

Precision Liquid Fertilizer Solutions



# AgXcel GX2

## Fertilizer System Integration for Integration into the John Deere GS2 & GS3



# JOHN DEERE

### AgXcel GX2 Dual Electric Pump GPA Specifications

This chart represents the maximum GPA on 30" centers at 6 MPH

Implement Size in Rows	8	12	16	24
GPA (Max)	20	13	10	5

Note: Dual 5.3 GPM electric pumps can only achieve a maximum of 6.0 GPM. However pumps should not be used at their highest capacity as this will drastically reduce the life of the pumps

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**NOTE: This is only a guide! Please consult your John Deere dealer for detailed instructions or troubleshooting!**



# AgXcel Fertilizer Application System Overview

(Read Instructions Completely Before Beginning Installation)

Thank you for purchasing an AgXcel Precision Liquid Fertilizer Application System (FAS) for your liquid placement requirements. The AgXcel FAS system can be integrated into the following OEM controllers:

- Ag Leader
- John Deere Green Star
- Trimble
- Raven
- Top Con
- Outback

This integration into these displays will require each of the OEM's Liquid Control Module which will need to be purchased from your local OEM dealer. The rate controller will provide the data required to manage the speed of the AgXcel electric or hydraulic pumps based on the flow response of the flow meter and the vehicle speed. The FAS system is also capable of managing section controls, also referred to as swath control, to minimize overlap areas with optional section control valves.

## **INITIAL INSTALLATION STEPS**

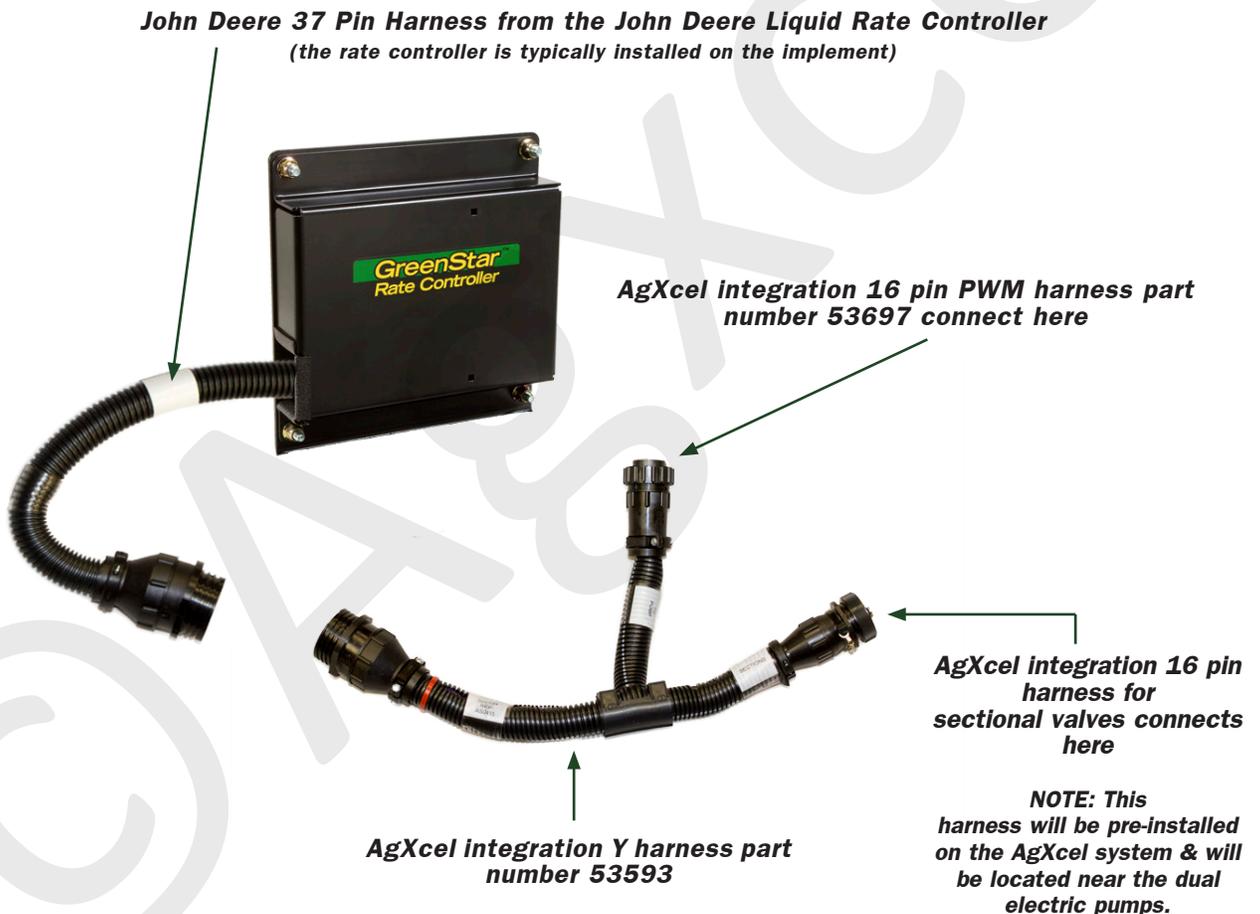
1. Install the OEM display and Liquid Control Module per OEM instructions.
2. Open the AgXcel FAS packages. Layout and familiarize yourself with the components.
3. Mount the AgXcel FAS GX system on your equipment.
4. Plumb the tank to the GX filter inlet. All FAS systems are plumbed with dual filters, 50 and 80 mesh, and the inlet should always be the 50 mesh.
5. Install the manifold system. This is a GX2 chassis base bracket that have floating ball indicators. These will mount on the toolbar. Check valves should be mounted according to the mounting instructions provided and plumbing to each row unit delivery point from the floating ball indicators.
6. Attach the flow meter outlet to section valve or manifold inlet. If using section valves, attach section valve outlets to the corresponding floating ball indicator inlets.
7. Attach harnesses to the appropriate OEM liquid rate controller.
8. Setup OEM controller to manage the AgXcel FAS according to the attached configuration details.
9. Fill system with water and conduct initial operation and tests to ensure all setting and calibrations are correct.
10. Winterize system with RV antifreeze if freezing temperatures are expected.

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## RATE CONTROLLER

AgXcel Precision Fertilizer Application Systems (FAS) are designed to integrate into various OEM controllers. This installation guide will assist in the controller configuration settings for the in-cab monitor. The integration process begins with the users purchase and installation of the corresponding OEM's Liquid Rate Control Module (must be purchased through your John Deere dealership), The picture below displays the John Deere Rate Controller with the AgXcel integration harnesses. Each John Deere Rate Controller can control one product. Therefore, if you were applying two liquid fertilizers on your planter, you will need three rate controllers, one for seed and two for liquid fertilizer. The harness coming out of the John Deere rate controller is a 37 pin amp connector that will be connected to the AgXcel 37 pin amp connector extending from the AgXcel GX system.



12 - section part number 53649

6 - section part number 53594

\* John Deere currently supports up to 10 sections

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

System Overview - Example with GX5 Hydraulic System



- A. John Deere Liquid Rate Controller
- B. John Deere GS2/3 Controller
- C. AgXcel Integration Harness - Part #53593
- D. AgXcel Section Valve Harness - Part #53594 (12 section harness also available)
- E. AgXcel Control Harness - Part #53697
- F. AgXcel GX2 Electric Dual Pump System

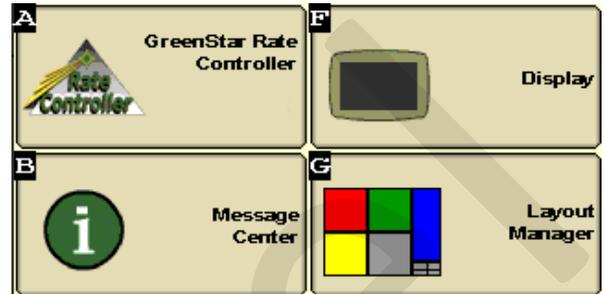
# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## RATE CONTROLLER SETUP

To access the GS2/3 Rate Controller functions, press the "GreenStar Rate Controller" button.

If this button is not present please contact your John Deere operators manual or your John Deere dealer for assistance. This button will take you to the Main Rate Controller Screen below.



## Main Rate Controller Screen

*Pressure (if optional pressure sensor installed) OR Flow in GPM (without pressure sensor)*

*Tractor Speed*

**GreenStar Rate Controller - Main**

**Actual Rate** → 5.0 gal/ac

**Target Rate** → 5.0 gal/ac

Manual

Master On

4.3 mi/h

6.6 psi

Implement Height Switch Indicator  
 Arrow will point up or down to indicate implement position if height switch is used. If implement does not follow arrow position you will need an implement switch.

956 (gal)

L1 R1

Rate (gal/ac) Predefined A Rate 1 3.0 B Rate 2 5.0 C Rate 3 7.0

15.5 ac/h

12:01 pm

## MENU STRUCTURE



- SETUP**
- Implement
  - System
  - Alarms
  - Rates



- TOTALS**
- Current
  - Job Summaries
  - Lifetime Totals



- DIAGNOSTICS**
- Readings
  - Tests

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## SETUP - IMPLEMENT

Here you will enter the type, name, total width and section width for your implement you will be using for this operation. In this section of the setup you will be configuring the details of your implement to prepare it for liquid management. *Implement Type, Implement Name, Implement Width, Section Width.*

### IMPLEMENT SETUP

1. Choose implement type “Liquid Fertiliz Tool” Note: “Pull Behind Sprayer” may be selected on previous GS versions and does not require an implement switch.
2. Enter your preferred name for the implement where “AgXcel” is shown.
3. Enter your Implement Width if feet.
4. If you are going to setup your implement into multiple sections, press the Setup Sections button.
5. Setup the width of each section when the screen pops up after pressing the Setup Sections button.

The screenshot shows the 'GreenStar Rate Controller - Setup' interface. At the top are tabs for 'Implement', 'System', 'Alarms', and 'Rates'. The 'Implement' tab is active. Below the tabs are dropdown menus for 'Implement' (set to 'Liquid Fert. Tool') and 'System' (set to 'AgXcel In-Furrow System'). There are buttons for 'New', 'Rename', 'Remove', and a 'Disable This GRC' checkbox. The 'Implement Width (ft)' is set to 30.00, with a 'Setup Sections' button. Below this, a diagram shows a 30-foot implement divided into two 15-foot sections. At the bottom, there is a 'Height Switch' checkbox (checked) and a dropdown menu set to 'Do Not Share'. On the right side, there are icons for 'Rate Controller', a home button, a back button, a numeric keypad (1, 2, 3), and a wrench icon. The time 12:06pm is displayed at the bottom right.

### HEIGHT SWITCH

If using a height switch on your implement, check the box at the bottom of this screen. You must then choose one of the choices at right. On a planter set this to “Receive Status” to use the Seed Controller’s height signal. (Some Seed Controller / Rate Controller combinations may not allow sharing of the Height Switch.) On a single product fertilizer applicator you would set to “Do Not Share.”

On previous versions of GS2/GS3 software, a height switch was required for a Liquid Fertilizer Tool. However, on this version you can leave the Height Switch box unchecked and no height switch is required.

This close-up shows the 'Height Switch' dropdown menu. The 'Height Switch' checkbox is checked. The dropdown menu is open, showing four options: 'Do Not Share' (highlighted in blue), 'Send Status', 'Receive Status', and 'Do Not Share'.

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## SETUP - SYSTEM

System setup is where you will set the GS2/3 to be compatible with the AgXcel fertilizer system components. In this section of the setup, this is where you will configure the John Deere Liquid Rate Controller to manage the AgXcel fertilizer system.

GreenStar Rate Controller - Setup

Implement **System** Alarms Rates

Section Valve Type **3-Wire** Constant Flow

Control Valve Type **PWM Close**

Tank Capacity (gal) **400** PWM Setup

Flowmeter Calibration **SEE CHART**

Flowmeter Units **gal**

Pressure 1  2

Agitator Valve

Agitator Duty Cycle (%) **10**

Flow Return

11:56am

Rate Controller  
Setup  
Totals  
Diagnostics

1. Section Valve Type: 3-Wire
2. Control Valve Type: PWM Close ("close" means when the rate is zero or all sections are off, the controller will stop the pump)
3. Flow Return: NOT Checked
4. Flowmeter Units: gal
5. Flowmeter Calibration: For details on flowmeter calibration see page 22.
6. Pressure Sensor: Check if using optional electronic pressure sensor.
7. Agitator Valve: NOT Checked
8. See the following pages for instructions on "PWM Setup" & "Calibrate Pressure Sensor"

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## SETUP - SYSTEM cont.

PWM SETUP - From System Setup screen, push "PWM Setup" to open this screen.

### 1. Control Valve Calibration: 9911

The GS2 Control Valve Calibration can be changed to optimize performance on your specific equipment. The 4 digit number is formatted XXYZ. Increase XX to make the system respond quicker. If set to high, the actual rate will oscillate around the target. Y is the output deadband and Z is the control deadband. Generally leave these two digits low. Read your GS2 Operators Manual for more information. For example, to slow your response speed, move the number from 9911 to 8011, changing the valve response from 99 to 80. AgXcel has found the fastest setting has the best performance with electric pump systems.

### 2. Coil Frequency: 100

### 3. High Limit: 255 (maximum value allowed)

### 4. Low Limit: 0

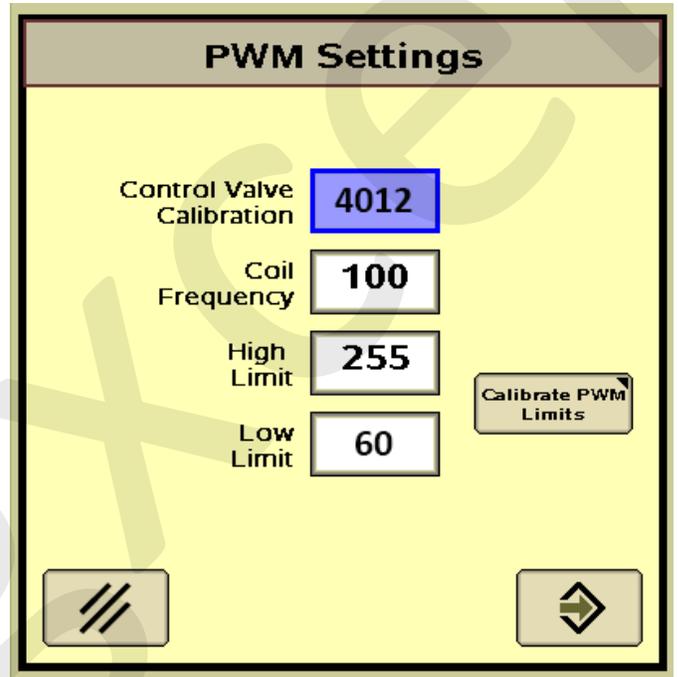
The "Calibrate PWM Limits" button is not necessary after you enter the numbers above. AgXcel recommends you NOT use that procedure, and use the settings shown here for optimum performance.

### 5. Push the lower right button to return to the System Setup screen.

6. The low limit may be set higher if the system continues to present an error of "Solution Tank Dry". Slowly increment the Low Limit by 5,10,15 and 20 being the highest. If you set this number too high you may not be able to achieve lower rates. Caution must be used when raising this number.

## Warning!

When receiving the "Solution Tank Dry" warning, it does not always warrant changing the "Low Limit" number. Other causes could be, fertilizer tank is low, flow meter is bad, pumps are not turning on, bad harness connection. First ensure that liquid is NOT flowing when changing this number.



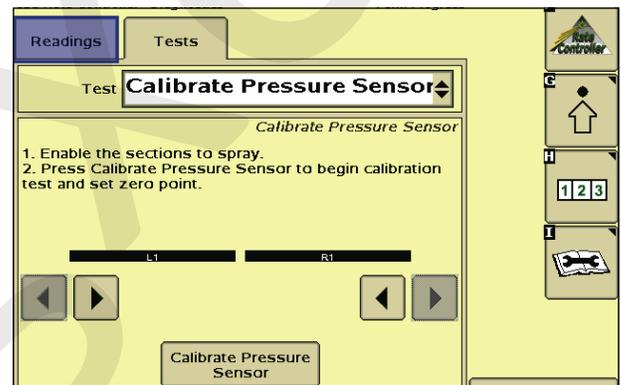
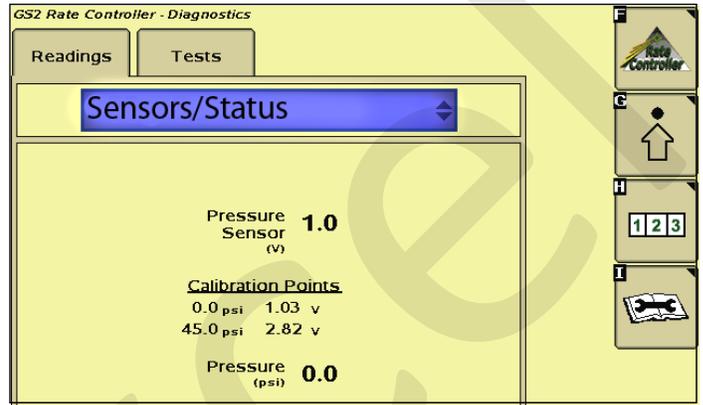
# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## SETUP - SYSTEM cont. (Note: Older software versions of the GS2)

### PRESSURE SENSOR CALIBRATION - complete after initial operation

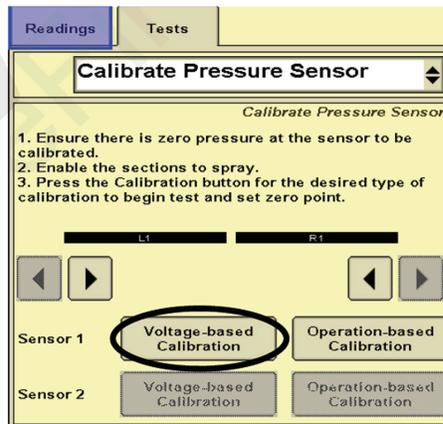
1. **Before Calibrating the pressure sensor**, make sure the pressure is absolutely ZERO. Many times a fertilizer system will have slight pressure left in it due to check valve pressure. Check the sensor voltage on this screen (Diagnostics, Readings, Sensor/Status). The voltage must be 1.0 volts. If it is higher there is pressure in the system and your calibration will be inaccurate. Open system to release all pressure. Verify the manual gauge reads 0.
2. **Open the "Calibrate Pressure Sensor Screen**. You can get to it from Setup, System OR from Diagnostics, Tests.
3. **Verify sections on (bars black)**
4. **Press "Calibrate Pressure Sensor"**, zero pressure voltage will be set & new screen will open.
5. **Turn Master switch on.**
6. **System will begin running**. Enter the pressure from the manual pressure gauge (system shuts off automatically, so you need to be rather quick on this step). The pressure is now calibrated.
7. **You can check your calibration point** on the Sensors/Status screen shown at the top of this page. 0 PSI should be 1.0 volts. The second point will be the pressure you entered in the calibration. For reference, 25 PSI should be 2.0 volts & 50 psi should be 3.0 volts.



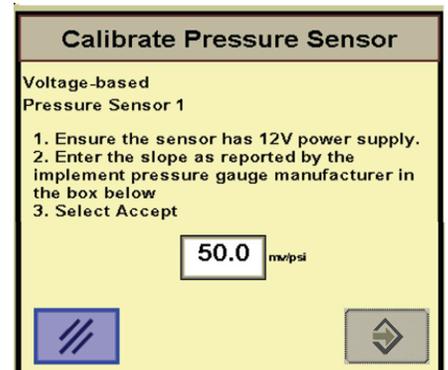
**NOTE:** The following steps are for NEWER versions of software on the GS2/3

### PRESSURE SENSOR CALIBRATION cont.

1. **Select Voltage based Calibration**
2. **On that screen that opens**, enter 50.0 mv/psi
3. **Push the lower right button** to return to the System Setup screen.



**Tip:** If the system has been running, there may be pressure in the system due to the check valves. In that case, simply unplug the sensor while this setup is being done so it will calibrate the zero point correctly.



# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## SETUP - ALARMS

Customize your alarms and settings on this page.

- 1. Minimum pressure:** 10 psi is a safe minimum pressure to ensure all check Valves (4 psi setting) are fully opening and equal flow will go to every row. AgXcel recommends turning this alarm off as each time the system turns on & off it will activate, being a nuisance.
- 2. Maximum Pressure:** 25 psi is the recommended setting. Electric pumps will draw more current and reduce output flow as pressure increases. If pressure is routinely over 40 psi, consider changing to a smaller orifice for optimum performance. Turn this alarm on so you are warned when system pressure increases for some reason (cold morning operation may trigger this alarm)
- 3. High and Low Alarm:** 20% is the John Deere default and AgXcel recommended setting. These alarms can not be disabled.

GreenStar Rate Controller - Setup

Implement System **Alarms** Rates

Low Tank Level (gal)  Alarm?

High Alarm (% above target rate)  Alarm?

Low Alarm (% below target rate)  Alarm?

---

Pressure Sensor 1

Minimum (psi)  Alarm?

Maximum (psi)  Alarm?

9:46 am

1/1

## SETUP - RATES

Enter your desired application rates here.

- 1. Enter up to 3 rates.**
- 2. AgXcel recommends** checking the Rate Smoothing box and entering 10%.
- 3. AgXcel recommends** leaving minimum flow rate at 0.0. If greater than zero, this is the minimum flow in gallons per minute that the system will NEVER go lower than. Optionally, it could be set to the minimum flow limit of your flow-meter.

GS2 Rate Controller - Setup

Implement System Alarms Rates

Rate 1  gal/ac

Rate 2  gal/ac

Rate 3  gal/ac

Minimum Flow Rate  gal/min

Rate Smoothing   %

**Warning!** Always make sure Minimum Flow Rate is set to "0" when using an AgXcel System

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

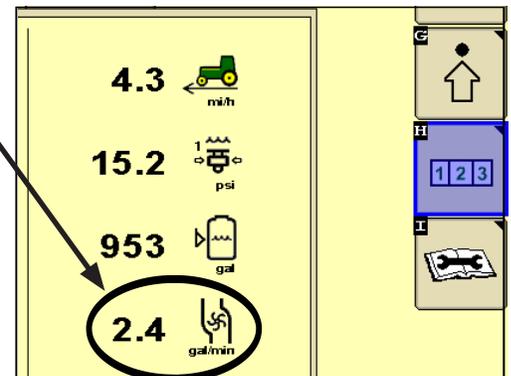
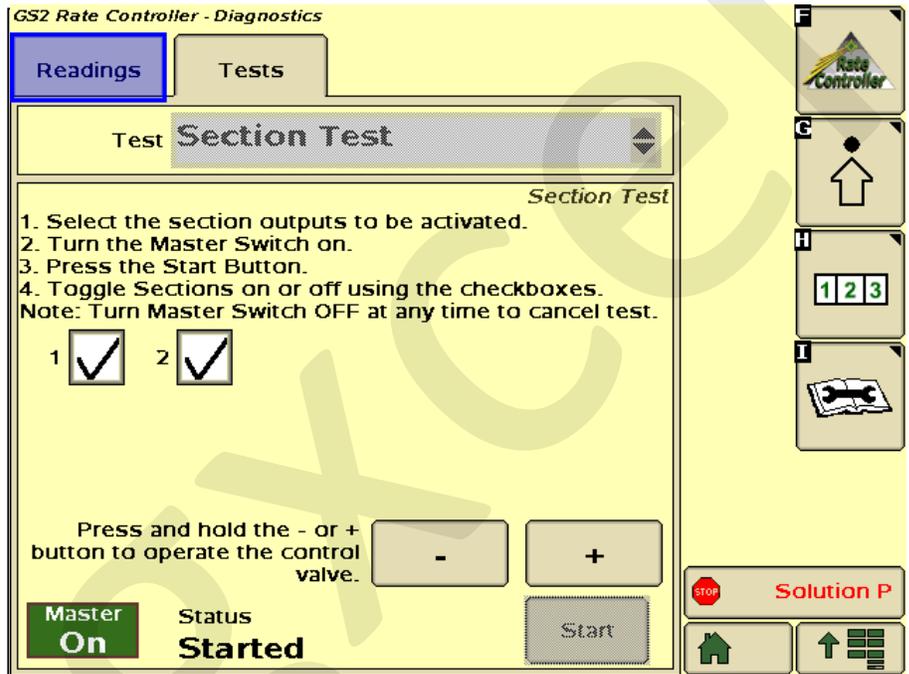
(Read Instructions Completely before Beginning Installation)

## INITIAL OPERATIONS INSTRUCTIONS - Step 1

The following steps are critical to ensuring that your AgXcel solution functions properly and is ready for field use. AgXcel recommends that you perform these steps with *WATER*.

1. **Go to the Section Test** (Diagnostics, Tests, Section Test). Section Test essentially functions like a MANUAL mode where you have direct control of pump and valves.
2. **Turn the Master switch on.**
3. **Test section valves** by checking and un-checking boxes. Check boxes to open all valves.
4. **Press the “+” button and hold it.** Electric pump(s) should begin running. (it takes lots of individual taps of this button to cause a visible effect).
5. **Is water being pumped?** If system is not primed, remove the end cap from a flow indicator manifold or otherwise open the system. This will allow air to be expelled and the pump to prime and fill system.
6. **With pump running and water flowing,** push “1,2,3” button. Look at flow in GPM. Is there a reading there. If not, is the system primed with water flowing to every row. If water is flowing, but no reading, check flowmeter calibration and wiring harness connections.
7. **Press the wrench button,** now push the “-” button. Go back to the “1,2,3” screen. Did the flow in GPM decrease?
8. **Make sure the GS2 flow readout** in GPM can be increased and decreased with the plus & minus buttons.

When these steps are successfully completed, proceed to the Nozzle Flow Check on the next page.



### Pro-Tip

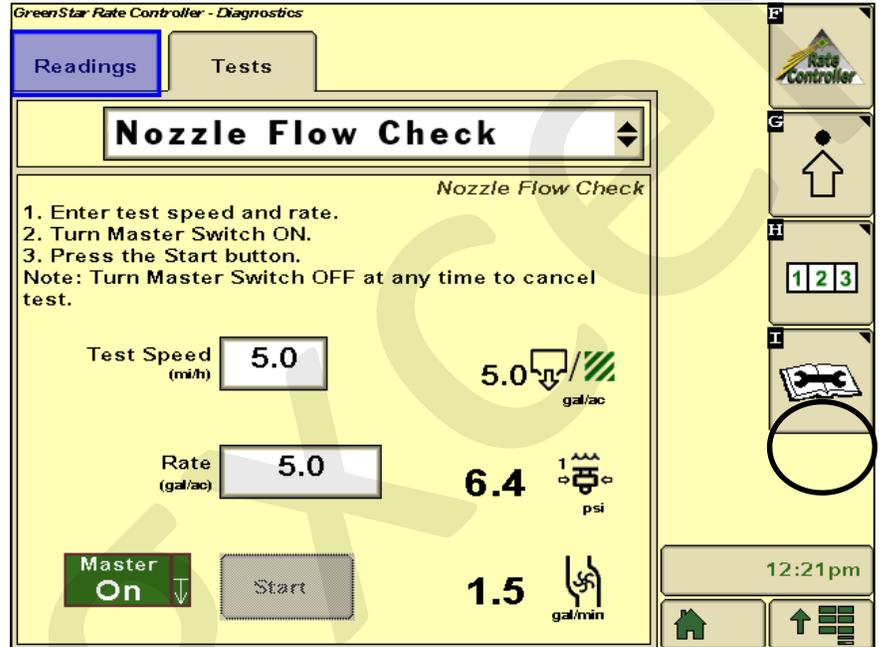
The “Section Test” is the first test to make sure your system is set up and connected correctly. This test will verify that the pump runs and you have ability to control the speed of the pumps. If you experience any problems with the operation of the system, begin with the “Section Test”.

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## INITIAL OPERATIONS INSTRUCTIONS - Step 2

1. **Go to the Nozzle Flow Check** (Diagnostics, Tests, Nozzle Flow Check ). This test will operate the system as if it were running in the field at a speed and application rate you enter.
2. **Test Speed:** Enter your typical field operating speed.
3. **Rate:** Enter your typical application rate.
4. **Turn the Master switch on.**
5. **Pump** will turn on and begin applying the entered rate.
6. **Observe the system.** Are the flow and pressure on the screen stable and reasonable? Is the flow reasonable and equal from each application point?
7. **Repeat this test** at minimum and maximum values for both Test Speed and Rate. Remember heavier fertilizers, such as 10-34-0, will have higher pressures at a given flow than water.



### TIP: If the alert message "Solution Tank Dry" appears, here are a few items to check.

With the error on the screen, is the RED LED on the AgXcel PWM controller on steady or flashing? If flashing refer to the troubleshooting section on page 15.

Is the ball valve from the tank to the pumps for liquid feed opened?

Are the pumps running but no liquid flowing? Make sure the vapor lock valve (small white body with blue lever) located near the pump(s) is open to allow bleeding of any air in the system.

Are the floating ball manifolds floating? If they are then check the flow meter connections.

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

(Read Instructions Completely before Beginning Installation)

## INITIAL OPERATIONS INSTRUCTIONS - Step 2, cont.....

Another way to verify that your system is working properly is by running the “**Configuration Test**”. This test will confirm that the section valves are operating while also checking the GreenStar’s ability to control the flow at various rates.

GreenStar Rate Controller - Diagnostics

Readings Tests

Configuration Test

Configuration Test

1. Turn Master Switch ON  
2. Press Start  
Note: Turn Master Switch OFF at any time to cancel test

Master On

Start

	Flow (gal/min)	Variance (%)
1. Test Started	0.0	0
2. Agitator Test	0.0	0
3. Section Valve Test	0.0	0
4. Flow Control Test	0.0	0
5. Test Complete	0.0	0

Rate Controller

Setup

Totals

Diagnostics

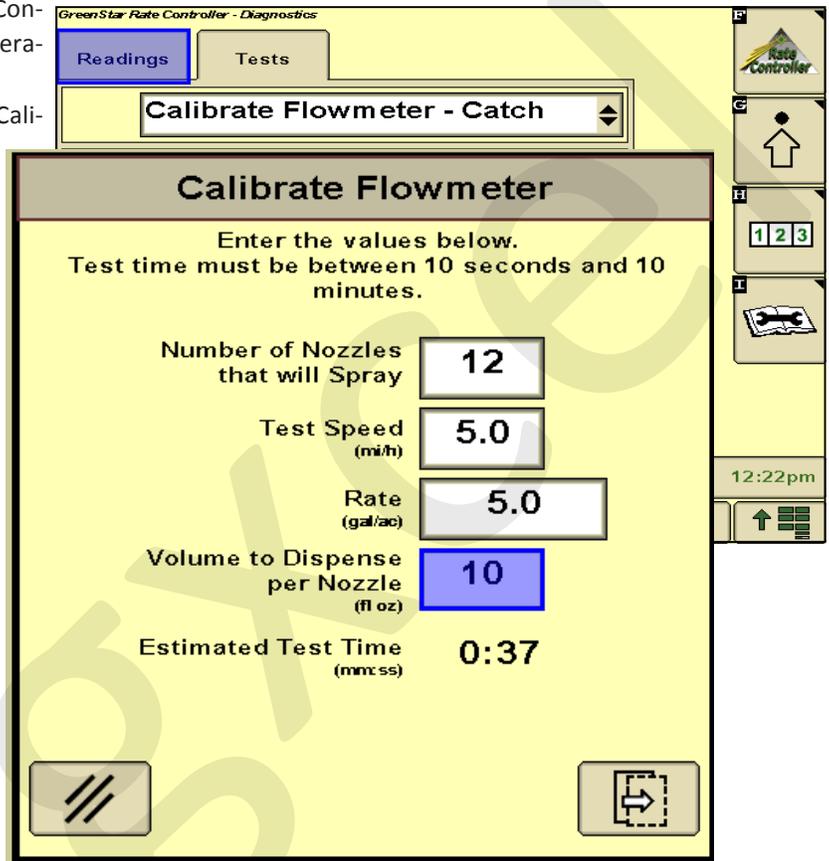
STOP Solution P

# AGXCEL INTEGRATION INTO THE JOHN DEERE GREEN STAR

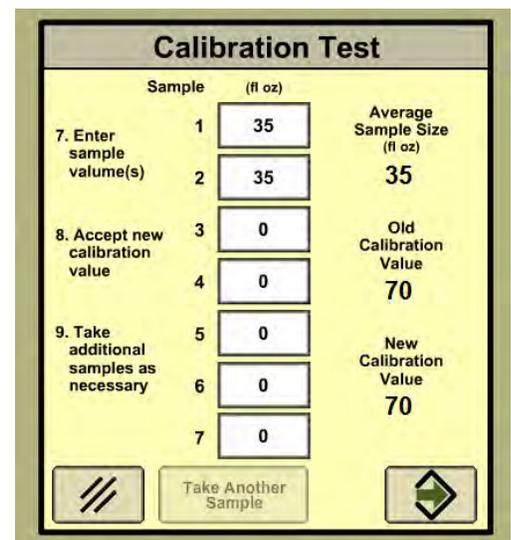
(Read Instructions Completely before Beginning Installation)

## INITIAL OPERATIONS INSTRUCTIONS - Step 3

1. **This test is required** before the John Deere Rate Controller will work properly and quit warning the operator to calibrate the flowmeter.
2. **Go to Calibrate Flow Meter** (Diagnostics, Tests, Calibrate Flow Meter). **The Calibrate Flowmeter** screen will pop up.
3. **Nozzle that will spray:** Enter total rows on equipment.
4. **Test Speed:** Enter typical operating speed.
5. **Rate:** Enter typical application rate.
6. **Volume to dispense:** Enter volume that you are capable of catching and measuring from a single nozzle (in ounces).
7. **Press continue button** in lower right corner.
8. **Turn master switch on** and begin test.
9. **The "Calibration Test" screen will pop up** after test is complete. Enter the sample size collected from 1 row. You need enter only 1 sample measurement. The GS2/3 just uses the various samples to calculate the average and total dispensed. The GS2/3 then calculates the new flowmeter calibration value.
10. **With AgXcel Mag FlowMeters**, in most cases the sample volume is correct. In that case, just enter the same sample size you did in #5 above to leave the calibration value unchanged. If the sample volume is different from what is expected, then recheck the calibration settings. Do not change the calibration values if there is only a small difference. **AgXcel** recommends that you do not change the flowmeter calibration number unless field use shows that the amount indicated by the flowmeter is not correct.



**NOTE: DO NOT ADJUST THE FLOWMETER CALIBRATION VALUE BASED ON A CATCH OF 1 ROW ON AN IMPLEMENT. AT A MINIMUM CATCH 3-4 ROWS.**



## TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

### Pumps run for a few seconds then turn off

This symptom is due to the pumps drawing more current than the 40 amp limit of the EPD.

1. **Unplug the EPD** connector going to the battery for 2-3 seconds. Removing power from the EPD resets it.
2. **Go to Diagnostics**, Section Test to investigate this issue.
3. **In Section Test**, hold down “+” button for a few seconds. A single tap of this button produces a very small change in signal to the valve, so you must hold it.
4. **Increase the flow slowly**, checking the “1,2,3” screen to see you flow in GPM. Find the approximate flow where the EPD kicks out. If this is below the flow you need you will need to reduce system pressure by:
  - Look for any unintended restrictions or plugged rows
  - Increase orifice size
  - Reduce ground speed
  - Reduce application rate

### Electric pumps will not turn on

**Connect pumps directly to battery**

1. **Find the EPD** (electric pump driver) shown at right. Connect the two connectors circled in each other (bypass the module and supply 12 volts directly to pumps)
2. **Do the pumps run?** If not, check the 40 amp fuse in the EPD harness near the tractor battery. Inspect harnesses and connections.
3. **If 2 pump system**, plug pumps in by themselves to check both.



### Electric pumps only run w/ 12 volts direct from battery

**Connect pumps and power harness back to EPD.**

1. **Go to Diagnostics**, Section Test to investigate this issue.
2. **In Section Test**, hold down “+” button for a few seconds. A single tap of this button produces a very small change in signal to the valve, so you must hold it.
3. **Remove PWM** valve connector and check voltage. You will need 1-12 volts to turn pumps on.
4. **If 1-12 volts is not present**, check harnesses and review control valve type setup.
5. **Go back to the 37 pin connector** at the John Deere Rate Controller. Check voltage between pins 15 & 16, should be between 6-12 volts while in section test after holding “+” button.
6. **If you cannot get voltage** at pins 15 & 16, contact your John Deere dealer for further assistance.

## TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

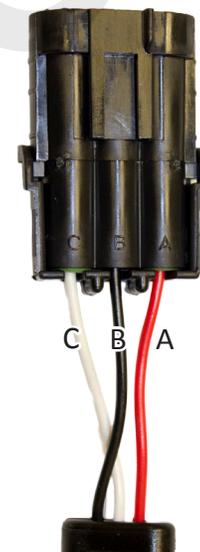
### Section Valve(s) will not move

1. **Go to Diagnostics**, Section Test to investigate this issue.
2. **In Section Test**, check and uncheck the boxes. With the box checked the valve should turn on. The valve should be off with the box not checked.
3. **Do you have a problem** with 1 valve or all valves.
4. **If working with the 7-12** section harness, identify if section 1-6 or section 7-12

### One Valve doesn't work

1. **Check the harness connection** to that valve. It is a 3 Pin Weather Pack connector. See image to the right.
2. **Check voltage pin A to Pin B**. Must be 12 volts, if not, go back to 16 pin & 37 pin connector and check voltage. See pages 38-39 for wiring diagrams.
3. **If no voltage on 37 pin connector** from John Deere Rate Controller, contact your John Deere dealer for assistance.
4. **If voltage is present on pins A&B** of 3 pin connection to valve, then check pin C to Pin B. This should be 12 volts when the valve is commanded on or open, this should be zero volts when valve is off or closed.
5. **If signal voltage is not present** to open valve, use diagrams to check at the 16 pin, then the 37 pin for voltage.
6. **If constant voltage (Pins A&B)** and switched voltage (Pins C&B) are pre-sent, inspect, repair or replace the valve.

PIN	FUNCTION
A	+ 12 V Constant
B	GND
C	+ 12 V Signal



### All or multiple valves don't work

1. Generally, follow the same steps as for a single valve. However, concentrate on checking for constant voltage on Pins A & B, then follow that back to the 16 pin and 37 pin connectors.
2. **This problem could also be related to** GS2 / GS3 configuration. Review Implement Setup to make sure sections are correct in controller.

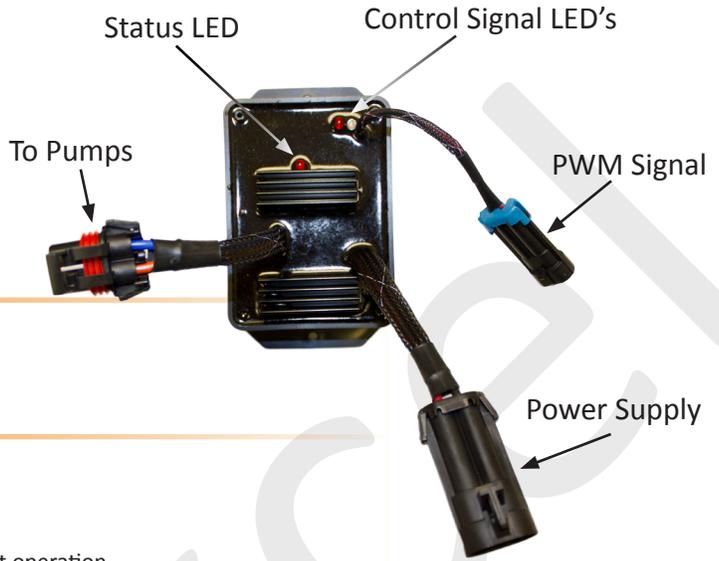


# TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

## EDP Status Lights

The status LED on the PWM is a good indicator to determine if there's a problem with the system. It is especially helpful if you are calling in for tech support.



### Light on steady



Unit is on and operating normally

### Steady flashing



Unit in HOLD. Check Run/Hold jumper or remote switch for correct operation.

### 1 Flash/pause



Open circuit detected. Check motor for open connections or circuits.

### 2 Flash/pause



Output short circuit detected. Check motor wiring.

### 3 Flash/pause



Overcurrent condition. Check total load.

### 4 Flash/pause



Input power fault. Check input wiring.

### 5 Flash/pause



Input frequency out of range (PWM models only)

**NOTE: Cycle power with the controller ON/OFF switch to clear a fault code.**

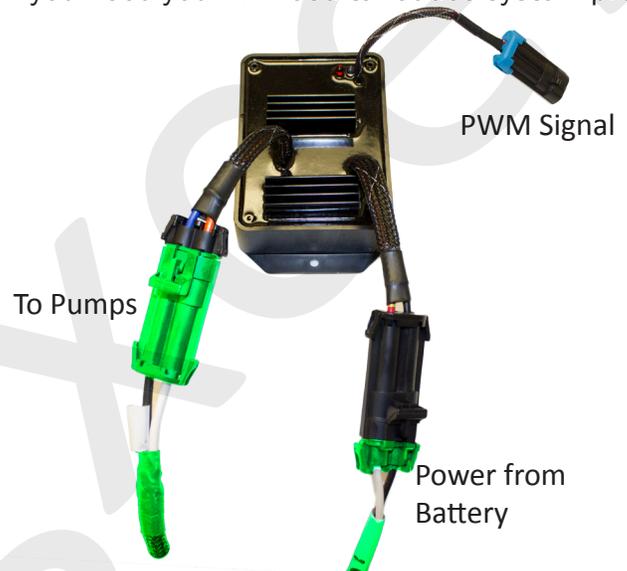
## TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

### Pumps run for a few seconds then turn off

This symptom is due to the pumps drawing more current than the 40 amp limit of the EPD.

1. **Unplug the EPD** connector going to the battery for 2-3 seconds. Removing power from the EPD resets it.
2. **Go to Diagnostics**, Section Test to investigate this issue.
3. **In Section Test**, hold down “+” button for a few seconds. A single tap of this button produces a very small change in signal to the valve, so you must hold it.
4. **Increase the flow slowly**, checking the “1,2,3” screen to see you flow in GPM. Find the approximate flow where the EPD kicks out. If this is below the flow you need you will need to reduce system pressure by:
  - Looking for any unintended restrictions or plugged rows
  - Increase orifice size
  - Reduce ground speed
  - Reduce application rate



### Electric pumps will not turn on

**Connect pumps directly to battery**

1. **Find the EPD** (electric pump driver) shown at right. Connect the two connectors (highlighted green, shown on the right) to each other. This will bypass the module and supply 12 volts directly to pumps.
2. **Do the pumps run?** If not, check the 40 amp fuse on the EPD harness that is connected to the tractor battery. Inspect harnesses and connections. Make sure wire colors match up. (white/white, black/black)
3. **If using a dual pump system**, test each pump by plugging one pump at a time directly to the battery.

### Electric pumps only run w/12 volts direct from battery

**Connect pumps and power harness back to EPD.**

1. **Go to Diagnostics**, Section Test to investigate this issue.
2. **In Section Test**, hold down “+” button for a few seconds. A single tap of this button produces a very small change in signal to the valve, so you must hold it.
3. **Remove the EPD** power connector and check voltage. You will need 1-12 volts to turn pumps on.
4. **If 1-12 volts is not present**, check harnesses and review control valve type setup.
5. **Go back to the 37 pin connector** at the John Deere Rate Controller. Check the voltage between pins 15 & 16, it should be between 6-12 volts while in section test after holding “+” button.
6. **If you cannot get voltage** at pins 15 & 16, contact your John Deere dealer for further assistance.

### Inspect connections for burned out connectors.

Inspect all connections for bent or burned out leads. Constantly running the system at a high pressure or getting more than the required voltage (12v) can result in burned out connections causing the system to not work properly.



# TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

## Application Rate Fluctuates

This symptom is due to the pumps drawing more current than the 40 amp limit of the EPD.

First, you need to determine if the fluctuation is caused by the controller sending fluctuating signals to the valve.

1. **Go to Section Test** as shown in Initial Operation.
2. **Turn the system** on watch the flow in GPM on the 1,2,3 screen.
3. **Is the flow steady** within a very small range. For example a fluctuation from 2.3 to 2.5 GPM would be considered normal. A fluctuation from 2-3 GPM is a problem. If only a small normal fluctuation is seen, skip steps 4-8 and proceed to "Application Rate Fluctuates in Field ..... " below.
4. **If there is a large fluctuation**, observe the system flow. Is the discharge a steady stream; are the flow indicator balls floating steady.
5. **If visually the flow is steady**, but the display reports a fluctuation in GPM, inspect the flowmeter. See section B for flowmeter information.
6. **If visually the flow is unsteady**, the flowmeter is working correctly reporting a flow problem. Is the pump turning steady or surging?
7. **Look for any type of obstruction** in the pump inlet. Clean the strainer. If continually plugging the strainer investigate fertilizer quality and necessary strainer size.

## Application Rate fluctuates in field, but flow in Section Test mode is stable

This problem indicates the valve calibration needs changed. The system is surging

1. **Go to Setup** - System - PWM Setup.
2. **Change the Valve Calibration** by reducing the valve speed (first two digits). For ex-ample reduce the number for 9911 to 8511, which changes valve speed from 99 to 85.

## Application Rate is slow to get to the Target Rate

1. **You may need to increase** the valve calibration. Go to Setup - System - PWM Setup.
2. **Change the Valve Calibration** by increasing the valve speed (first two digits). For example increase the number from 8511 to 9911, which changes valve speed from 85 to 99. (AgXcel recommends 9911, which is fastest valve calibration possible)
3. **The low limit may be set higher** if the system continues to present an error of "Solution Tank Dry". Slowly increment the Low Limit by 5,10,15 and 20 being the highest. If you set this number too high you may not be able to achieve lower rates. Caution must be used when raising this number.

## No Flow shown on OEM display but liquid is being pumped

1. **Unplug flowmeter.** With voltmeter, check for 12 volts between pins B&C of flowmeter connector (on main harness PN 53593). If 12 volts not present, inspect wiring harness and troubleshoot all connections per schematic.
2. **If 12 volts is present**, then conduct a tap test. Go to setup and change the flow cal to 100. Have a second person watch GPM on the Rate Control Detail screen while other person taps (use a short piece of wire or a paper clip) between pins A&C of flowmeter connector (on 53521 harness). A flow value should show up indicating the wiring is not damaged.
3. **If the display responded** to the tap test, your wiring to that point is good. If still not fixed, inspect adapter harness and test continuity per schematic.
4. **Replace flowmeter.**

LIQUID CONTROL MODULE MATRIX		
LIQUID RATE CONTROLLER	CHECK VOLTAGE BETWEEN PINS	VOLTAGE
AGLEADER	2 AND 7	BETWEEN 6 - 12 VOLTS
TRIMBLE	E1 AND E2	BETWEEN 6 - 12 VOLTS
JD GS2 / GS3	15 AND 16	BETWEEN 6 - 12 VOLTS

\* IF VOLTAGE CANNOT BE ACHIEVED CONTACT YOUR OEM DEALER

## FERTILIZER SYSTEM FLOW VERIFICATION

(Read Instructions Completely before Beginning Installation)

I can't get up to my desired rate. How much flow is required? Can I achieve a new application rate with my current system? How much oil does my AgXcel system need?

### Follow the Steps Below:

1. **Use the Fertilizer System Flow Charts** on the next two pages to find your required flow. First, locate the chart for your implement size. Next, find your operating speed on the left side and your application rate on the top. Record the flow in gallons per minute for your maximum speed and rate and your minimum speed and rate.
  - A. Maximum Flow \_\_\_\_\_ GPM (Max Rate & Max Speed)
  - B. Minimum Flow \_\_\_\_\_ GPM (Min Rate & Min Speed)
2. **Locate your pump model** on the chart on this page. Will the pump model provide the maximum flow you need from above?
3. **Do you have a problem** with 1 valve or all valves.
4. **Find your flowmeter model** in the chart on this page. Will the flowmeter work at both the maximum and minimum flow your recorded in step 1? If not, a different flow meter is required.
5. **If using section valves you must complete this step.**
  - A. Minimum Flow (from above) ÷ Total Rows = \_\_\_\_\_ GPM / Row
  - B. GPM / Row (from line above) x Rows per section = \_\_\_\_\_ GPM / Section

**Will your flowmeter measure the minimum GPM / section?**

AgXcel GX2 Electric Pump Flow Rates	
	Max Flow GPM
1 pump	3.0
2 pumps	6.0
Roller pump	4.5

AgXcel GX5 Flow Rates		
	# of Diaphragms	Max Flow GPM
D70	2	15
D115	3	25
D160	4	35
D250	6	55

Flowmeter Table				
Model	Type	Min GPM	Max GPM	
FM750LR	TURBINE	0.3	12	
FM750	TURBINE	2	40	
FLOWMASTER 270	TURBINE	3.5	70	
.13-2.6	Mag Meter	0.13	2.6	
.3-5	Mag Meter	0.13	6.5	
.6-13	Mag Meter	0.6	13	
1.3-26	Mag Meter	1.3	26	
2.6-53	Mag Meter	2.6	53	

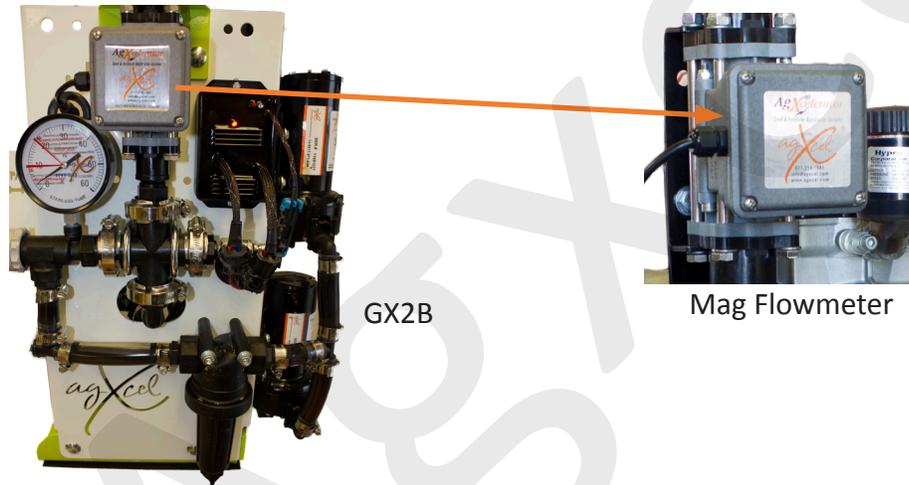
**Note:** Location of tanks will have a major affect on overall GPM capacity of electric pump setups.

## AGXCEL MAGNETIC FLOWMETER OPTION

(Read Instructions Completely before Beginning Installation)

### AGXCEL MAG FLOWMETER

The AgXcel Mag Flowmeter is a magnetic flowmeter, also technically known as an electromagnetic flowmeter. A magnetic field is applied to the metering tube, which results in a potential difference proportional to the flow velocity perpendicular to the flux lines. The physical principle at work is electromagnetic induction. The Mag meter is superior to other flow meter since there are no moving parts to replace or maintain just as when dirty or fertilizer with particles is present. Also given that the Mag meter detects the flow of ions in the liquid, it can therefore accommodate for viscosity or liquid density changes. Given the superior features of the Mag flow meter, a quick catch test is always recommended to ensure precision application.



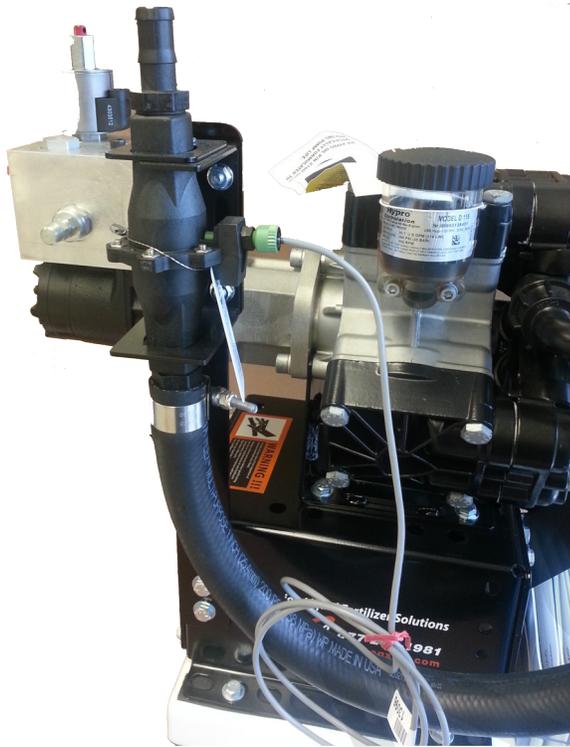
FLOW METER GPM	PART NUMBER	PULSES/GALLON	JD CALIBRATION #
0.13 - 2.6 GPM	34412	22710	2839
0.3 - 5.0 GPM	34415	11355	1419
0.6 - 13 GPM	53615	4542	4542
1.3 - 26 GPM	34418	2271	2271
2.6 - 53 GPM	34420	1135	1135

## AGXCEL TURBINE FLOWMETER OPTION

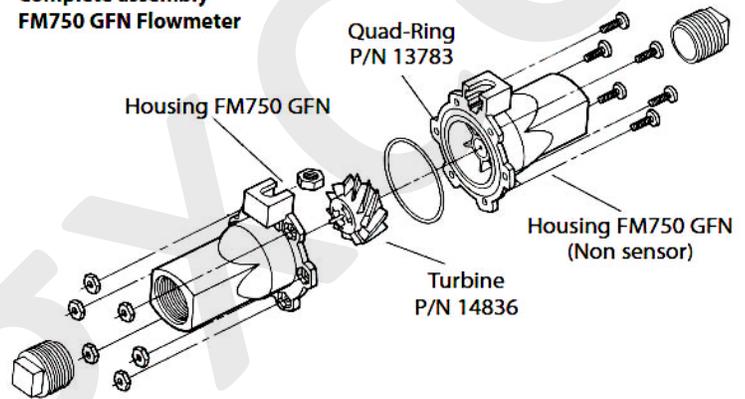
(Read Instructions Completely before Beginning Installation)

### AGXCEL TURBINE FLOWMETER

AgXcel flowmeter kits consist of the flowmeter, sensor, mounting bracket and hose barb fittings. The FM750 GFN turbine flowmeter requires a minimum of 24" of hose, with a gentle curve, should be used after the flowmeter outlet before any fittings are inserted. The FM750 GFN is bidirectional so it works with flow in either direction. The FM750 calibration number is stamped on a metal tag attached to the flowmeter.



Complete assembly  
FM750 GFN Flowmeter



The FM750 GFN may need to be disassembled for cleaning or to remove an obstruction. This diagram shows the components and proper location of each. If necessary use a mild detergent and brush to clean the flowmeter. The turbine should spin freely in the housing. After disassembly, recalibration of the flowmeter is recommended as its flow characteristics may change.

FLOW METER GPM	PART NUMBER	PULSES/GALLON	JD CALIBRATION #
2.0 - 40 GPM	38310	134-154	72.50
LOW FLOW METER GPM	PART NUMBER	PULSES/GALLON	JD CALIBRATION #
0.5 - 12 GPM	20309	233	233

\*\* The FM750LR (low rate) flowmeter is identical externally, however, its maximum flow is 12 GPM and it is not recommended with the GX5. It can be identified by: an orange Zip Tie and a Flowmeter Calibration number on metal tag between 400-550.

## LOCATING THE FLOWMETER CALIBRATION NUMBERS

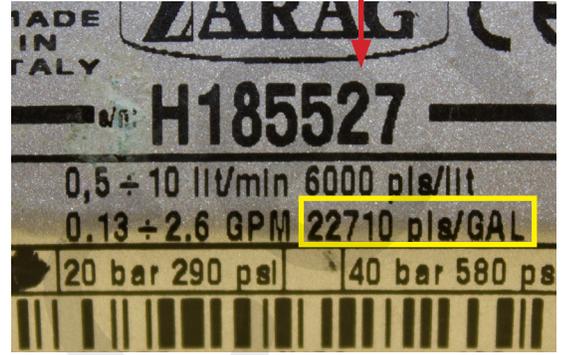
(Read Instructions Completely before Beginning Installation)

If you have a magnetic flowmeter there will be a sticker located on one of the sides. Find the pulses per gallon and use the chart below to determine your flowmeter calibration number.

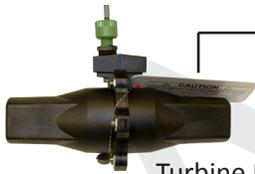
Mag Flowmeter



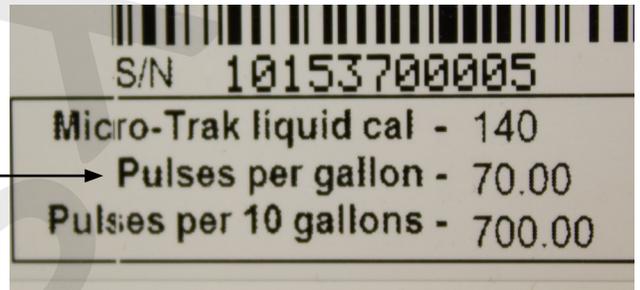
FLOW RANGE (GPM)	PULSES PER GALLON	JOHN DEERE GS2/GS3	
		DB8 CABLE	CAL #
<b>DIVIDE BY 8 CABLE REQUIRED (DB8)</b>			
0.13 - 2.6	22710	YES	2839
0.3 - 5	11355	YES	1419
0.6 - 13	4542	NO	4542
1.3 - 26	2271	NO	2271
2.6 - 53	1135	NO	1135



If you have a turbine flowmeter (black cylinder shape) there will be a tag tied to the flowmeter like the image shown on the right. The number you are looking for is the "Pulses per Gallon".



Turbine Flowmeter



When calling for tech support our technicians may ask if you have a "Divide by 8" cable connected to the flowmeter. The image to the right is what the cable looks like. This only applies to the magnetic flowmeter. This cable is easily identified by the small "pill box" in the middle of the harness.



## **GX2 ACCESSORY - SECTION VALVES**

(Read Instructions Completely before Beginning Installation)

### **SECTION VALVES - HOW THEY WORK**

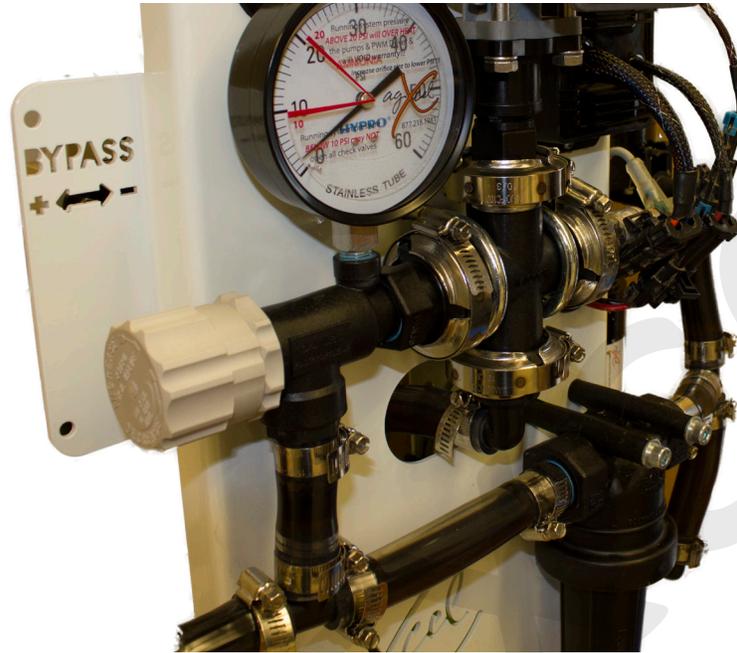
Section valves can be assembled into groups with a common inlet to control flow to each section. Common assemblies use up to 5-6 valves, however, more can be used where practical. Many alternate fittings can be used to accommodate different hose sizes and configurations. The valves have a 3 pin weather pack electrical connector. This has a power, ground, and switched wire. The power measured to ground should have 12 volts when the controller is on. The switched wire will have 12 volts to turn the valve on, and 0 volts to turn the valve off.



## **GX2 ACCESSORY - RECIRCULATION KIT**

(Read Instructions Completely before Beginning Installation)

### **Recirculation Regulation valve**



#### **APPLICATIONS**

1. Recirculation flow is required for product agitation.
2. IF a low flow rate is required, that would require pump to run less than 10-20% of maximum capacity. This kit will allow the pump to turn faster, while only applying a low rate of product. This makes the pump performance more stable under these circumstances. Make sure the flowmeter minimum flow is capable of metering the flow rate you wish to apply to the ground.

#### **HOW IT WORKS**

The recirculation valve diverts some pump flow before the flowmeter. The application rate is still measured by the flowmeter and everything that passes through the flowmeter is applied to the ground. Adjust the regulation valve to set the required recirculation.

USE OF THIS KIT LOWERS THE MAXIMUM RATE THAT CAN BE APPLIED

#### **GX5 ACCESSORY - RECIRCULATION KIT - D160 & D250**

Same function as above, slightly different attachment to pump.

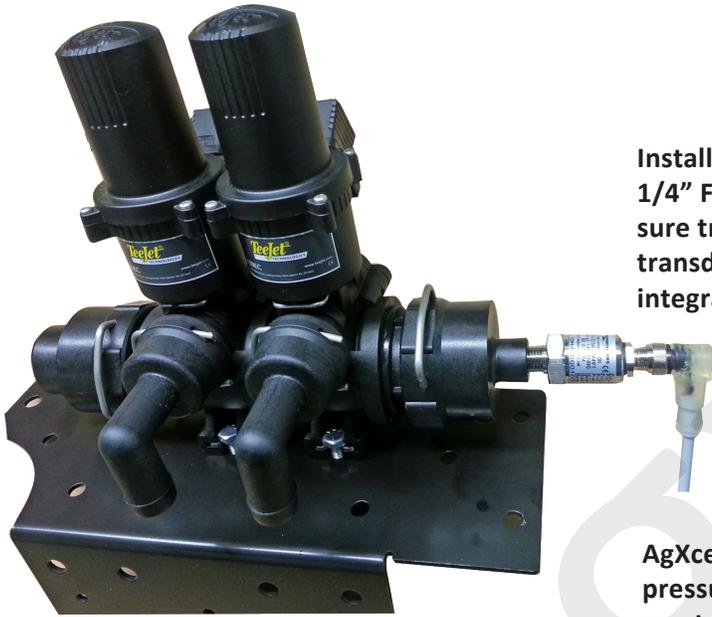
## **GX2 ACCESSORY - PRESSURE SENSOR AND GAUGE**

(Read Instructions Completely before Beginning Installation)

### **MOUNT ON SECTION VALVES**

The AgXcel GX10 OEM integration harness is capable of implementing a pressure transducer into the system so that system pressure may be displayed on the console in the cab of the tractor. Now even though the in-cab pressure is for informational purposes only, it can be very useful for managing the system.

### **MOUNT ON SECTION VALVE OUTLET**



Install the section valve with a 2" end cap and a 1/4" FPT port on the end. This is where the pressure transducer will be installed. The pressure transducer harness will connect to the AgXcel integration harness.

AgXcel has many different pressure gauge mounts and most all AgXcel systems have a visual pressure gauge mounted on the GX2 system



### **MOUNT ON GX2 OUTLET**



## IMPLEMENT SWITCH

(Read Instructions Completely before Beginning Installation)

### Implement Lift Switch (Mercury Run/Hold Switch)

The Mercury Run/Hold Switch turns liquid application on and off automatically when the implement is raised or lowered. The switch is mounted on a component that rotates when the implement is raised and lowered. The switch is attached to a magnetic base for easy mounting to any metal part of your tractor hitch or implement.

#### For mounted 3-point equipment:

- Mount the switch on the tractor 3 point arms.
- See the pictures below for switch orientation in run and hold positions.

#### For hitch drawn implements:

- Mount the switch on a wheel frame that rotates as it lifts the wheels up and down to raise and lower the implement.
- See the pictures below for switch orientation in run and hold positions.



Standard implement switch  
also available #17921

### Run/Hold Switch Logic

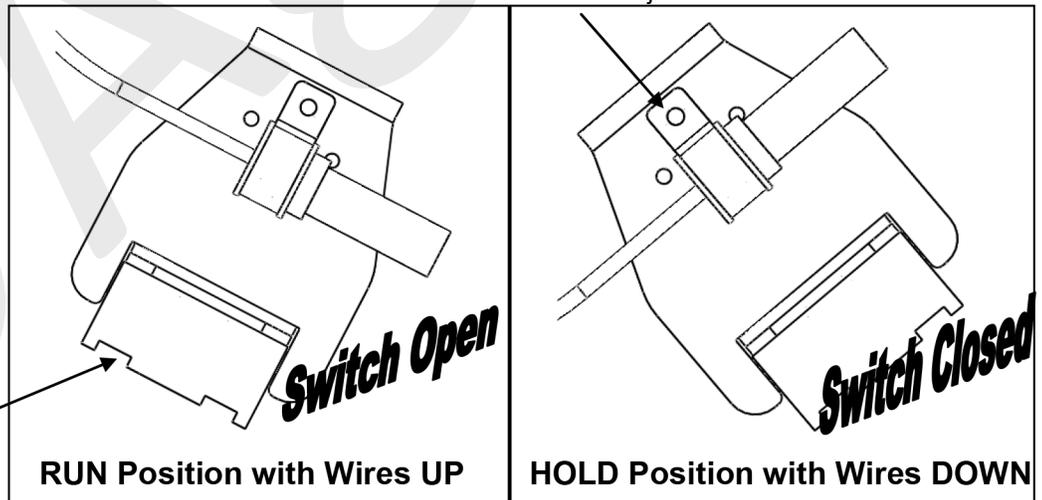
#### How to Adjust:

If your controller is turning off product application before or after you want, tilt the switch. If it turns off after you want when lifting the implement, tip more to the HOLD position. If product application should begin sooner when you lower the implement, tip more to the RUN position.

You can adjust the switch by moving the magnet or by loosening the screw and rotating the mercury switch.

Loosen screw to adjust sensor tilt

Magnet to attach  
to metal surface.



#### How to Test:

To test the run / hold mercury switch you will need a volt meter. Set the meter to test continuity (or ohms). With the wires down, you should have continuity between the two pins in the connector. With the wires up, the switch should be open (no continuity).

# FLOATING BALL MANIFOLDS

(Read Instructions Completely before Beginning Installation)

## High Flow Columns

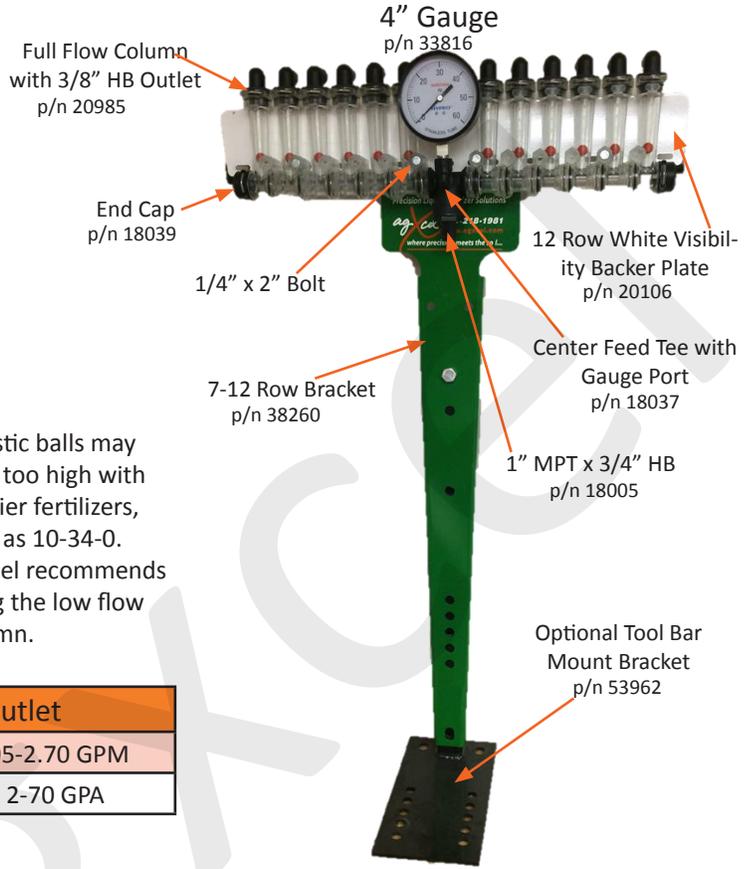
The high flow column is typically used with rates over 10 GPA. AgXcel recommends the use of low flow columns with 1/4" push to connect outlet fittings.

The high flow columns are most often assembled with 3/8" hose barb outlets. See the low flow info below for the difference between full and low flow columns.

Ball Selection for 30" Rows		
GPM	GPA	Ball
.05-.18	2-16	Green Plastic*
.09-.30	3-10	Red Plastic*
.31-.72	10-20	Maroon Glass
.40-2.1	13-70	Stainless Steel

\*Plastic balls may float too high with heavier fertilizers, such as 10-34-0. AgXcel recommends using the low flow column.

High Flow Indicators with 3/8" Hose Barb Outlet	
Column Flow (GPM)	.05-2.70 GPM
Equivalent Application Rate of 30" Rows at 6 MPH	2-70 GPA



## Low Flow Column (usually 1/4" QC)

The low flow column has a smaller internal diameter. This means a heavier ball can be used to monitor a smaller flow. AgXcel uses the low flow columns with 1/4" push to connect outlet fittings. The flow capability of 1/4" tubing and the low flow column is a great pair for rates on 30" rows under 10 GPA.

Externally, the low flow column can only be identified by "LOW FLOW" molded into one side of the column. All the same fittings work with low flow and full flow columns.

Ball Selection for 30" Rows		
GPM	GPA	Ball
.03-.09	1-3	Green Plastic*
.05-14	2-4	Red Plastic*
.10-.18	3-6	Maroon Glass
.15-.70	5-10	Stainless Steel

\*Plastic balls may float too high with heavier fertilizers, such as 10-34-0. AgXcel recommends using maroon glass in this case.

Low Flow Indicators with 1/4" Push to Connect Outlet	
Column Flow (GPM)	.03-.30 GPM
Low Flow Column with 3/8" hose barb	.03-70 GPM
Equivalent Application Rate on 30" Rows at 6 MPH (1/4" QC)	1-10 GPA



# FLOATING BALL MANIFOLDS

(Read Instructions Completely before Beginning Installation)

Floating ball manifolds are extremely flexible and can be mounted in many different configurations on various types of liquid application implements. The following illustrations will provide some general concepts on how to configure your implement

## 12 Row

### Split 3--3--3--3

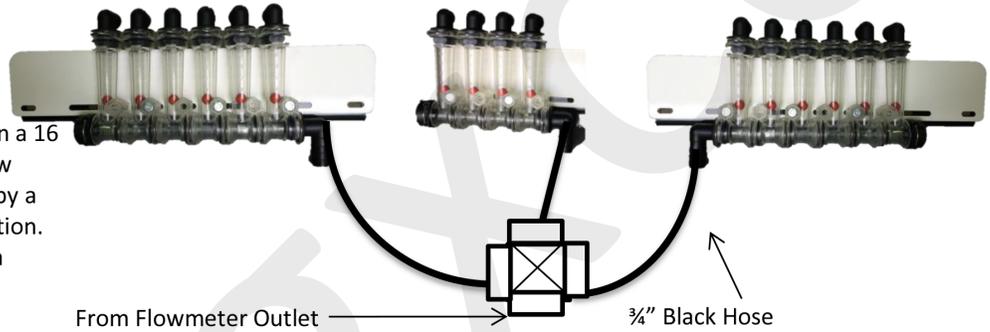
Shown here is a 12 row with four 3 row sections controlled by four section valves. Note each 6 row T-Bracket can hold two separate 3 row manifolds. A 4 section 24 row could be similar with four 6 row manifolds on two large T-Brackets.



## 16 Row

### Split 6--4--6

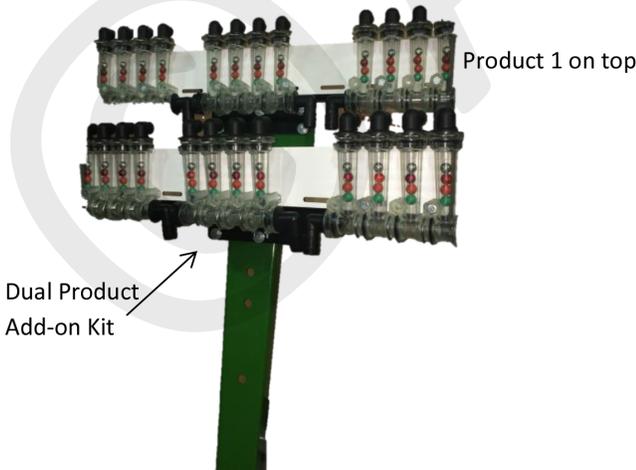
This configuration works well on a 16 row front fold planter. Each flow indicator manifold is shown fed by a cross in a single section installation. Each manifold could be fed by a section valve if desired.



## 12 Row Dual Product

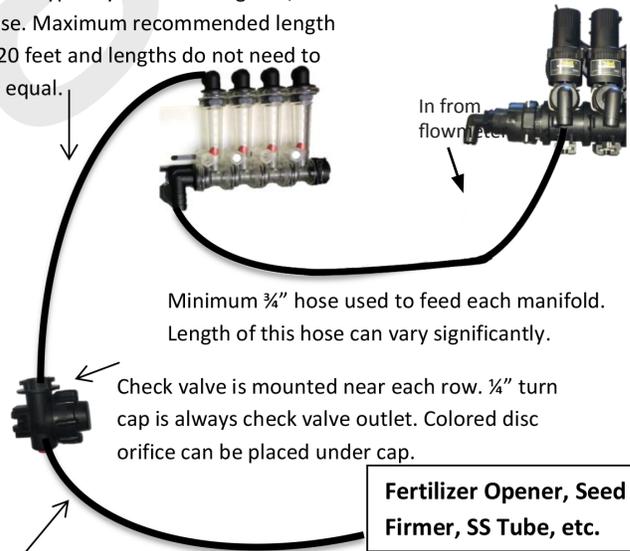
### Product 1 Split 4--4--4/Product 2 Split 4--4--4

Shown here is a 12 row with four 3 row sections controlled by four section valves. Note each 6 row T-Bracket can hold two separate 3 row manifolds. A 4 section 24 row could be similar with four 6 row manifolds on two large T-Brackets.



## Plumbing Overview

This is typically 3/8" OD tubing or 3/8" hose. Maximum recommended length is 20 feet and lengths do not need to be equal.



Minimum 3/4" hose used to feed each manifold. Length of this hose can vary significantly.

Check valve is mounted near each row. 3/4" turn cap is always check valve outlet. Colored disc orifice can be placed under cap.

**Fertilizer Opener, Seed Firmer, SS Tube, etc.**

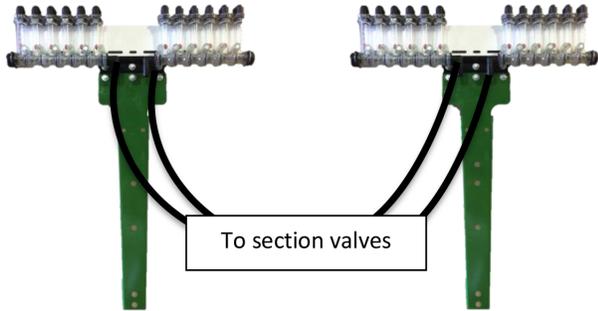
This is usually 1/4" OD tubing or 3/8" hose. Typical length is 1-4' with check valves place on each row that distance from ground.

## FLOATING BALL MANIFOLDS

(Read Instructions Completely before Beginning Installation)

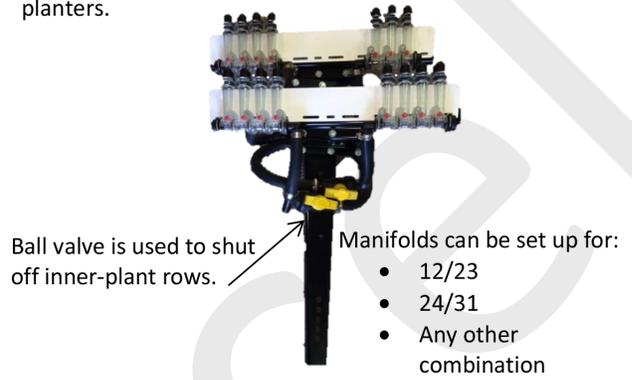
### 24 Row Planter with 4 Sections

This is a 24 Row implement that is set up with 4 sections



### Planter with Interplant

This system is to be used to shut off planters when corn is spaced at 30" and beans are spaced at 15". For example inner-plant planters.



## Agxcel Colored Disc Orifice Rate Charts For 30" Spacing

Read Instructions Completely Before Beginning Installation

### Check Valves

#### 10 lb check valve with 3/8" hose barbs P/N - 313

The recommended check valve for most Agxcel installations is the 10 lb check valve with 3/8" hose barbs. This works with 3/8" rubber hose which Agxcel recommends for most applications over 10 GPA on 30" rows. The recommended minimum system operation pressure for this check valve is 20 psi, to ensure all check valves open fully.



#### 4 lb check valve with 1/4" quick connect fittings P/N - 310

4 lb check valves are typically used with Agxcel's GX electric pump systems. Agxcel recommends this check valve for use with 1/4" tubing applying up to 10 GPA on 30" rows. The recommended minimum system operating pressure for this check valve is 10 psi, to ensure all check valves open fully.



**PART NUMBERS AND DESCRIPTIONS**  
 (Read Instructions Completely before Beginning Installation)

Part #	Description	
18032	3/4" Hose Shank - Straight	
18033	3/8" Hose Shank - 90°	
18034	3/4" Hose Shank - 90°	
18037	ORS Male x ORS Male x 1" Female Tee	
18038	ORS Male x ORS Female - 90°	
18039	End Cap w/u-clip (Wilger)	
18083	12 Column Bracket (6 and 8 Column Brackets available)	
19898	3/8 NPTF - 90°	
20106	12 Column Wilger White Backdrop (6 and 8 Column Backdrops available)	

**PART NUMBERS AND DESCRIPTIONS**  
 (Read Instructions Completely before Beginning Installation)

20985	Wilger Regular Flow Column with 3/8" Hose Barb (Complete)	
25681	Floating Ball Retainer	
25682	U-Clip Lock (Wilger)	
25687	Flow Indicator Column (Wilger)	
25709	1/4" Quick Connect - 90°	
37614	Wilger Low Flow Column 1/4" Push Connect Outlet (Complete)	
38260	GX1 Chassis Bracket	
40406	2 Section Valve (Tee Jet)	
52142	1/4" Poly Elbow 90°	

## FERTILIZER SYSTEM FLOW CHARTS

(Read Instructions Completely before Beginning Installation)

Use the correct implement width chart to find the required pump flow (in gallons per minute) based on travel speed and application rate.

IMPLEMENT SIZE IN FEET		15													
MPH	GPA														
	2	4	6	8	10	12	15	20	25	30	35	40	45	50	
4	0.2	0.5	0.7	1.0	1.2	1.5	1.8	2.4	3.0	3.6	4.2	4.9	5.5	6.1	
4.5	0.3	0.5	0.8	1.1	1.4	1.6	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	
5	0.3	0.6	0.9	1.2	1.5	1.8	2.3	3.0	3.8	4.5	5.3	6.1	6.8	7.6	
5.5	0.3	0.7	1.0	1.3	1.7	2.0	2.5	3.3	4.2	5.0	5.8	6.7	7.5	8.3	
6	0.4	0.7	1.1	1.5	1.8	2.2	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.1	
6.5	0.4	0.8	1.2	1.6	2.0	2.4	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.9	
7	0.4	0.8	1.3	1.7	2.1	2.5	3.2	4.2	5.3	6.4	7.4	8.5	9.5	10.6	
7.5	0.5	0.9	1.4	1.8	2.3	2.7	3.4	4.5	5.7	6.8	8.0	9.1	10.2	11.4	
8	0.5	1.0	1.5	1.9	2.4	2.9	3.6	4.9	6.1	7.3	8.5	9.7	10.9	12.1	
8.5	0.5	1.0	1.5	2.1	2.6	3.1	3.9	5.2	6.4	7.7	9.0	10.3	11.6	12.9	
9	0.5	1.1	1.6	2.2	2.7	3.3	4.1	5.5	6.8	8.2	9.5	10.9	12.3	13.6	
10	0.6	1.2	1.8	2.4	3.0	3.6	4.5	6.1	7.6	9.1	10.6	12.1	13.6	15.2	

IMPLEMENT SIZE IN FEET		20													
MPH	GPA														
	2	4	6	8	10	12	15	20	25	30	35	40	45	50	
4	0.3	0.6	1.0	1.3	1.6	1.9	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.1	
4.5	0.4	0.7	1.1	1.5	1.8	2.2	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.1	
5	0.4	0.8	1.2	1.6	2.0	2.4	3.0	4.0	5.1	6.1	7.1	8.1	9.1	10.1	
5.5	0.4	0.9	1.3	1.8	2.2	2.7	3.3	4.4	5.6	6.7	7.8	8.9	10.0	11.1	
6	0.5	1.0	1.5	1.9	2.4	2.9	3.6	4.9	6.1	7.3	8.5	9.7	10.9	12.1	
6.5	0.5	1.1	1.6	2.1	2.6	3.2	3.9	5.3	6.6	7.9	9.2	10.5	11.8	13.1	
7	0.6	1.1	1.7	2.3	2.8	3.4	4.2	5.7	7.1	8.5	9.9	11.3	12.7	14.1	
7.5	0.6	1.2	1.8	2.4	3.0	3.6	4.5	6.1	7.6	9.1	10.6	12.1	13.6	15.2	
8	0.6	1.3	1.9	2.6	3.2	3.9	4.9	6.5	8.1	9.7	11.3	12.9	14.6	16.2	
8.5	0.7	1.4	2.1	2.7	3.4	4.1	5.2	6.9	8.6	10.3	12.0	13.7	15.5	17.2	
9	0.7	1.5	2.2	2.9	3.6	4.4	5.5	7.3	9.1	10.9	12.7	14.6	16.4	18.2	
10	0.8	1.6	2.4	3.2	4.0	4.9	6.1	8.1	10.1	12.1	14.1	16.2	18.2	20.2	

IMPLEMENT SIZE IN FEET		30													
MPH	GPA														
	2	4	6	8	10	12	15	20	25	30	35	40	45	50	
4	0.5	1.0	1.5	1.9	2.4	2.9	3.6	4.9	6.1	7.3	8.5	9.7	10.9	12.1	
4.5	0.5	1.1	1.6	2.2	2.7	3.3	4.1	5.5	6.8	8.2	9.5	10.9	12.3	13.6	
5	0.6	1.2	1.8	2.4	3.0	3.6	4.5	6.1	7.6	9.1	10.6	12.1	13.6	15.2	
5.5	0.7	1.3	2.0	2.7	3.3	4.0	5.0	6.7	8.3	10.0	11.7	13.3	15.0	16.7	
6	0.7	1.5	2.2	2.9	3.6	4.4	5.5	7.3	9.1	10.9	12.7	14.6	16.4	18.2	
6.5	0.8	1.6	2.4	3.2	3.9	4.7	5.9	7.9	9.9	11.8	13.8	15.8	17.7	19.7	
7	0.8	1.7	2.5	3.4	4.2	5.1	6.4	8.5	10.6	12.7	14.9	17.0	19.1	21.2	
7.5	0.9	1.8	2.7	3.6	4.5	5.5	6.8	9.1	11.4	13.6	15.9	18.2	20.5	22.7	
8	1.0	1.9	2.9	3.9	4.9	5.8	7.3	9.7	12.1	14.6	17.0	19.4	21.8	24.3	
8.5	1.0	2.1	3.1	4.1	5.2	6.2	7.7	10.3	12.9	15.5	18.0	20.6	23.2	25.8	
9	1.1	2.2	3.3	4.4	5.5	6.5	8.2	10.9	13.6	16.4	19.1	21.8	24.6	27.3	
10	1.2	2.4	3.6	4.9	6.1	7.3	9.1	12.1	15.2	18.2	21.2	24.3	27.3	30.3	

## FERTILIZER SYSTEM FLOW CHARTS

(Read Instructions Completely before Beginning Installation)

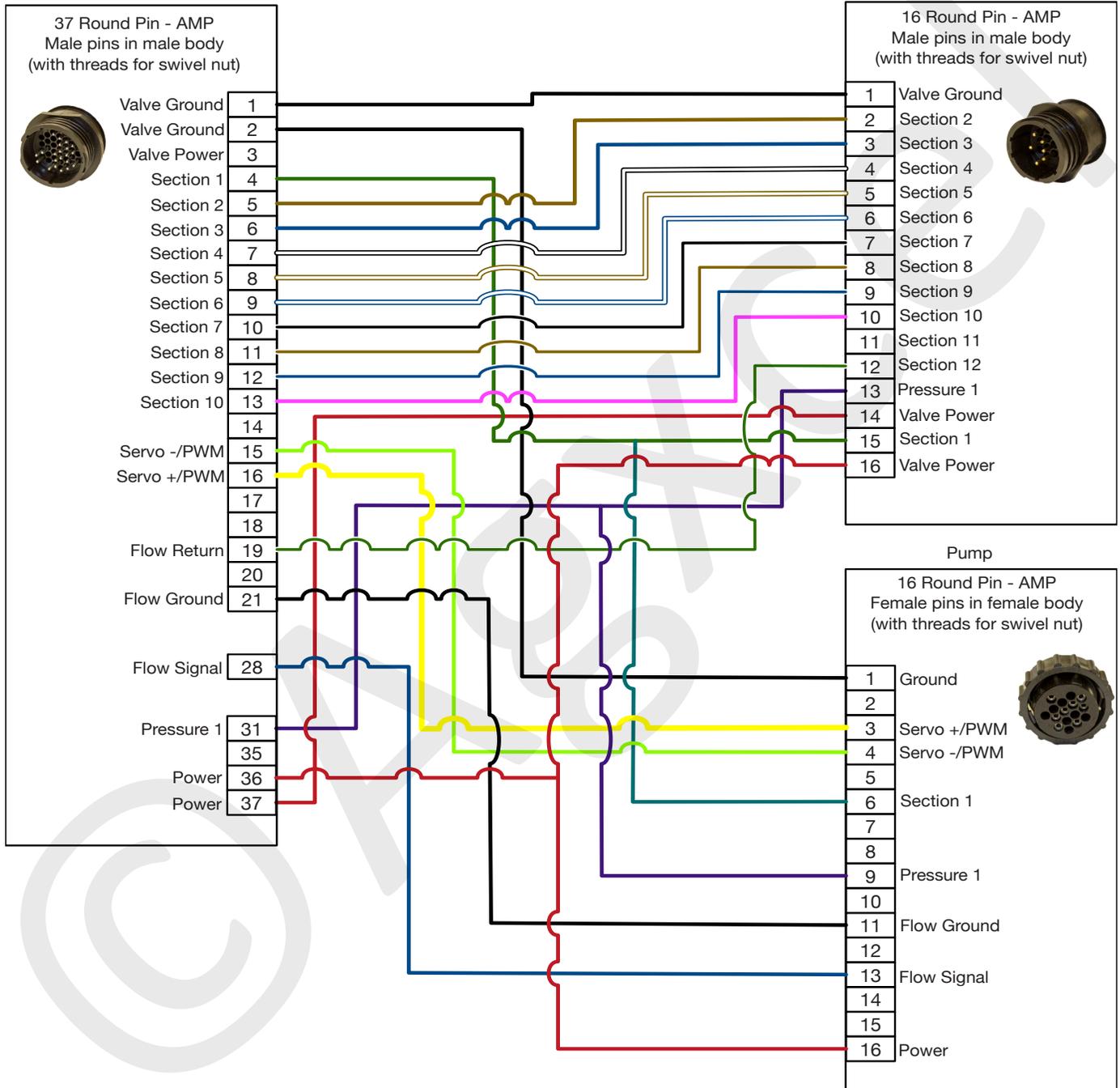
Use the correct implement width chart to find the required pump flow (in gallons per minute) based on travel speed and application rate

IMPLEMENT SIZE IN FEET		40												
MPH	GPA													
	2	4	6	8	10	12	15	20	25	30	35	40	45	50
4	0.6	1.3	1.9	2.6	3.2	3.9	4.9	6.5	8.1	9.7	11.3	12.9	14.6	16.2
4.5	0.7	1.5	2.2	2.9	3.6	4.4	5.5	7.3	9.1	10.9	12.7	14.6	16.4	18.2
5	0.8	1.6	2.4	3.2	4.0	4.9	6.1	8.1	10.1	12.1	14.1	16.2	18.2	20.2
5.5	0.9	1.8	2.7	3.6	4.4	5.3	6.7	8.9	11.1	13.3	15.6	17.8	20.0	22.2
6	1.0	1.9	2.9	3.9	4.9	5.8	7.3	9.7	12.1	14.6	17.0	19.4	21.8	24.3
6.5	1.1	2.1	3.2	4.2	5.3	6.3	7.9	10.5	13.1	15.8	18.4	21.0	23.6	26.3
7	1.1	2.3	3.4	4.5	5.7	6.8	8.5	11.3	14.1	17.0	19.8	22.6	25.5	28.3
7.5	1.2	2.4	3.6	4.9	6.1	7.3	9.1	12.1	15.2	18.2	21.2	24.3	27.3	30.3
8	1.3	2.6	3.9	5.2	6.5	7.8	9.7	12.9	16.2	19.4	22.6	25.9	29.1	32.3
8.5	1.4	2.7	4.1	5.5	6.9	8.2	10.3	13.7	17.2	20.6	24.1	27.5	30.9	34.4
9	1.5	2.9	4.4	5.8	7.3	8.7	10.9	14.6	18.2	21.8	25.5	29.1	32.7	36.4
10	1.6	3.2	4.9	6.5	8.1	9.7	12.1	16.2	20.2	24.3	28.3	32.3	36.4	40.4

IMPLEMENT SIZE IN FEET		60												
MPH	GPA													
	2	4	6	8	10	12	15	20	25	30	35	40	45	50
4	1.0	1.9	2.9	3.9	4.9	5.8	7.3	9.7	12.1	14.6	17.0	19.4	21.8	24.3
4.5	1.1	2.2	3.3	4.4	5.5	6.5	8.2	10.9	13.6	16.4	19.1	21.8	24.6	27.3
5	1.2	2.4	3.6	4.9	6.1	7.3	9.1	12.1	15.2	18.2	21.2	24.3	27.3	30.3
5.5	1.3	2.7	4.0	5.3	6.7	8.0	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3
6	1.5	2.9	4.4	5.8	7.3	8.7	10.9	14.6	18.2	21.8	25.5	29.1	32.7	36.4
6.5	1.6	3.2	4.7	6.3	7.9	9.5	11.8	15.8	19.7	23.6	27.6	31.5	35.5	39.4
7	1.7	3.4	5.1	6.8	8.5	10.2	12.7	17.0	21.2	25.5	29.7	34.0	38.2	42.4
7.5	1.8	3.6	5.5	7.3	9.1	10.9	13.6	18.2	22.7	27.3	31.8	36.4	40.9	45.5
8	1.9	3.9	5.8	7.8	9.7	11.6	14.6	19.4	24.3	29.1	34.0	38.8	43.7	48.5
8.5	2.1	4.1	6.2	8.2	10.3	12.4	15.5	20.6	25.8	30.9	36.1	41.2	46.4	51.5
9	2.2	4.4	6.5	8.7	10.9	13.1	16.4	21.8	27.3	32.7	38.2	43.7	49.1	54.6
10	2.4	4.9	7.3	9.7	12.1	14.6	18.2	24.3	30.3	36.4	42.4	48.5	54.6	60.6

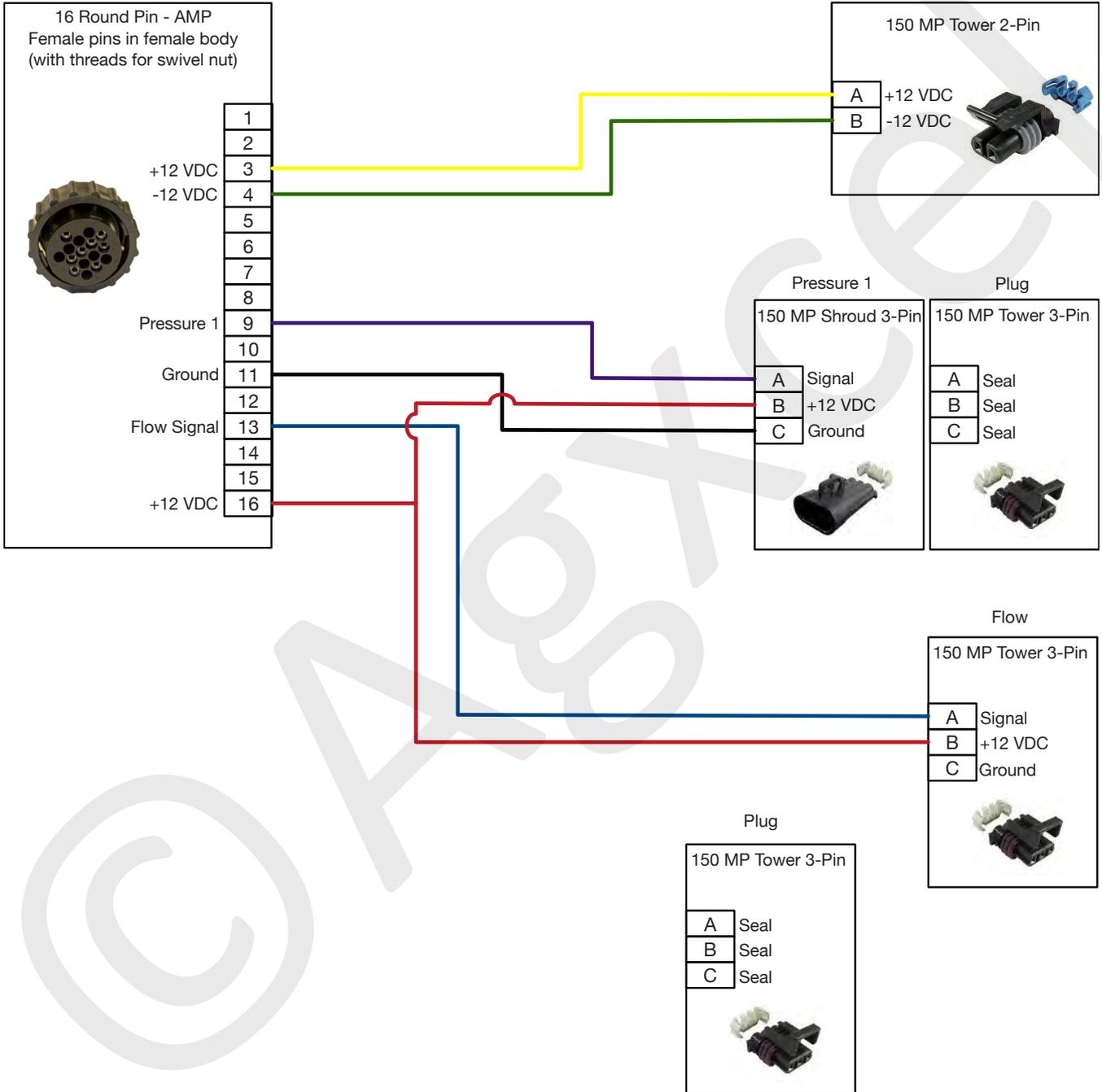
IMPLEMENT SIZE IN FEET		90												
MPH	GPA													
	2	4	6	8	10	12	15	20	25	30	35	40	45	50
4	1.5	2.9	4.4	5.8	7.3	8.7	10.9	14.6	18.2	21.8	25.5	29.1	32.7	36.4
4.5	1.6	3.3	4.9	6.5	8.2	9.8	12.3	16.4	20.5	24.6	28.6	32.7	36.8	40.9
5	1.8	3.6	5.5	7.3	9.1	10.9	13.6	18.2	22.7	27.3	31.8	36.4	40.9	45.5
5.5	2.0	4.0	6.0	8.0	10.0	12.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
6	2.2	4.4	6.5	8.7	10.9	13.1	16.4	21.8	27.3	32.7	38.2	43.7	49.1	54.6
6.5	2.4	4.7	7.1	9.5	11.8	14.2	17.7	23.6	29.6	35.5	41.4	47.3	53.2	59.1
7	2.5	5.1	7.6	10.2	12.7	15.3	19.1	25.5	31.8	38.2	44.6	50.9	57.3	63.7
7.5	2.7	5.5	8.2	10.9	13.6	16.4	20.5	27.3	34.1	40.9	47.7	54.6	61.4	68.2
8	2.9	5.8	8.7	11.6	14.6	17.5	21.8	29.1	36.4	43.7	50.9	58.2	65.5	72.8
8.5	3.1	6.2	9.3	12.4	15.5	18.6	23.2	30.9	38.7	46.4	54.1	61.8	69.6	77.3
9	3.3	6.5	9.8	13.1	16.4	19.6	24.6	32.7	40.9	49.1	57.3	65.5	73.7	81.9
10	3.6	7.3	10.9	14.6	18.2	21.8	27.3	36.4	45.5	54.6	63.7	72.8	81.9	91.0

# John Deere Green Star Adapter Harness P/N 53593



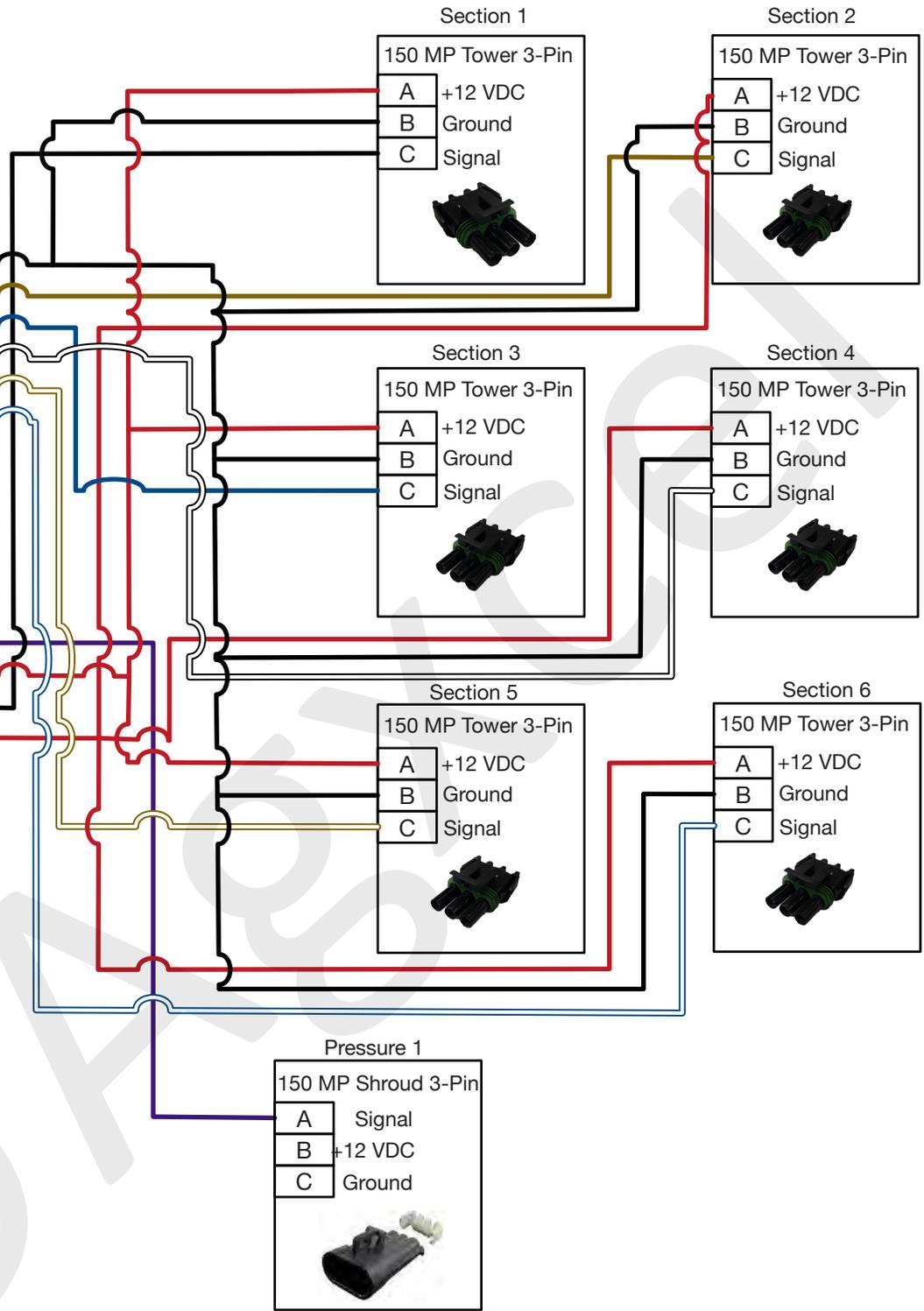
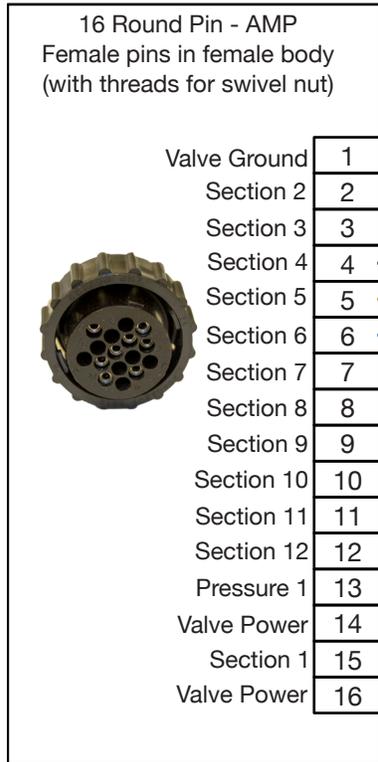
# PWM Harness

Flowmeter, PWM, Pressure  
P/N 53697



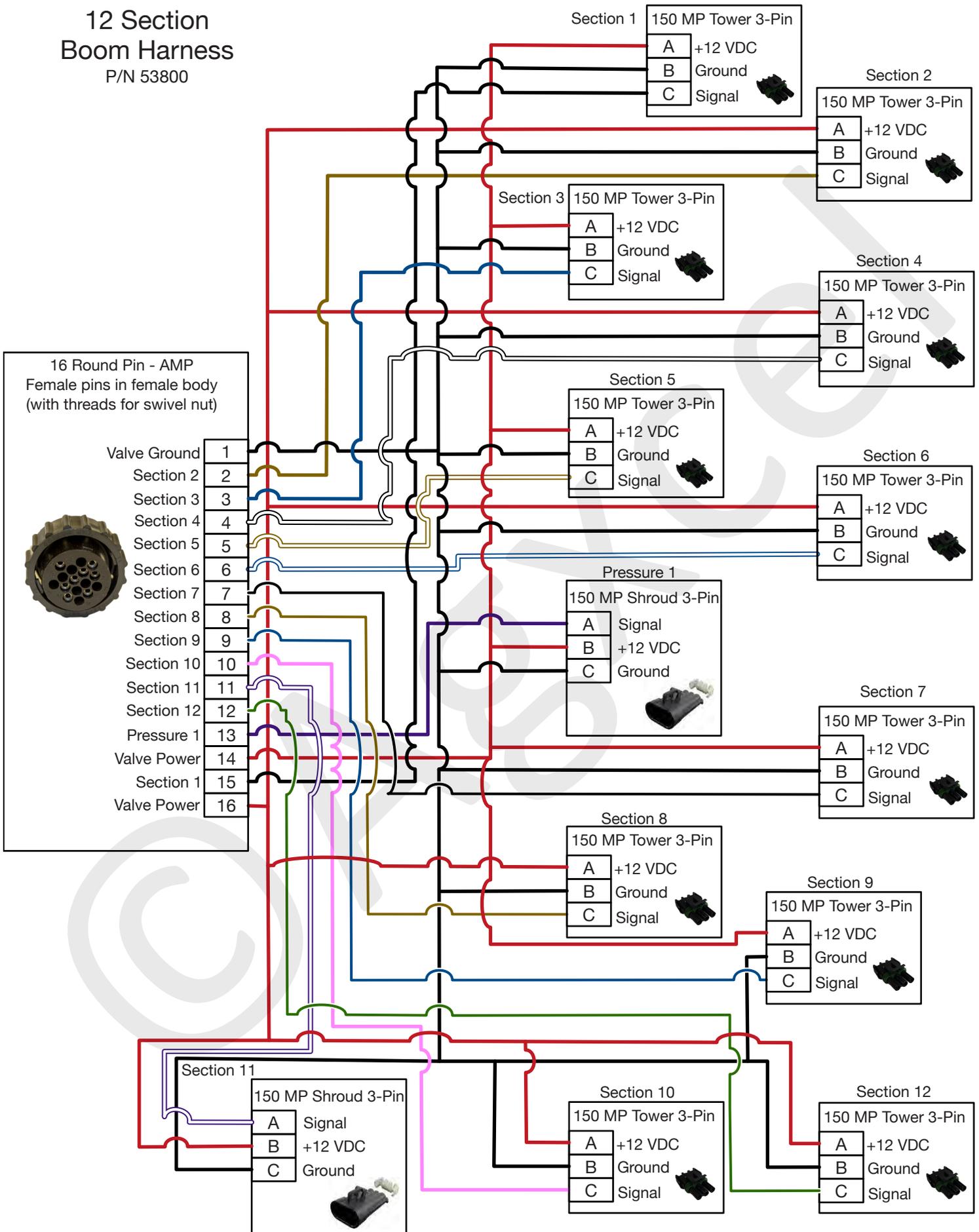
# 6 Section Boom Harness

P/N 53594



# 12 Section Boom Harness

P/N 53800



## **RECOMMENDED CARE AND MAINTENANCE**

(Read Instructions Completely before Beginning Installation)

### **WINTERIZATION**

AgXcel recommends flushing your fertilizer pump and complete system with adequate amounts of water first. Next, use RV antifreeze to winterize your system by pumping an adequate amount through all components. At the beginning

### **CHANGE PUMP OIL ANNUALLY (GX5 HYDRAULIC SYSTEMS ONLY)**

GX5 pumps use an internal oil lubricated crankshaft and connecting rod design. The oil is held in an external reservoir with level indicators. Hypro oil is recommended for the pump. This is a non-detergent SAE30 weight oil. If not available, hydraulic jack oils are a similar non-detergent formulation. Annual oil changes are recommended. To fill or drain the pump completely, the pump shaft must be turned slowly by hand. The hydraulic motor will have to be removed to do this. On some pump models, the pump will have to be removed from the mounting bracket and lifted slightly to allow access to the oil plug. When refilling the pump with oil, the shaft will again have to be rotated to fill the pump to its required oil volume.

### **DIAPHRAGM & VALVE REPLACEMENT (GX5 HYDRAULIC SYSTEMS ONLY)**

GX5 pumps are designed to allow very simple replacement of the two main pumping components; the diaphragms and the inlet & outlet valves. It is a good practice to replace these annually. It is a small job that helps ensure reliable operation during the busy season.

### **RECOMMENDED PRESSURE (GX ELECTRIC SYSTEMS ONLY)**

Agxcel recommends to maintain a pressure between 10 and 20 psi. Doing so, and with proper winterization, will ensure the durability of the system, and reduce problems when preparing for the next season.

### **TESTING THE SYSTEM**

Agxcel recommends testing your system with water first. Water testing will help determine if the plumbing and hardware is secure.

### **CALLING FOR TECH SUPPORT**

Before calling for tech support, please check our troubleshooting section. If your problem cannot not be resolved please have your serial number handy so our technicians can easily look up your order. Serial numbers can be located on the chassis of the pump systems, or on the front page on the installation guide.

## ORIFICE DISC CHARTS

(Read Instructions Completely before Beginning Installation)

### AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING

(Read Instructions Completely before Beginning Installation)

# 30"



#### GX2 ELECTRIC PUMPS

The AgXcel GX2 Dual Pump electric system is designed with a 2# or 4# inline check valve. AgXcel highly recommends pressure settings to fall between

**Minimum - 10psi**

**Maximum - 20psi**

This range will allow for the check valves to properly open for equal flow on each row, and ensure that the electric pumps do not overheat at higher pressure settings. It is important that if system pressure rises above 20psi CHANGE to a larger orifice or lower your MPH.



#### GX5 HYDRAULIC PUMPS

The AgXcel GX5 Hydraulic Pump system is designed with an 8# inline check valve. AgXcel highly recommends pressure settings to fall between

**Minimum - 15psi**

**Maximum - 75psi**

This range will allow for the check valves to properly open for equal flow on each row, and ensure that the GX5 hydraulic pump operates at a sufficient pressure range.

#### CAUTION!

- Cold temperatures will have a dramatic effect on electric pumps systems. This includes increased current draw from the tractors electrical system, higher operating system pressure that will increase the chances of overheating of pumps.
- These rate charts are for informational purposes only. GPA rates are affected by many environmental conditions. Rates charts are only to be used a reference and or a starting point for GPA requirements.
- End users must still perform a liquid row catch test to ensure accurate rates and flow.
- The AgXcel charts are calculated for 10-34-0 which has a density of 11.65 and a conversion factor of 1.18

NOTE: 30 inch spacing is most common. Additional spacing charts can be found on our website.

## AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING

(Read Instructions Completely before Beginning Installation)

# 30"

PINK ORIFICE (24)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.023	5	1.50	1.28	1.12	1.00	0.90	0.82	0.75	0.69	0.64	0.60	0.56
0.032	10	2.11	1.81	1.58	1.40	1.26	1.15	1.05	0.97	0.90	0.84	0.79
0.039	15	2.61	2.23	1.95	1.74	1.56	1.42	1.30	1.20	1.12	1.04	0.98
0.045	20	2.99	2.57	2.25	2.00	1.80	1.63	1.50	1.38	1.28	1.20	1.12
0.050	25	3.33	2.85	2.49	2.22	2.00	1.81	1.66	1.54	1.43	1.33	1.25
0.055	30	3.66	3.14	2.74	2.44	2.20	2.00	1.83	1.69	1.57	1.46	1.37
0.060	35	3.94	3.37	2.95	2.62	2.36	2.15	1.97	1.82	1.69	1.57	1.48
0.064	40	4.21	3.61	3.16	2.81	2.30	2.30	2.11	1.94	1.81	1.69	1.58
0.068	45	4.49	3.85	3.37	2.99	2.69	2.45	2.25	2.07	1.92	1.80	1.68
0.073	50	4.82	4.13	3.62	3.22	2.89	2.63	2.41	2.23	2.07	1.93	1.81
0.078	60	5.16	4.42	3.87	3.44	3.09	2.81	2.58	2.38	2.21	2.06	1.93

GREY ORIFICE (30)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.023	5	1.50	1.28	1.12	1.00	0.90	0.82	0.75	0.69	0.64	0.60	0.56
0.048	10	3.16	2.71	2.37	2.11	1.90	1.72	1.58	1.46	1.35	1.26	1.19
0.059	15	3.88	3.33	2.91	2.59	2.33	2.12	1.94	1.79	1.66	1.55	1.46
0.068	20	4.49	3.85	3.37	2.99	2.69	2.45	2.25	2.07	1.92	1.80	1.68
0.076	25	4.99	4.28	3.74	3.33	2.99	2.72	2.49	2.30	2.14	2.00	1.87
0.083	30	5.49	4.70	4.12	3.66	3.29	2.99	2.74	2.53	2.35	2.20	2.06
0.090	35	5.93	5.08	4.45	3.95	3.56	3.24	2.97	2.74	2.54	2.37	2.22
0.096	40	6.32	5.42	4.74	4.21	3.45	3.45	3.16	2.92	2.71	2.53	2.37
0.102	45	6.76	5.80	5.07	4.51	4.06	3.69	3.38	3.12	2.90	2.71	2.54
0.109	50	7.21	6.18	5.41	4.80	4.32	3.93	3.60	3.33	3.09	2.88	2.70
0.118	60	7.76	6.65	5.82	5.17	4.66	4.23	3.88	3.58	3.33	3.10	2.91

BLACK ORIFICE (35)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.046	5	3.05	2.61	2.29	2.03	1.83	1.66	1.52	1.41	1.31	1.22	1.14
0.066	10	4.32	3.71	3.24	2.88	2.59	2.36	2.16	2.00	1.85	1.73	1.62
0.081	15	5.32	4.56	3.99	3.55	3.19	2.90	2.66	2.46	2.28	2.13	2.00
0.092	20	6.10	5.23	4.57	4.07	3.66	3.33	3.05	2.81	2.61	2.44	2.29
0.103	25	6.82	5.84	5.11	4.55	4.09	3.72	3.41	3.15	2.92	2.73	2.56
0.113	30	7.48	6.42	5.61	4.99	4.49	4.08	3.74	3.45	3.21	2.99	2.81
0.123	35	8.09	6.94	6.07	5.40	4.86	4.42	4.05	3.74	3.47	3.24	3.04
0.131	40	8.65	7.41	6.49	5.77	4.72	4.72	4.32	3.99	3.71	3.46	3.24
0.139	45	9.20	7.89	6.90	6.14	5.52	5.02	4.60	4.25	3.94	3.68	3.45
0.150	50	9.87	8.46	7.40	6.58	5.92	5.38	4.93	4.55	4.23	3.95	3.70
0.160	60	10.59	9.08	7.94	7.06	6.35	5.78	5.29	4.89	4.54	4.24	3.97

## AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING

(Read Instructions Completely before Beginning Installation)

# 30"

BROWN ORIFICE (41)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.062	5	4.10	3.52	3.08	2.74	2.46	2.24	2.05	1.89	1.76	1.64	1.54
0.088	10	5.82	4.99	4.37	3.88	3.49	3.18	2.91	2.69	2.49	2.33	2.18
0.108	15	7.15	6.13	5.36	4.77	4.29	3.90	3.58	3.30	3.07	2.86	2.68
0.124	20	8.21	7.03	6.15	5.47	4.92	4.48	4.10	3.79	3.52	3.28	3.08
0.139	25	9.20	7.89	6.90	6.14	5.52	5.02	4.60	4.25	3.94	3.68	3.45
0.153	30	10.09	8.65	7.57	6.73	6.05	5.50	5.05	4.66	4.32	4.04	3.78
0.165	35	10.87	9.31	8.15	7.24	6.52	5.93	5.43	5.02	4.66	4.35	4.07
0.176	40	11.64	9.98	8.73	7.76	6.35	6.35	5.82	5.37	4.99	4.66	4.37
0.193	45	12.75	10.93	9.56	8.50	7.65	6.96	6.38	5.89	5.46	5.10	4.78
0.204	50	13.47	11.55	10.10	8.98	8.08	7.35	6.74	6.22	5.77	5.39	5.05
0.216	60	14.25	12.21	10.69	9.50	8.55	7.77	7.12	6.58	6.11	5.70	5.34

ORANGE ORIFICE (46)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.079	5	5.21	4.47	3.91	3.47	3.13	2.84	2.61	2.41	2.23	2.08	1.95
0.112	10	7.37	6.32	5.53	4.92	4.42	4.02	3.69	3.40	3.16	2.95	2.77
0.137	15	9.04	7.75	6.78	6.02	5.42	4.93	4.52	4.17	3.87	3.61	3.39
0.158	20	10.42	8.93	7.82	6.95	6.25	5.69	5.21	4.81	4.47	4.17	3.91
0.176	25	11.64	9.98	8.73	7.76	6.99	6.35	5.82	5.37	4.99	4.66	4.37
0.193	30	12.75	10.93	9.56	8.50	7.65	6.96	6.38	5.89	5.46	5.10	4.78
0.209	35	13.80	11.83	10.35	9.20	8.28	7.53	6.90	6.37	5.92	5.52	5.18
0.223	40	14.75	12.64	11.06	9.83	8.04	8.04	7.37	6.81	6.32	5.90	5.53
0.240	45	15.86	13.59	11.89	10.57	9.51	8.65	7.93	7.32	6.80	6.34	5.95
0.251	50	16.58	14.21	12.43	11.05	9.95	9.04	8.29	7.65	7.10	6.63	6.22
0.274	60	18.07	15.49	13.56	12.05	10.84	9.86	9.04	8.34	7.75	7.23	6.78

MAROON ORIFICE (52)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.139	5	9.15	7.84	6.86	6.10	5.49	4.99	4.57	4.22	3.92	3.66	3.43
0.147	10	9.70	8.32	7.28	6.47	5.82	5.29	4.85	4.48	4.16	3.88	3.64
0.180	15	11.86	10.17	8.90	7.91	7.12	6.47	5.93	5.48	5.08	4.75	4.45
0.207	20	13.69	11.74	10.27	9.13	8.22	7.47	6.85	6.32	5.87	5.48	5.14
0.233	25	15.36	13.16	11.52	10.24	9.21	8.38	7.68	7.09	6.58	6.14	5.76
0.255	30	16.80	14.40	12.60	11.20	10.08	9.16	8.40	7.75	7.20	6.72	6.30
0.275	35	18.13	15.54	13.60	12.09	10.88	9.89	9.06	8.37	7.77	7.25	6.80
0.294	40	19.40	16.63	14.55	12.94	10.58	10.58	9.70	8.96	8.32	7.76	7.28
0.315	45	20.79	17.82	15.59	13.86	12.47	11.34	10.40	9.60	8.91	8.32	7.80
0.333	50	21.95	18.82	16.47	14.64	13.17	11.98	10.98	10.13	9.41	8.78	8.23
0.360	60	23.78	20.39	17.84	15.86	14.27	12.97	11.89	10.98	10.19	9.51	8.92

## AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING

(Read Instructions Completely before Beginning Installation)

# 30"

RED ORIFICE (63)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.160	5	10.53	9.03	7.90	7.02	6.32	5.75	5.27	4.86	4.51	4.21	3.95
0.203	10	13.42	11.50	10.06	8.94	8.05	7.32	6.71	6.19	5.75	5.37	5.03
0.249	15	16.41	14.07	12.31	10.94	9.85	8.95	8.21	7.57	7.03	6.56	6.15
0.287	20	18.96	16.25	14.22	12.64	11.38	10.34	9.48	8.75	8.13	7.58	7.11
0.322	25	21.23	18.20	15.93	14.16	12.74	11.58	10.62	9.80	9.10	8.49	7.96
0.352	30	23.23	19.91	17.42	15.49	13.94	12.67	11.61	10.72	9.96	9.29	8.71
0.381	35	25.11	21.53	18.84	16.74	15.07	13.70	12.56	11.59	10.76	10.05	9.42
0.407	40	26.83	23.00	20.12	17.89	14.64	14.64	13.42	12.38	11.50	10.73	10.06
0.428	45	28.27	24.24	21.21	18.85	16.96	15.42	14.14	13.05	12.12	11.31	10.60
0.467	50	30.82	26.42	23.12	20.55	18.49	16.81	15.41	14.23	13.21	12.33	11.56
0.498	60	32.88	28.18	24.66	21.92	19.73	17.93	16.44	15.17	14.09	13.15	12.33

C BLUE ORIFICE (80)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.235	5	15.52	13.31	11.64	10.35	9.31	8.47	7.76	7.16	6.65	6.21	5.82
0.329	10	21.73	18.63	16.30	14.49	13.04	11.85	10.87	10.03	9.31	8.69	8.15
0.403	15	26.61	22.81	19.96	17.74	15.97	14.52	13.31	12.28	11.40	10.64	9.98
0.465	20	30.71	26.33	23.04	20.48	18.43	16.75	15.36	14.18	13.16	12.29	11.52
0.521	25	34.37	29.46	25.78	22.92	20.62	18.75	17.19	15.86	14.73	13.75	12.89
0.570	30	37.64	32.27	28.23	25.10	22.59	20.53	18.82	17.37	16.13	15.06	14.12
0.616	35	40.64	34.83	30.48	27.09	24.38	22.17	20.32	18.76	17.42	16.26	15.24
0.659	40	43.46	37.26	32.60	28.98	23.71	23.71	21.73	20.06	18.63	17.39	16.30
0.700	45	46.18	39.58	34.64	30.79	27.71	25.19	23.09	21.31	19.79	18.47	17.32
0.747	50	49.29	42.25	36.96	32.86	29.57	26.88	24.64	22.75	21.12	19.71	18.48
0.806	60	53.22	45.62	39.92	35.48	31.93	29.03	26.61	24.56	22.81	21.29	19.96

YELLOW ORIFICE (95)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.340	5	22.45	19.25	16.84	14.97	13.47	12.25	11.23	10.36	9.62	8.98	8.42
0.479	10	31.60	27.09	23.70	21.07	18.96	17.24	15.80	14.58	13.54	12.64	11.85
0.586	15	38.70	33.17	29.02	25.80	23.22	21.11	19.35	17.86	16.58	15.48	14.51
0.677	20	44.68	38.30	33.51	29.79	26.81	24.37	22.34	20.62	19.15	17.87	16.76
0.757	25	49.95	42.82	37.46	33.30	29.97	27.25	24.98	23.05	21.41	19.98	18.73
0.829	30	54.72	46.90	41.04	36.48	32.83	29.85	27.36	25.26	23.45	21.89	20.52
0.899	35	59.32	50.85	44.49	39.55	35.59	32.36	29.66	27.38	25.42	23.73	22.25
0.958	40	63.20	54.17	47.40	42.13	34.47	34.47	31.60	29.17	27.09	25.28	23.70
0.991	45	65.42	56.07	49.06	43.61	39.25	35.68	32.71	30.19	28.04	26.17	24.53
1.050	50	69.30	59.40	51.98	46.20	41.58	37.80	34.65	31.98	29.70	27.72	25.99
1.176	60	77.62	66.53	58.21	51.74	46.57	42.34	38.81	35.82	33.26	31.05	29.11

## AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING

(Read Instructions Completely before Beginning Installation)

# 30"

EM GREEN ORIFICE (110)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.456	5	30.10	25.80	22.57	20.06	18.06	16.42	15.05	13.89	12.90	12.04	11.29
0.638	10	42.13	36.12	31.60	28.09	25.28	22.98	21.07	19.45	18.06	16.85	15.80
0.782	15	51.61	44.24	38.71	34.41	30.97	28.15	25.81	23.82	22.12	20.65	19.36
0.899	20	59.32	50.85	44.49	39.55	35.59	32.36	29.66	27.38	25.42	23.73	22.25
1.008	25	66.53	57.02	49.90	44.35	39.92	36.29	33.26	30.71	28.51	26.61	24.95
1.109	30	73.18	62.73	54.89	48.79	43.91	39.92	36.59	33.78	31.36	29.27	27.44
1.193	35		67.48	59.04	52.48	47.23	42.94	39.36	36.33	33.74	31.49	29.52
1.277	40		72.23	63.20	56.18	50.56	45.96	42.13	38.89	36.12	33.71	31.60
1.369	45			67.78	60.24	54.22	49.29	45.18	41.71	38.73	36.15	33.89
1.470	50			72.77	64.68	58.21	52.92	48.51	44.78	41.58	38.81	36.38
1.562	60				68.75	61.87	56.25	51.56	47.59	44.19	41.25	38.67

WHITE ORIFICE (125)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.571	5	37.70	32.31	28.27	25.13	22.62	20.56	18.85	17.40	16.16	15.08	14.14
0.806	10	53.22	45.62	39.92	35.48	31.93	29.03	26.61	24.56	22.81	21.29	19.96
0.991	15	65.42	56.07	49.06	43.61	39.25	35.68	32.71	30.19	28.04	26.17	24.53
1.142	20	75.40	64.63	56.55	50.27	45.24	41.13	37.70	34.80	32.31	30.16	28.27
1.277	25		72.23	63.20	56.18	50.56	45.96	42.13	38.89	36.12	33.71	31.60
1.394	30			69.02	61.35	55.22	50.20	46.02	42.48	39.44	36.81	34.51
1.512	35			74.84	66.53	59.88	54.43	49.90	46.06	42.77	39.92	37.42
1.613	40				70.96	58.06	58.06	53.22	49.13	45.62	42.58	39.92
1.806	45					71.52	65.02	59.60	55.01	51.08	47.68	44.70
1.893	50						68.16	62.48	57.67	53.56	49.98	46.86
1.974	60						71.06	65.14	60.13	55.84	52.11	48.86

LIME ORIFICE (132)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
0.921	5	60.76	52.08	45.57	40.51	36.46	33.14	30.38	28.04	26.04	24.30	22.79
1.302	10		73.66	64.45	57.29	51.56	46.87	42.97	39.66	36.83	34.37	32.22
1.596	15			79.00	70.22	63.20	57.46	52.67	48.62	45.14	42.13	39.50
1.840	20					72.85	66.23	60.71	56.04	52.03	48.57	45.53
2.058	25						74.09	67.91	62.69	58.21	54.33	50.94
2.251	30							74.29	68.58	63.68	59.43	55.72
2.436	35								74.20	68.90	64.31	60.29
2.604	40									73.66	68.75	64.45
2.735	45										72.21	67.69
2.929	50											72.49
3.192	60											

**AGXCEL COLORED DISC ORIFICE RATE CHARTS FOR 30" SPACING**

(Read Instructions Completely before Beginning Installation)

**30"**

ROYAL BLUE ORIFICE (141)		MILES PER HOUR										
GPM	PSI	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
1.223	5		69.19	60.54	53.81	48.43	44.03	40.36	37.26	34.59	32.29	30.27
1.302	10		73.66	64.45	57.29	51.56	46.87	42.97	39.66	36.83	34.37	32.22
1.596	15			79.00	70.22	63.20	57.46	52.67	48.62	45.14	42.13	39.50
1.840	20					72.85	66.23	60.71	56.04	52.03	48.57	45.53
2.058	25						74.09	67.91	62.69	58.21	54.33	50.94
2.251	30							74.29	68.58	63.68	59.43	55.72
2.436	35								74.20	68.90	64.31	60.29
2.604	40									73.66	68.75	64.45
2.817	45										74.38	69.73
3.006	50											74.39
3.192	60											79.00

## 5059 Industrial Series Pumps

# Installation, Operation, Repair and Parts Manual

## Description

AgXcel offers various pump models for different applications. The information outlined in this manual is general and not specific to all 5059 series pumps. Be certain the pump materials are compatible with the fluid being pumped. Product data sheets, outlining detailed specifications such as thermal limits, load capacities, and performance curves are available for individual models, along with further technical data. If unsure about chemical compatibility or intended applications of a motor, please call AgXcel for assistance.



## General Safety Information

**California Proposition 65 Warning** -- This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

### NOTE

Notes are used to notify of installation, operation, or maintenance information that is important but not safety related.

### CAUTION

Caution is used to indicate the presence of a hazard, which will or may cause minor injury or property damage if the notice is ignored.

### CAUTION

“Intermittent Duty” is defined as: operated and/or frequently started within a period of time that would cause the motor to reach its maximum thermal limits. Once the maximum thermal limit is obtained, the motor must be allowed to return to ambient temperature before resuming operation.

### CAUTION

DO NOT use to pump flammable liquids. Never operate the pump in an explosive environment. Arcing from the motor brushes, switch or excessive heat from an improperly cycled motor may cause an explosion.

### CAUTION

DO NOT assume fluid compatibility. If the fluid is improperly matched to the pump’s elastomers, a leak may occur. Pumps used to transfer hazardous or hot (max. tempera-

### WARNING

Warning denotes that a potential hazard exists and indicates procedures that must be followed exactly to either eliminate or reduce the hazard, and to avoid serious personal injury, or prevent future safety problems with the product.

### DANGER

Danger is used to indicate the presence of a hazard that will result in severe personal injury, death, or property damage if the notice is ignored.

ture 120°F [49°C] viton only) chemicals must be in a vented area to guard against the possibility of injury due to harmful or explosive liquid/vapors.

### CAUTION

DO NOT operate the pump at pressures which cause the motor to exceed the amperes rating indicated on the name plate. Various pump models are equipped with thermal breakers to interrupt operation due to excessive heat. Once the temperature of the motor is within proper limits, it will automatically reset, and the pump will start operation without warning.

### CAUTION

To prevent electrical shock, disconnect power before initiating any work. In the case of pump failure, the motor housing and/or the pumped fluid may carry high voltage to components normally considered safe.

## Hazardous Substance Alert

1. Always drain and flush pump before servicing or disassembling for any reason (see instructions).
2. Never store pumps containing hazardous chemicals.
3. Before returning pump for service/repair, drain out all liquids and flush unit with neutralizing liquid. Then, drain the pump. Attach tag or include written notice certifying that this has been done.

### NOTE

It is illegal to ship or transport any hazardous chemicals without United States Environmental Protection Agency Licensing.

## Pressure Switch Operation

The pressure switch reacts to outlet pressure and interrupts power at the preset shut-off pressure indicated on the pump label. When outlet pressure drops below a predetermined limit (typically 15-20 psi [1-1.4 bar] less than the shut-off pressure), the switch will close and the pump will operate until the shut-off (high) pressure is achieved. The shut-off pressure is set to factory calibrated standards. See the motor label for specific pump specifications.

### ⚠ CAUTION

Improper adjustment of the pressure switch may cause severe overload or premature failure. Failures due to improper adjustment of the pressure switch will not be covered under the limited warranty.

If the plumbing is restrictive or the flow rate is very low, the pump may re-pressurize the outlet faster than the fluid is being released, causing rapid cycling (ON/OFF within 2 seconds). If the pump is subjected to rapid cycling during normal operation, damage may occur. Applications which exhibit rapid cycling should have restrictions in the outlet minimized.

## Bypass Operation

A bypass pump may be used for applications that normally induce frequent start/stop of the motor, and thereby create a potential for overheating. Models equipped with an internal bypass are designed to pump at high pressure while at low flow rates.

Bypass models equipped with a switch may operate for several seconds even though the outlet side has been closed off. Contact AgXcel for information regarding bypass pumps.

## Mounting

The 5059 series pumps are self priming. Horizontal and vertical prime vary depending on the fluid viscosity and pump configuration.

The pump should be located in an area that is dry and provides adequate ventilation. If mounted within an enclosure, provisions to cool the motor may be necessary. If increased heat dissipation is necessary, motor mountable heat sinks are available from AgXcel.

### ⚠ CAUTION

DO NOT locate the motor near low temperature plastics or combustible materials. The surface temperature of the motor may exceed 250°F [120°C].

The pump may be mounted in any position. However, if mounting the pump vertically, the pump head should be in the down position so that in the event of a leak, fluid will not enter the motor.

Secure the rubber feet with #8 hardware. DO NOT compress the feet: doing so will reduce their ability to isolate vibration/noise.

## Plumbing

Flexible high pressure tubing compatible with the fluid should be used to connect the inlet/outlet ports. Tubing should be 1/2" [13 mm] I.D. and at least an 18 in. [46 cm] length is suggested to minimize stress on the fitting/ports and reduce noise. Allow for the shortest possible tubing route and avoid sharp bends that may kink over time.

### NOTE

Restrictions on the inlet may cause vacuum levels to reach the fluid vapor pressure, causing cavitation, degassing, vapor lock, noise, and a loss in performance. Inlet pressure must not exceed 30 psi [2.1 bar] maximum.

### NOTE

AgXcel does not recommend the use of metal fittings or rigid pipe to plumb the inlet/outlet ports. Standard plastic male and female-threaded fittings can be acquired at commercial plumbing supply stores. AgXcel also distributes swivel barb fittings and special fittings through its dealers.

**1/2" Female NPT models:** In some cases, the ports may require a suitable thread sealer applied sparingly. DO NOT over-tighten, max. torque 3.7 ft. lbs. [45 in. lbs. (5 Nm)].

**1/2" Male-threaded models** are intended to be used with SHURflo swivel barb fittings which seal with an internal taper when hand-tightened. Standard 1/2" NPT fittings may be used when tightened to a maximum torque of 3.7 ft.lbs [45 in.lbs (5 Nm)].

### ⚠ CAUTION

Sealers and Teflon tape may act as a lubricant, causing cracked housings or stripped threads due to over-tightening. Care should be used when applying sealers. Sealers may enter the pump, inhibiting valve action, causing no prime or no shut-off. Failures due to foreign debris are not covered under warranty.

Installation of a 50-mesh strainer is recommended to prevent foreign debris from entering the pump.

If a check valve is installed in the plumbing, it must have a cracking pressure of no more than 2 psi (.14 bar).

## Electrical

### ⚠ CAUTION

Electrical wiring should be performed by a qualified electrician, in accordance with all local electrical codes.

The pump should be on a dedicated (individual) circuit, controlled with a double pole switch (VAC U.L./C-UL certified) rated at or above the fuse ampere indicated by the pump motor label. Depending on distance of the power source from the pump and ampere load on the circuit, wire may need to be heavier than indicated by the chart.

### ⚠ CAUTION

All 115 VAC and 230 VAC pump motors and systems MUST be grounded per local and state electrical codes.

Improper duty cycle and/or rapid start & stop conditions may cause the internal thermal breaker (if equipped) to

trip, or can result in premature motor or switch failure due to excessive heat.

For the pump to meet U.L./C-UL requirements, the circuit MUST be protected with a slow-blow fuse (U.L./C-UL certified) or equivalent circuit breaker as indicated on the motor label. Use an approved wire of the size specified or heavier.

### ⚠ CAUTION

Circuit protection is dependent on the individual application requirements. Failure to provide proper overload/thermal devices may result in a motor failure, which will not be covered under warranty.

Voltage	Wire Leads	Wire Size	Fuse Rating
12 DC			
24 DC	Red (positive +)	#14 AWG [2.5 Mm <sup>2</sup> ] (or heavier)	SEE PUMP MOTOR LABEL
36 DC	Black (negative -)		
115 AC	Black (common)	#16 AWG [1 Mm <sup>2</sup> ] C-UL - TEW / UL 1015 (or heavier depending on distance)	
	White (neutral) Green (ground)		
230 AC	Brown (common)		
	Blue (neutral) Green/Yellow (ground)		

## Troubleshooting

### Symptom

### Corrective Action(s)

Pump will not start:

Check fuse or breaker.  
Check for correct voltage ( $\pm 10\%$ ) and electrical connections.  
Check pressure switch operation and correct voltage at switch or motor wires (as equipped).  
Check rectifier or motor for open or grounded circuit.  
Check for locked drive assembly.

Pump will not prime:  
(no discharge/motor runs)

Check to see if out of product.  
Check strainer for debris.  
Check inlet tubing/plumbing for severe vacuum leak.  
Check to see if inlet/outlet tubing is severely restricted (kinked).  
Check for debris in pump inlet/outlet valves.  
Check for proper voltage with the pump operating ( $\pm 10\%$ ).  
Inspect pump housing for cracks.

Leaks from pump head or switch:

Check for loose screws at switch or pump head.  
Check to see if switch diaphragm is ruptured or pinched.  
Check for punctured diaphragm if fluid is present at bottom drain.

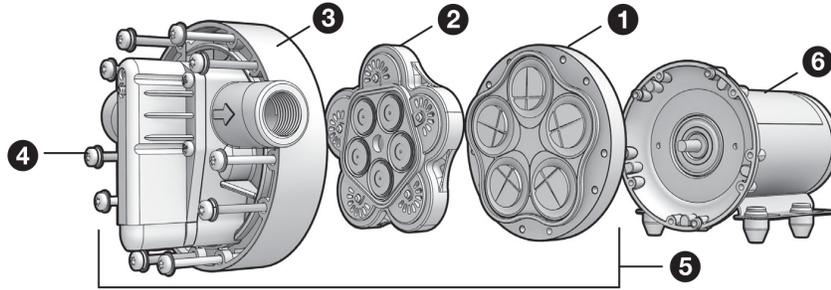
Pump will not shut off:  
(pressure switch equipped)

Check to see if output line is closed and not leaking.  
Check for air trapped in outlet line or pump head.  
Check for correct voltage to pump ( $\pm 10\%$ )  
Check inlet/outlet valves for debris or swelling.  
Check for loose drive assembly or pump head screws.  
Check pressure switch operation and/or if adjustment incorrect.

Noisy / rough operation:

Check mounting feet to see if they are compressed too tight.  
Does the mounting surface multiply noise (flexible)?  
Check for loose pump head or drive screws.  
Is the pump plumbed with rigid pipe, causing noise to transmit?

\*Agxcel does not carry replacement parts for electric pumps. Please check with your local Remco dealer for parts listed below.



### 1 Lower Housing Assembly

Part Number	GPM	Description
LHA-5510-1E77	3.0-3.6 GPM	DEMAND OR BYPASS
LHA-5512-1E77	4 GPM	DEMAND OR BYPASS
LHA-5513-1E77	5.3 GPM	DEMAND OR BYPASS

### 2 Valve Housing Assembly

Part Number	GPM	Description
VHA-5513-1E77	3.0-5.3 G PM	DEMAND OR BYPASS

### 3 Upper Housing Assembly

Part Number	GPM	Description
UHA-5513-1E77	3.0-5.3 GPM	THREADED W/ PRESSURE SWITCH
UHA-5513-2E77	3.0-5.3 GPM	THREADED W/ BYPASS
UHA-5503-1E77	3.0-5.3 GPM	QUICK ATTACH W/ PRESSURE SWITCH
UHA-5503-2E77	3.0-5.3 GPM	QUICK ATTACH W/ BYPASS

### 4 Mounting Bolt Kit

Part Number	GPM	Description
11-133-100	3.0-5.3 GPM	5 MOUNTING BOLTS W/ WASHERS

### 5 Complete Pump Head Assembly

Part Number	GPM	Description
5510-1X77	3.0-3.6 GPM	THREADED W/ PRESSURE SWITCH
5510-2X77	3.0-3.6 GPM	THREADED W/ ADJUSTABLE BYPASS
5512-1X77	4.0 GPM	THREADED W/ PRESSURE SWITCH
5512-2X77	4.0 GPM	THREADED W/ ADJUSTABLE BYPASS
5513-1X77	5.3 GPM	THREADED W/ PRESSURE SWITCH
5513-2X77	5.3 GPM	THREADED W/ ADJUSTABLE BYPASS
5500-1X77	3.0-3.6 GPM	QUICK ATTACH W/ PRESSURE SWITCH
5500-2X77	3.0-3.6 GPM	QUICK ATTACH W/ ADJUSTABLE BYPASS
5502-1X77	4.0 GPM	QUICK ATTACH W/ PRESSURE SWITCH
5502-2X77	4.0 GPM	QUICK ATTACH W/ ADJUSTABLE BYPASS
5503-1X77	5.3 GPM	QUICK ATTACH W/ PRESSURE SWITCH
5503-1X77	5.3 GPM	QUICK ATTACH W/ ADJUSTABLE BYPASS

### 6 12 VDC Motor

Part Number	GPM	Description
M582-S	3.0 GPM / 5.3 GPM	W/2 PIN CONNECTOR, NO ON/OFF SWITCH

## Limited Warranty on AgXcel Agricultural Pumps & Accessories

AgXcel agricultural products are warranted to be free of defects in material and workmanship under normal use for the time periods listed below, with proof of purchase.

- Pumps: one (1) year from the date of manufacture, or one (1) year of use. This limited warranty will not exceed two (2) years, in any event.
- Accessories: ninety (90) days of use.

This limited warranty will not apply to products that were improperly installed, misapplied, damaged, altered, or incompatible with fluids or components not manufactured by Hypro. All warranty considerations are governed by Hypro's written return policy.

Hypro's obligation under this limited warranty policy is limited to the repair or replacement of the product. All returns will be tested per Hypro's factory criteria. Products found not defective (under the terms of this limited warranty) are subject to charges paid by the returnee for the testing and packaging of "tested good" non-warranty returns.

No credit or labor allowances will be given for products returned as defective. Warranty replacement will be shipped on a freight allowed basis. Hypro reserves the right to choose the method of transportation.

This limited warranty is in lieu of all other warranties, expressed or implied, and no other person is authorized to give any other warranty or assume obligation or liability on Hypro's behalf. Hypro shall not be liable for any labor, damage or other expense, nor shall Hypro be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product. This limited warranty covers agricultural products distributed within the United States of America. Other world market areas should consult with the actual distributor for any deviation from this document.

# Precision Liquid Fertilizer Solutions

The logo for AgXcel features the word "ag" in a lowercase, cursive script, followed by a large, stylized "X" that is formed by two thick, orange-colored strokes. To the right of the "X" is the word "cel" in a lowercase, cursive script, matching the style of "ag". The entire logo is rendered in a light gray color.

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