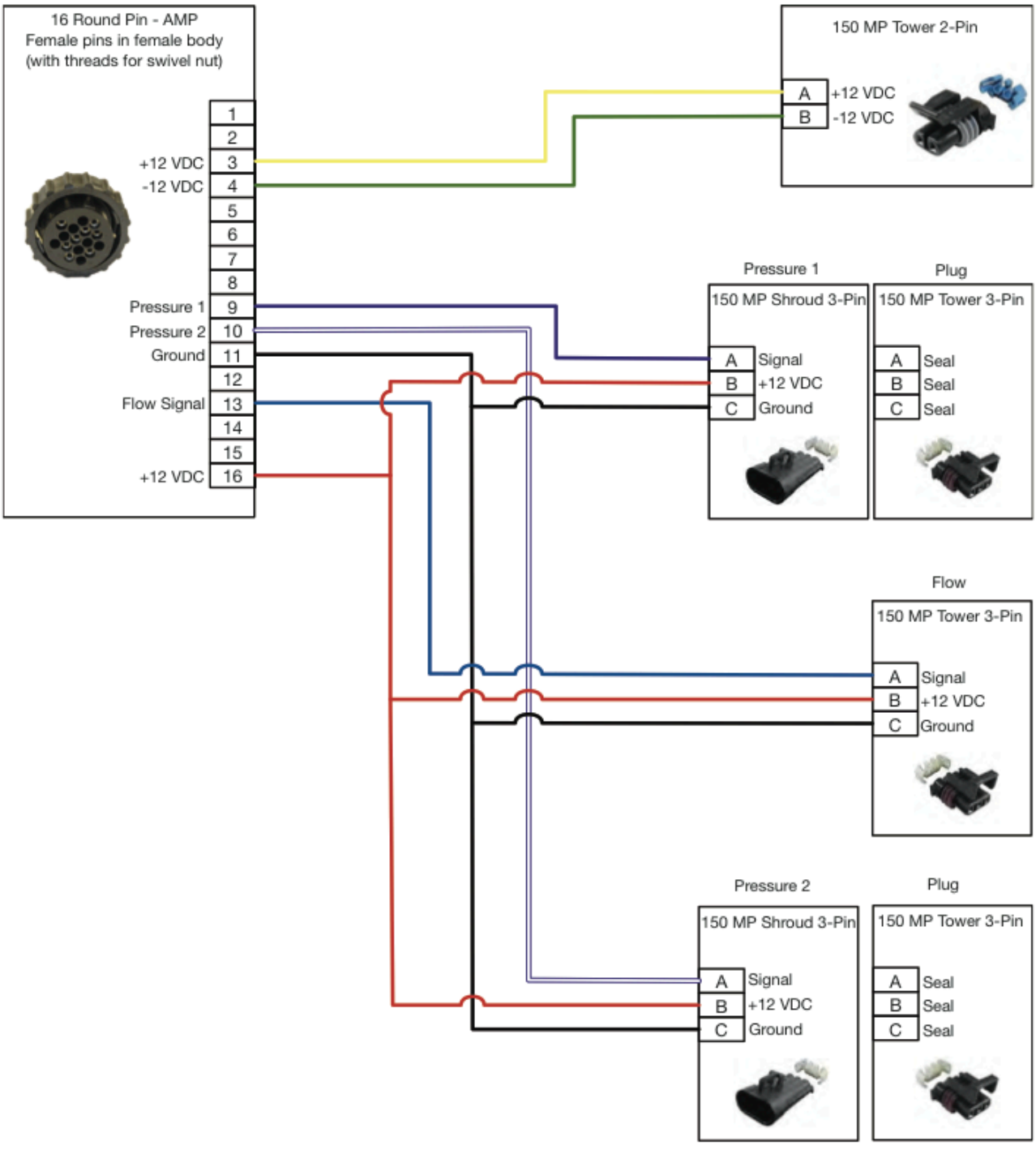


AgXcel Trimble Pinout Diagrams

PINOUT DIAGRAMS

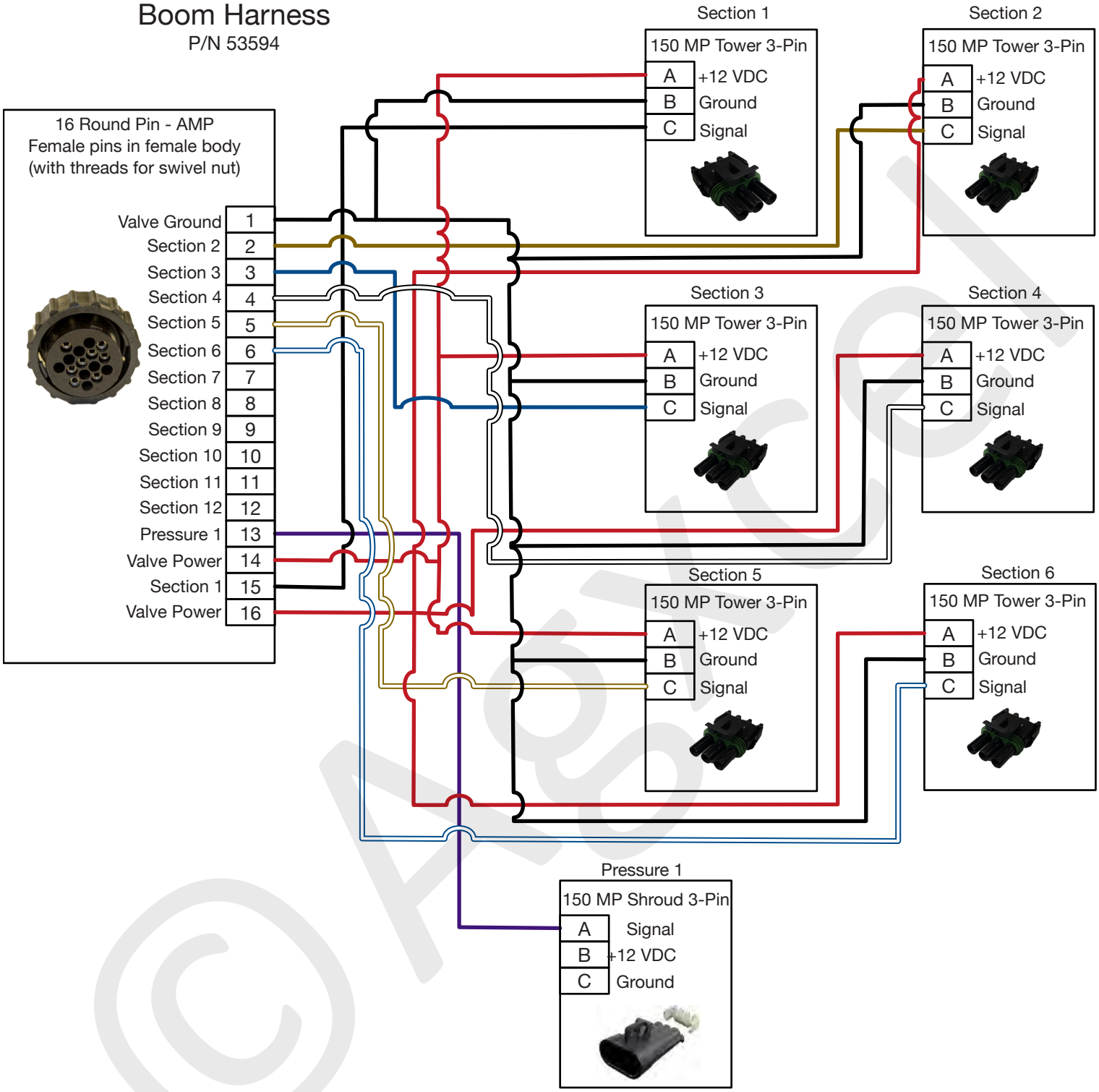
PWM Harness

Flowmeter, PWM, Pressure
P/N 53697



6 Section Boom Harness

P/N 53594



12 Section Boom Harness

P/N 53800