

agXcel 40 Synergist

Nano-Technology Application System



JOHN DEERE



JDRC2000 NH3

Low Volume System for
Integration into the JDRC2000 NH3

REFERENCE MANUAL

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

Precision Liquid Fertilizer Solutions



877-218-1981
www.agxcel.com

where precision meets the soil...



www.agxcel.com

info@agxcel.com

Important Information

The AgXcel Synergist® system is designed for low volume distribution of NutriSphere-N NH₃ at a rate of 32 oz/acre. Higher rates are possible.

Note on ounces per acre

On the John Deere Greenstar console display, the flow meter will be calibrated to measure this product in **ounces**, not gallons. The display is programmed to show measurements in gallons, so be aware the numbers shown for this product will actually be in **ounces**.

Ounces per acre means a very small amount of liquid is being distributed. At 6 mph on 30" spacing, 32 oz/acre means that each row is doing just under 1 oz/min. On a 12 row implement the total amount being distributed is less than 12 oz/min. AgXcel's Synergist system has been engineered to distribute this flow evenly and accurately.

AgXcel's Low Flow Magnetic Flow Meter

AgXcel's Synergist system uses an electromagnetic flow meter that is designed to accurately measure flow on to 10 oz/min. With no moving parts this flowmeter proves to be reliable, accurate, durable, and long lasting.

Dual Micro tube Solution

AgXcel's Synergist system uses our Dual Micro tube Solution. Micro tubing eliminates the need for an orifice. By using a micro tube with an opening 4 to 5 times larger than an orifice, the risks of plugging are greatly reduced.

By using a Dual Micro tube Solution (two micro tubes), the system will be able to handle a variety of rates and speeds. As well as handling a wide range of temperature changes that would affect the viscosity of the product.

Floating Ball Manifold

Each row will be evenly distributed through a visual flow indicator with one or two floating balls. While providing a good indication of the flow to each row, they do not indicate the exact flow. AgXcel recommends doing a catch test on each row to verify it's distribution.

Field Kit

The Synergist system has an optional field kit available (see pg. 27 for details) containing key replacement parts for your system to reduce equipment downtime.

Product and Rinse Tank

The Synergist comes with a 55 or 110 gallon product tank and 3 gallon rinse tank. The rinse tank can be filled with RV anti-freeze to allow the system to be flushed when not in use for a period of time, thus protecting the system from freezing after rinsing.

AgXcel's Micro Control Valves

Implements that are 60' or wider can be split into 2 sections to allow section control. Standard single section setups are equipped with AgXcel's Micro Control Valve on each floating ball manifold. This allows the system pump to continuously run when application stops at the end of the field to allow for a quicker return to the target rate when application resumes. A two section system will have the same Micro Control Valves but can be configured for two sections.



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 pump(s) 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

This guide contains information and settings for AgXcel's Synergist system for NutriSphere-N NH₃. Changes to components or configuration settings can be made to improve operation of the system.

Below are some basic installation steps.

- Have your control module and display in the cab connected and set up by your display dealer. To apply anhydrous ammonia and NutriSphere-N NH₃ you will need 2 rate control modules. One for the anhydrous ammonia and one for NutriSphere-N NH₃, when using an Agxcel Integration kit. However, when using with the AgXcel AutoX Compact Plus, you only need 1 rate controller to control the NH₃.
- Open and layout AgXcel's Synergist and any components and familiarize yourself with system. See the overview example for installation ideas.
- Mount the AgXcel Synergist system on your equipment.
- Install and mount any floating ball manifolds, plumbing, and check valves to each row delivery unit.
- Attach any integration harnesses.
- Apply settings that you find in this guide to your controller.
- Fill system with water and conduct flow and operation tests.
- Winterize the system with RV anti-freeze if freezing temperatures are expected.

AgXcel's Micro Control Valve

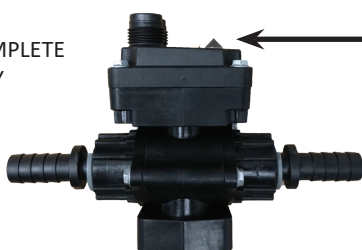


AgXcel's micro control valves are designed to eliminate the need for large sectional valves. The small compact design makes them ideal for controlling flow through the manifolds.

Implements that are 60 ft and wider may be set up with 2 control valves, therefore half of the applicator can be shut off. These systems are setup similar to a single section setup. However, Section 1 of the boom harness will connect to one valve and Section 2 will connect to the other valve.

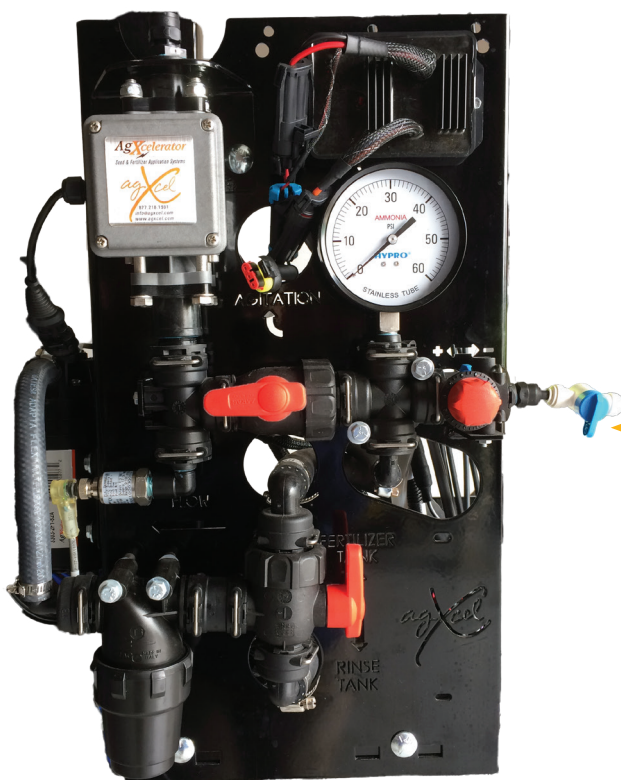
Please note, implements that are less than 60 feet wide need to be setup as one section on order to prevent range dropping below flow meter capabilities at lower speeds.

GX40 PRO STOP COMPLETE
REPLACEMENT BODY
PN# 709



AgXcel's micro control valve (MCV) includes an indicator light. The red light shows voltage/power being supplied to the valve. It will turn Green when receiving a signal to open/close.

Pump Priming and Bleeder Valve



A bleeder valve is included on every AgXcel system. Every row has a check valve. These valves do not let air escape from the system unless it is pressurized. 12 volt electric pump are not good air compressors, so pumps can struggle to prime due to air trapped on the outlet side of the pump.

The bleeder valve is a small 1/4" valve that, when opened, lets air escape from the pump outlet at zero pressure. Open this valve until liquid comes out and then close the valve.

Bleeder Valve



AgXcel's Mag Flow Meter 0.08 - 1.6 GPM

AgXcel's Magnetic Flow Meters are superior to turbine flow meters in two ways. Magnetic flow meters have no moving parts. This eliminates any wear items or any potential for contaminants to jam a spinning turbine.

In addition, magnetic flow meters detect flow by electrically measuring the velocity of the liquid which make them independent of viscosity or density of the liquid measured. While extremely accurate when using the indicated calibration number, AgXcel strongly recommends performing a catch test to verify the system is properly installed and configured.

The flow meter included with your Synergist system is rated down to 10 oz/min, but will accurately measure flow down to 8 oz/min. Anything below 8 oz and the flow meter may not give a continuous pulse output.



tip

Caution: Before welding on the implement, disconnect the flow meter or damage to the flow meter electronics may occur.

Do not power wash the flow meter. High pressure spray directed at the back edge of the face plate or at the wire connector may allow water into the flow meter electronics.

Pressure Sensor

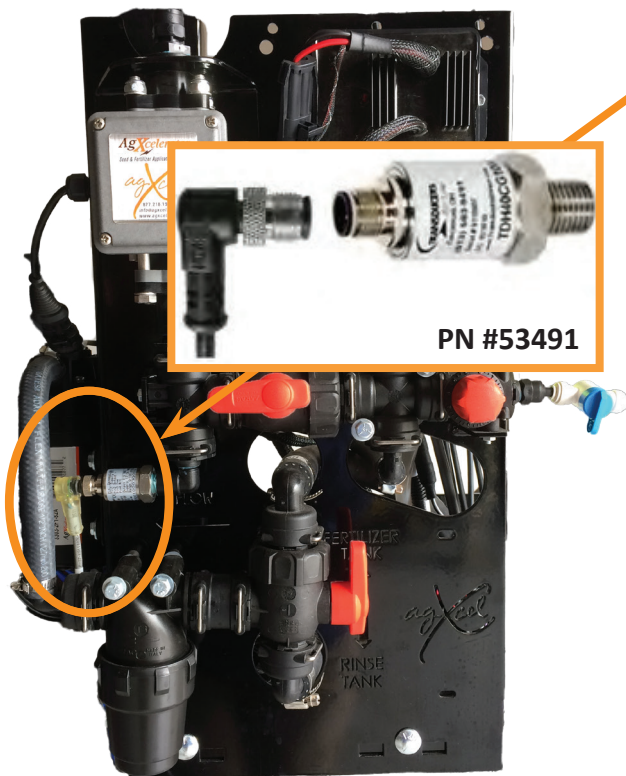
The GX40 Synergist comes equipped with a 100 psi pressure sensor to work with your controller. The sensor for the rate controller is a 3-wire type sensor. The Sensor has a 1/4" MPT fitting.

Your display will show the system pressure on the in cab screen. **The pressure reading is only for informational purposes and is not used in the flow control process.** Flow control uses the flowmeter feedback only.

The pressure sensor is very helpful to optimize system performance and troubleshoot any issues.

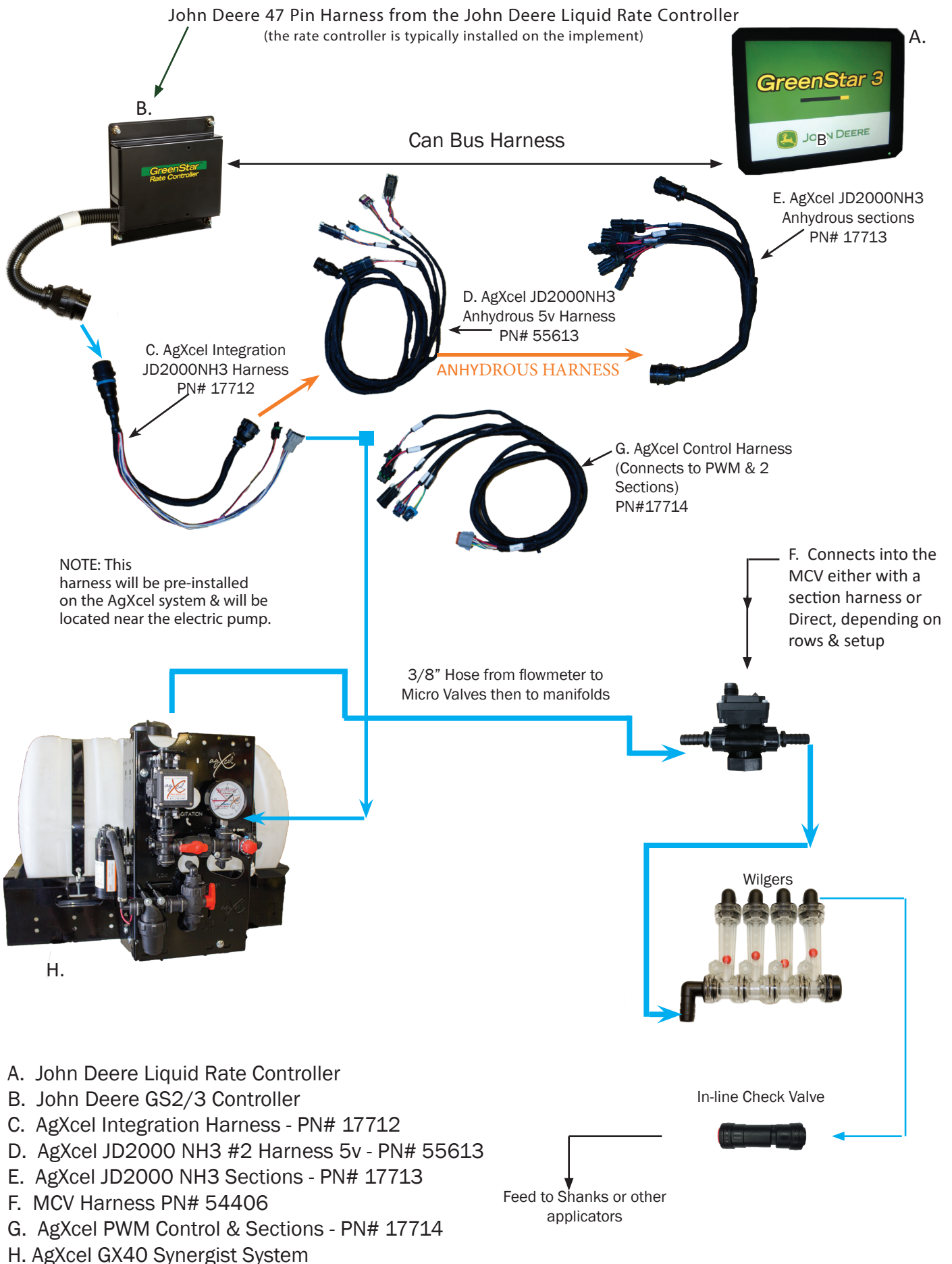
The pressure transducer is factory calibrated and will display a very accurate pressure reading on your display. No manual gauge is required. However, the Synergist will have a visual gauge for quick reference when standing near the system and not in cab to see controller display.

When attaching connector to pressure sensor, make sure pins are aligned so they are not bent.



AGXCEL INTEGRATION INTO THE JDRC 2000

(Read Instructions Completely before Beginning Installation)



- A. John Deere Liquid Rate Controller
- B. John Deere GS2/3 Controller
- C. AgXcel Integration Harness - PN# 17712
- D. AgXcel JD2000 NH3 #2 Harness 5v - PN# 55613
- E. AgXcel JD2000 NH3 Sections - PN# 17713
- F. MCV Harness PN# 54406
- G. AgXcel PWM Control & Sections - PN# 17714
- H. AgXcel GX40 Synergist System

AGXCEL INTEGRATION INTO THE JDRC 2000

(Read Instructions Completely before Beginning Installation)

Involved AgXcel Harnesses: 17712, 17713, 17714, 55613

PLEASE NOTE: Your setup may vary. These screen shots represents a typical AgXcel Liquid Fertilizer System setup. See the John Deere JDRC 2000 Operator's Manual for safety information and additional setup and operating information.

Navigate to the Profile Setup

For the initial setup, start a new profile. The JDRC 2000 allows you to store 8 profiles. Be prepared to wait during this phase of the setup process....**A LONG TIME!**

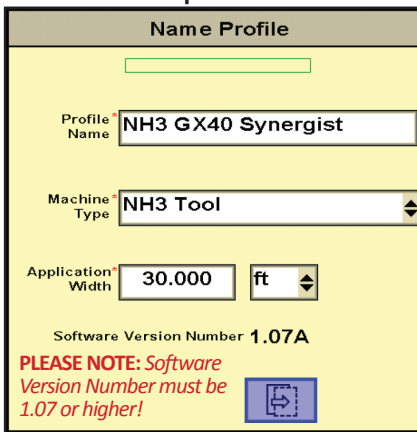
1. Navigate to the Profile Setup



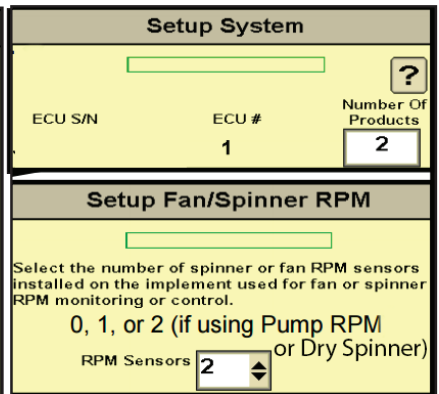
2. Enter Profile Name



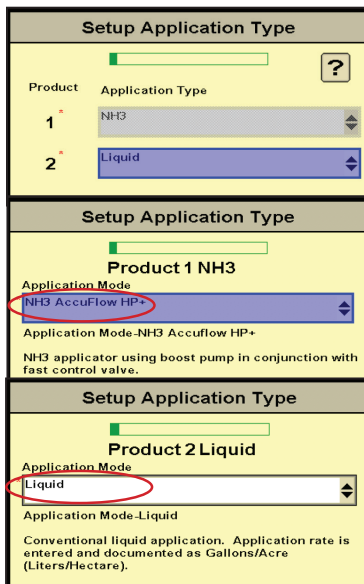
3. Machine Type -> NH3 Tool -> AgXcel 2 Product for Liquid



4. Setup System and RPM Sensors

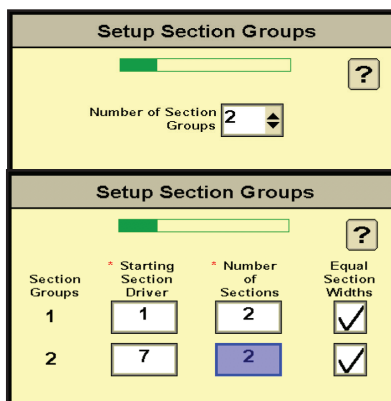


5. Select Application Type & Application Mode.

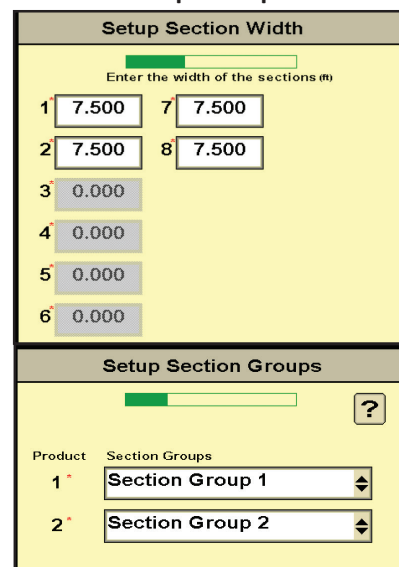


6. Setup Section Groups. Section Group 2 will start with Section Driver 7.

Other Section Setups are possible. PR 1 (NH3) – Sections 1-6 are reserved for NH3 and PR 2 - Starts with Section Driver 7



Sample Setup:



AGXCEL INTEGRATION INTO THE JDRC 2000

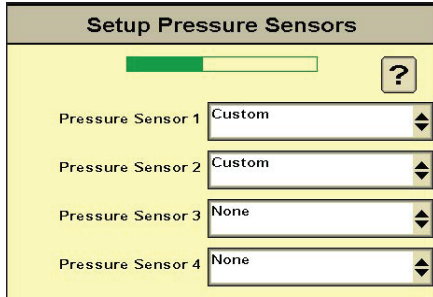
(Read Instructions Completely before Beginning Installation)

Configuration – cont.

7. The AgXcel Pressure Sensor will be setup as a Custom sensor. Calibration will be done later.

Pressure Sensor 1 – NH3

Pressure Sensor 2 – Liquid

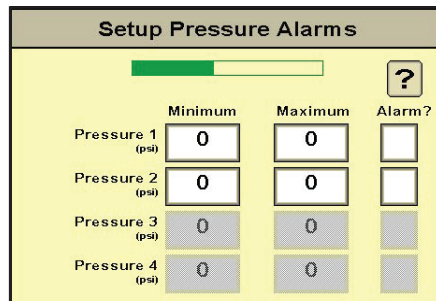


Sensors (such as pressure, pump RPM, spinner RPM) do not need to be assigned to a specific product if they are just being used to monitor a device and not to control it. There may be times when you want to assign the sensor to a product, and there will be time when you do not want to specifically assign the sensor.

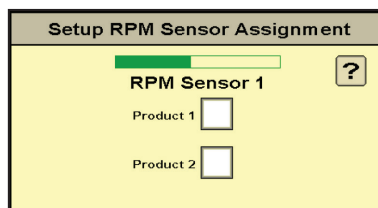
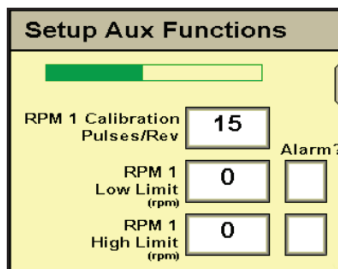
For a typical setup, leave these 2 screens as shown on the left and bottom.

If you assign a Pressure Sensor to a Product, and enter a Minimum/Maximum and check the Alarm box, those become control limits. The system will not go above or below those pressures.

You can put the display for a particular sensor on the product RUN screen so you can see all the information about that system on one screen. (See Display Settings).

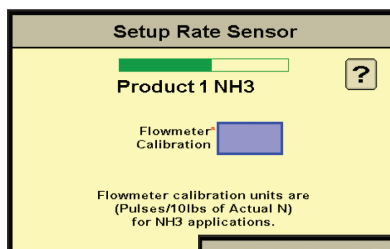
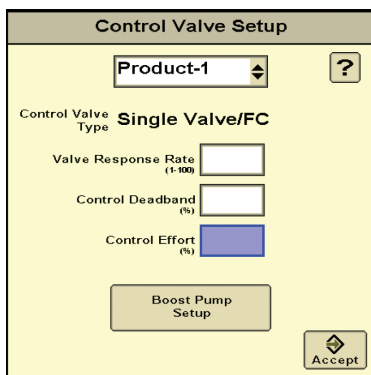


8. Optional Aux Functions - RPM Sensors

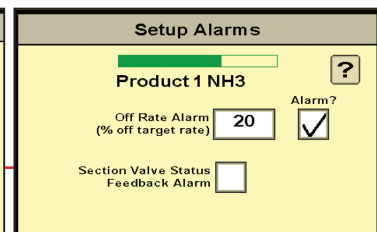
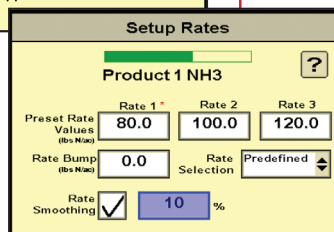


On the AgXcel wiring harnesses, Pressure signal 1 is on the NH3 Product 1 connector. Pressure Signal 2 is on the Product 2 connector for Liquid.

9. Control Valve Setup (Please Refer to your Owner's Manual for your NH3 Settings)



Start with the Default values for Valve Response Rate and Control Effort. Adjust as needed so system adjusts quickly to speed/rate changes, yet doesn't oscillate regularly going across the field. If Control Deadband is set too low, it may create oscillation in the system.



AGXCEL INTEGRATION INTO THE JDRC 2000

(Read Instructions Completely before Beginning Installation)

Configuration – cont.

10. Product 2 Control Valve Setup - PWM Setup

Coil Frequency: *(Adjust as needed)*

Synergist 125

Valve Response Rate: *(Adjust as needed)*

Synergist 80

If pump is slow responding to rate or speed changes, increase **Valve Response Rate** 10hz at a time. If product oscillates around rate going across the field, reduce **Valve Response Rate**.

Control Deadband: Start at 2

Low Limit *(Adjust in field as needed)*

Synergist 10

PWM Startup *(Adjust in field as needed)*

Synergist 10

11. Rate Sensor Flowmeter Setup

AGXCEL FLOW METER GUIDE		
MODEL / RATE	PULSES / GAL	Flow Cal #
0.08 - 1.6	22710*	177

**For AgXcel GX40 Synergist, divide pulses/gal by 128 and use fl. oz. as flowmeter units! GX40 Synergist Flow Cal: 177*

12. Tank and fill Flowmeter Setup (Optional)

Check Tank Fill Monitor box if using a fill flowmeter. Then enter Tank Fill Flowmeter Calibration (Units are 10gal).

13. Set Rates & Rate Smoothing as desired.

Set Rates and Rate Smoothing as desired. Check the Decimal Shift box to enter rates with one or more decimal point (such as 0.25 gpa).

14. Off Rate Alarm Setup

Set Off Rate Alarm as desired. The Minimum Flow Rate box will be present if a pressure sensor has **not** been assigned to this product. AgXcel recommends setting it to 0.08

NOTE: This guide sheet does not cover every possible setup. Your setup may be different. See the John Deere Rate Controller 2000 Operators Manual for important safety information and complete setup and operating instructions.

AGXCEL INTEGRATION INTO THE JDRC 2000

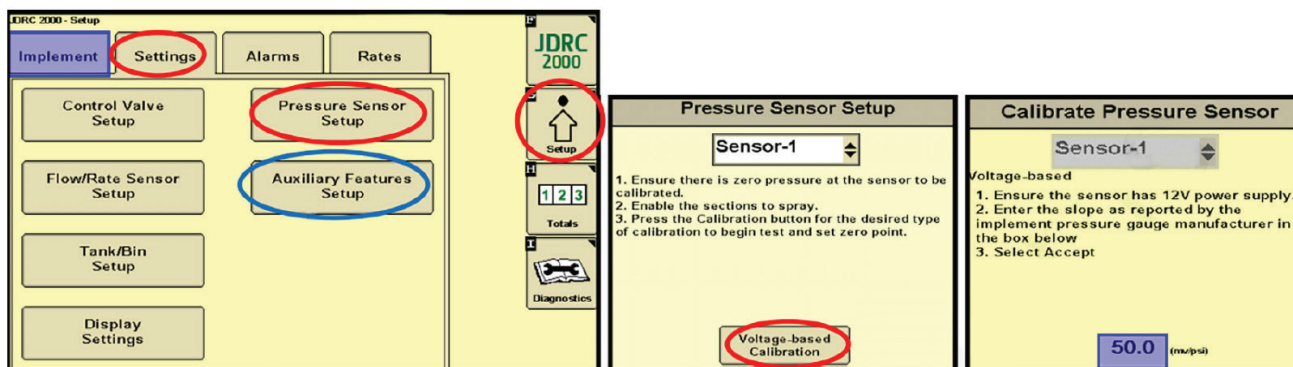
(Read Instructions Completely before Beginning Installation)

15. Pressure Sensor

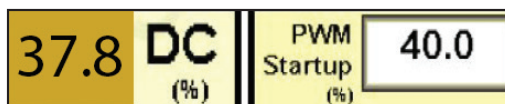
When using an AgXcel pressure sensor the steps must be performed below. AgXcel uses a 0 - 100 PSI pressure transducer and a calibration number of **50.0 mv/PSI** is to be used. To ensure that the sensor is properly calibrated, please make sure that the M12 connector with a **GREEN lit LED** is **DISCONNECTED** from the sensor, this will ensure that the sensor does not detect any pressure in the system. 0 Pressure = 0.00 V.

For complete information on how the **Sensor** is operating, go to:

Diagnostics > Readings > Pressure Sensors. 0 Pressure Voltage should be 0.00 V .



Valuable Tip for Best Startup Performance on AgXcel Liquid System. For best performance set the PWM Startup at or slightly above the normal operating PWM Duty Cycle (DC%). When the pump starts, it will go immediately to that Duty Cycle and then will have just a monitor adjustment to lock on to the Target Rate. For example, if the normal DC% is as shown on the right, set the PWM Start-up at 40%. And the pump will start just a little faster than normal operating speed for a quick return to rate.



Press and HOLD the SETTINGS tab for about 10 seconds until the Advanced Tuning button displays

16. Advance Tuning - Many times the Control Valve Settings are not enough to appropriately control the AgXcel EMD PWM Intelligent Module. Therefore, additional fine tuning using the JDRC2000 under the Advance Tuning section is required. On the AgXcel GX2 or Synergist system the PID values must be modified. For more in-depth details of this feature press the ? button.

Default Settings are:

P = 50 D = 50

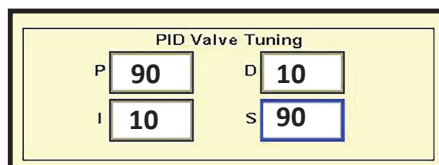
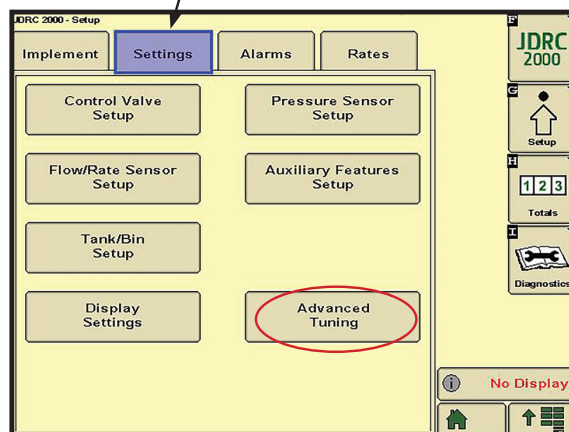
I = 20 S = 50

PID Valve Tuning for AgXcel GX2 Electric System:

Set P = 90 D = 10

Set i = 10 S = 90

Setting P = 100 and S = 100 will ensure the quickest response from the AgXcel GX2 Electric System



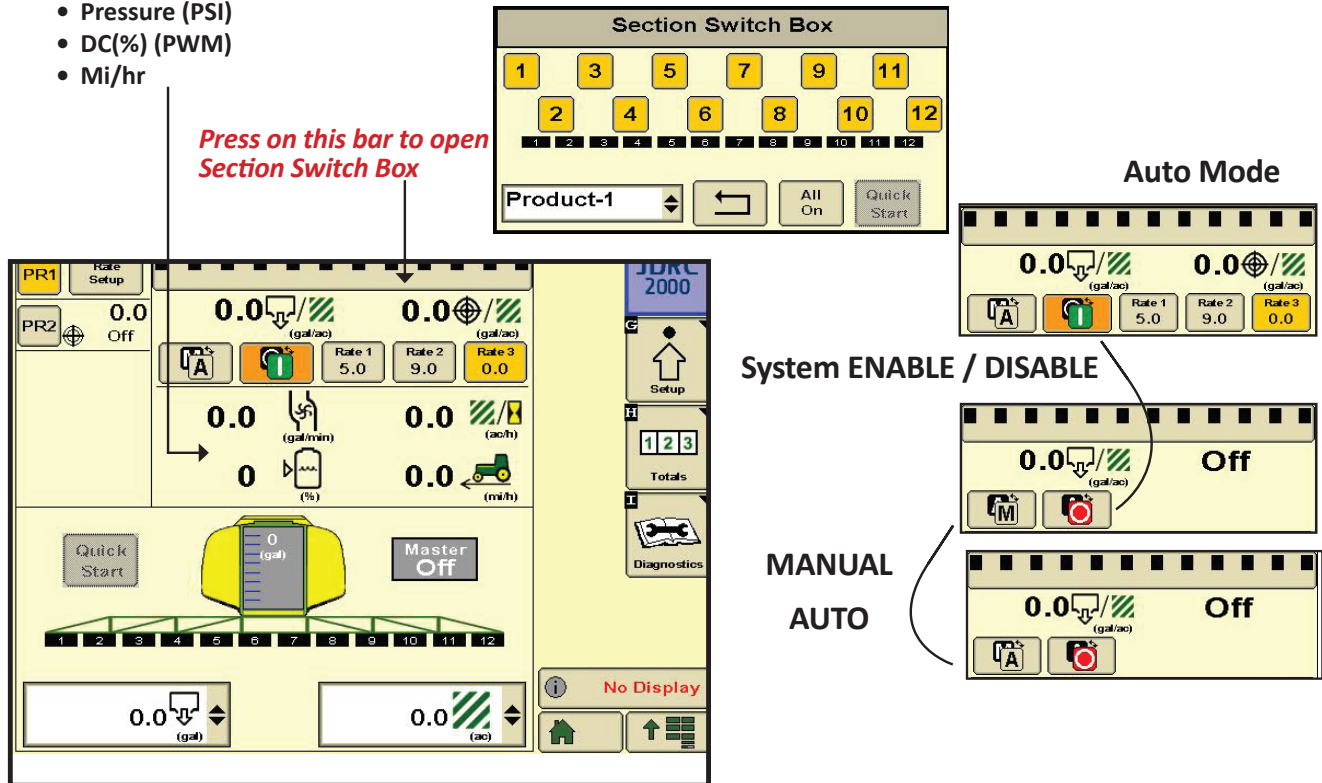
AGXCEL INTEGRATION INTO THE JDRC 2000

(Read Instructions Completely before Beginning Installation)

Configuration – cont.

Set these 4 items in **Setup -> Settings -> Display Settings**

- Gal/min
- Pressure (PSI)
- DC(%) (PWM)
- Mi/hr



17. NH3 Initial Operation: PLEASE REFER TO YOUR OWNER'S MANUAL FOR YOUR NH3 SETTINGS

18. Liquid Initial Operation in MANUAL mode:

- Fill the system with water. For first time startup, open bleeder valve.
- Enter a Test Speed at Setup > Implement
- Navigate to MANUAL MODE as shown above.
- Height switch must be DOWN.
- Turn on Master Switch. Press + to increase flow.
- Monitor Flow (gal/min), PSI, DC, Pump RPM.
- Go to Section Switch box (above). Turn Sections OFF and ON.
- Turn Master Switch OFF.

OPTIONAL MANUAL PUMP OPERATION:

Start with Diagnostics > Tests > Calibrate PWM LIMITS. This is the place where you can manually run the pump to test the Liquid System:

Override Height Switch Manual Switch > ON Press Start > Press and hold (+) to speed up pump

19. Liquid initial Operation in AUTO mode: (for Generic or liquid Fertilizer Tool profile):

- Enter a Test Speed at Setup > Implement
- Press the AUTO button
- Ensure that the height switch is down or unchecked
- Turn the Master ON
- You can not monitor system flow vitals and ensure that all outlets of liquid are flowing
- Once again check sections of sections are being used
- System testing is complete - Turn OFF the Master Switch

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

AGXCEL INTEGRATION INTO THE JDRC 2000

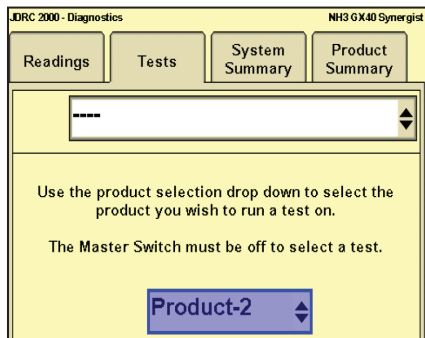
(Read Instructions Completely before Beginning Installation)

Initial Operations - STEP 1

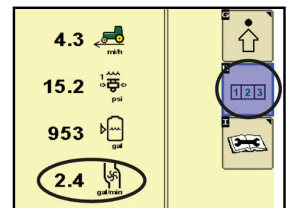
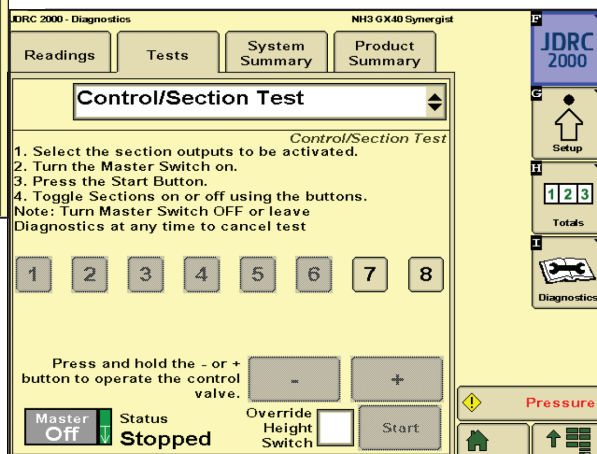
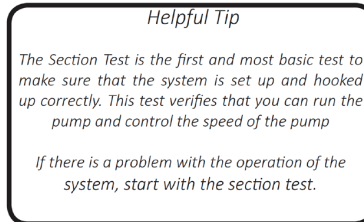
AgXcel highly recommends you perform these steps with water to verify system is correctly installed and ready for the field! Please note, pressure will be much lower with water than with NutriSphere.

Go to the **Section Test (Diagnostics, Tests, Select Product 2, Nozzle Flow Check)**. **Section Test** essentially functions like a **MANUAL** mode where you have direct control of pump and valves.

2. Turn the **Master** switch on and press START.
3. **Test** section valves by checking and un-checking boxes. Check boxes to open all valves.
4. Push the “+” button and hold it. Electric pump 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, open the priming air bleed valve. This will allow air to be expelled and the pump to prime.
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. Push **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/GS3 flow readout in GPM can be increased and decreased with the plus & minus buttons.**



Go to Step 2 on the next page when you can increase and decrease the GPM reading using the + and - buttons.



On Synergist systems, screens that show gal/min are actually showing oz/min!



AGXCEL INTEGRATION INTO THE JDRC 2000

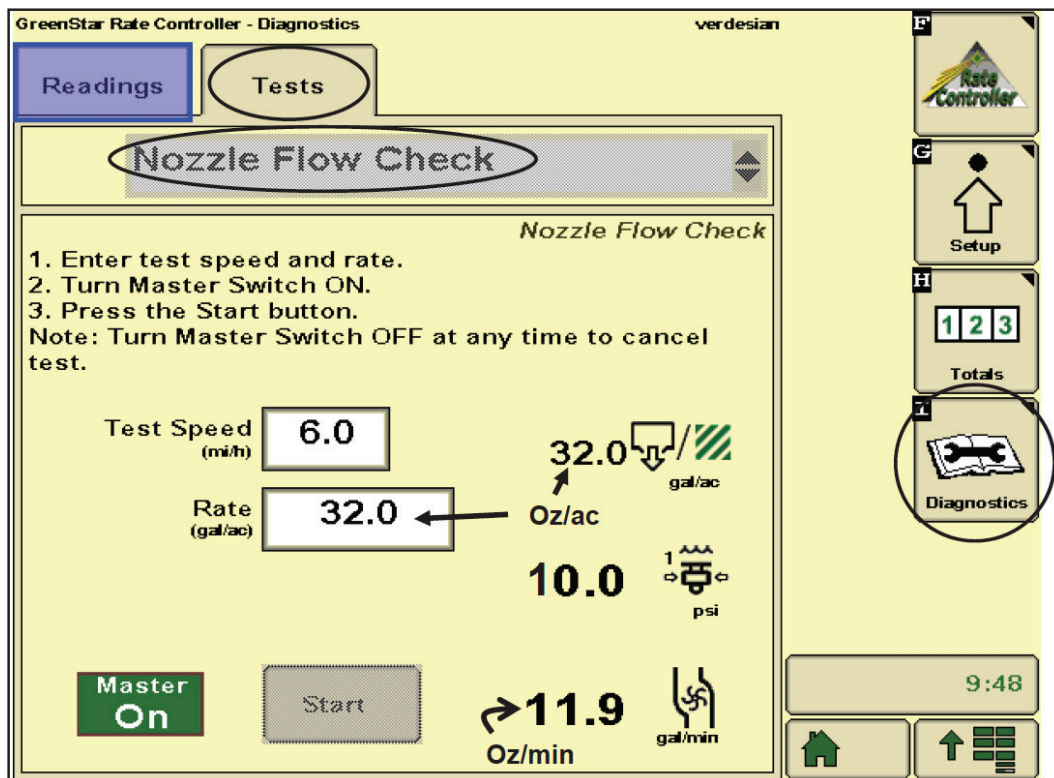
(Read Instructions Completely before Beginning Installation)

AgXcel Harness for NH3 Profile plus Synergist

Involved AgXcel Harnesses: 17712, 17713, 17714, 55613

Initial Operations - 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. (Note: When testing with water, the system will operate much differently than it will with the actual product. It will take much higher rates with water to build pressure and it may not lock on to rate as well.)
2. **Test Speed:** Enter your typical field operating speed.
3. **Rate:** Enter your typical application rate. (32 oz/ac. Ignore gal/ac)
4. Turn the **Master switch on and press START**.
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, thicker products such as NutriSphere will have higher pressures at a given flow than water.
8. You can use this procedure with product (instead of water) to verify your **minimum pressure is at least 10 psi** (to ensure all check valves open). Also check the **maximum speed and rate to make sure pressure is under 50 psi**.



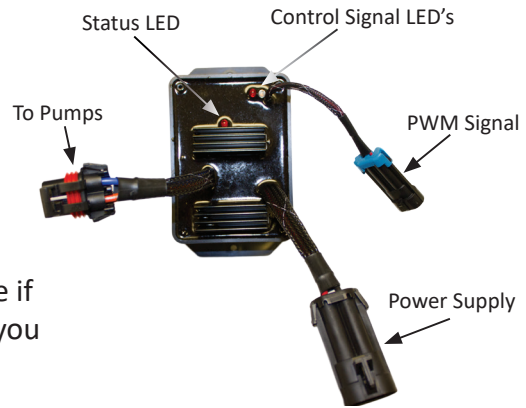
TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

EPD LED Signals

AgXcel has 2 styles for EPD's. One of the models has three lights and the other model has five lights. Ensure that you are looking at the correct diagram to confirm the signals you are receiving.

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.



LED STATUS INDICATOR CODES		EDP Status Lights
Light on steady		Unit is turned 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 connections for open.
2 Flashes/pause		Output short circuit detected. Check motor wiring.
3 Flashes/pause		Over-current condition. Check total load.
4 Flashes/pause		Input Power fault. Check input power wiring.
5 Flashes/pause		Input frequency out of range.
NOTE: Cycle power with the controller ON/OFF switch to clear a fault code		

EDP Status Lights

	Color	Time Line	LED State	Condition
POWER	Power (12V) Green		Off	No power (or less then 6.8V)
	Power (12V) Green		1hz Flash	Under Voltage (less then 10.5V)
	Power (12V) Green		On Solid	12V supplied (power is acceptable)
PWM	PWM Blue		Off	No PWM Signal to the Module
	PWM Blue		1hz Flash	PWM signal present
	PWM Blue		On Solid	Maximum Duty Cycle
TEMP	High Temp Yellow		Off	Module within Temperature Range
	High Temp Yellow		1hz Flash	Module Temp is elevated
	High Temp Yellow		On Solid	Module Auto Shutdown from Temp
MOTOR CURRENT	Current Red		Off	Normal Operation (Under Max)
	Open Circuit Red		1hz Flash	Open Circuit Condition
	Over Current Red		On Solid	Over Current (Output Shorted)
MOTOR RUNNING	Motor Orange		Off	Motor is not running
	Motor Orange		On Solid	Motor is running



The PWM's take 12 volts for power and will send that voltage to the pumps to kick on and off. If the pumps are not turning on, then your PWM might not be getting 12 volts or your pumps might have gone bad.

TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

Pumps run for a few seconds then turn off

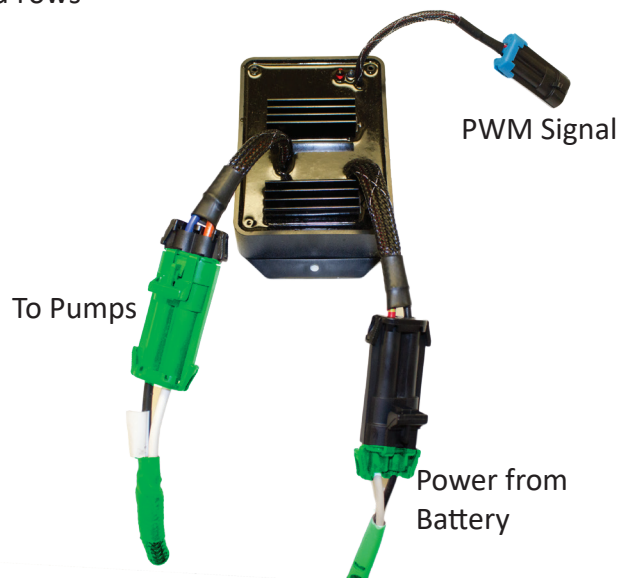
This symptom is due to the pumps drawing more current than the 40 amp limit of the EPD.

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

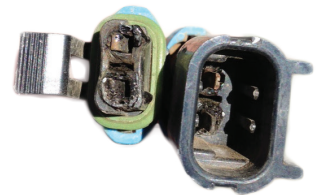
Connect pumps directly to battery

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.



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.



IMPLEMENT SWITCH

(Read Instructions Completely before Beginning Installation)

GXIMPLEMENTSWITCH KIT

PN# 53824

PN# 53982 (2 PIN/JD STYLE)

KIT INCLUDES:

- 1- 15FT Extension (John Deere or 3pin connector)
- 1- Implement Switch with 15FT Lead
- 1- Magnet Mount

IMPLEMENT SWITCH KIT:

1. Run/Hold optional connections (If not using be sure to use provided loop to close circuit)
 - For use with a N.O. (normally open) whisker switch, remove the dummy plug and connect to your run/hold switch wires. A smaller gauge wire (18 AWG minimum) may be used for this low current circuit.
 - For use with a hall-effect sensor, remove the dummy plug and attach the plug from your sensor.



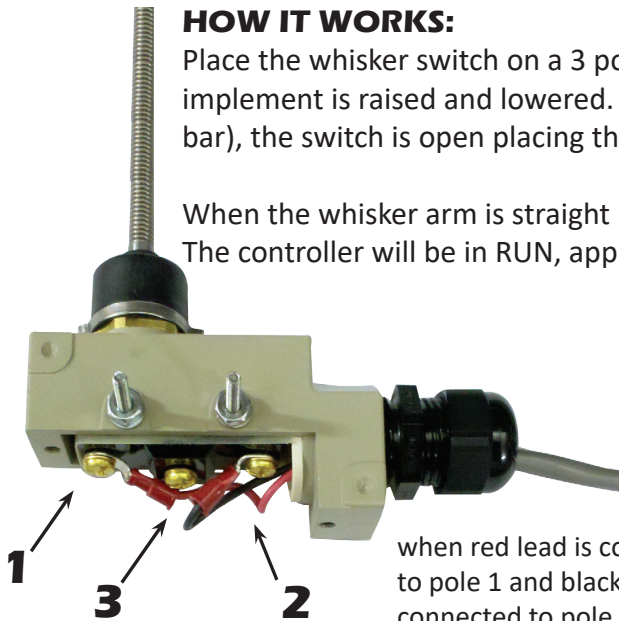
Illustration shown has a 3pin connector.

HOW IT WORKS:

Place the whisker switch on a 3 point arm or wheel frame that changes angle as the implement is raised and lowered. When the whisker arm is bent up (against the tool bar), the switch is open placing the controller in HOLD, not applying fertilizer.

When the whisker arm is straight (not touching the toolbar), the switch will be closed. The controller will be in RUN, applying fertilizer.

* The Whisker switch will work with many other controllers. However, the polarity might be reversed from the positions described above.



when red lead is connected to pole 1 and black lead is connected to pole 3 pumps will run when whisker is bent

when red lead is connected to pole 1 and black lead is connected to pole 2 pumps will run when whisker is straight

EXTENSIONS AVAILABLE		
3PIN	2PIN	DESCRIPTION
17924	55917	GXH_EXT 15FT
54073	55415	GXH_EXT 30FT
Custom extension lengths can be special ordered - contact SALES for a price quote		



FLOATING BALL MANIFOLDS

(Read Instructions Completely before Beginning Installation)

In order to assure proper and even distribution to each row, the product being applied must be metered to each individual row. This metering is done by using metering tubes which create back pressure so an equal amount of liquid is applied to each row.

Flow indicators give a clear visual signal that a fertilizer system is working. These indicators use an o-ring and wire clip connection to snap together in any configuration necessary.

The flow to each row will pass through a flow column that has one or two balls that will float to indicate flow to that row. This gives an immediate visual confirmation of flow to each row. While the floating balls are a good visual indication of flow they are **not always** an indicator of exact flow to each row. **Only a catch test will verify the evenness of the row-to-row distribution.**



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.

*NOTE: Manifold Configuration is situational
Photos are for general reference.*



manifold examples

Floating Balls

For most applications of Nutri-Sphere-N NH₃ at 32 oz/acre, The Green plastic ball gives a good flow indication. If a heavier ball is needed, use the Red Plastic ball. See Fig.1

On the Gx40 Synergist low-volume system, the flow appears to be more stable if only one ball is used.

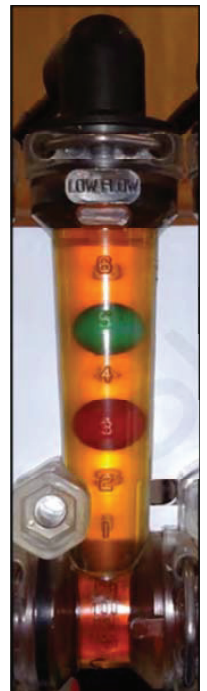
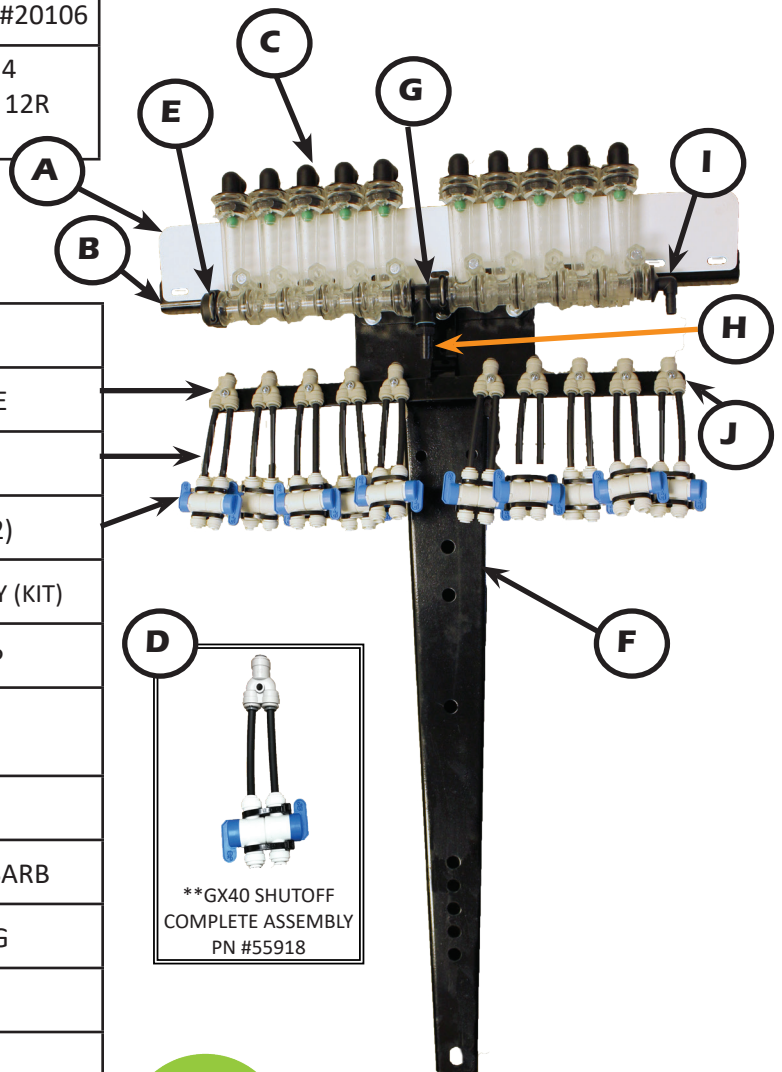


Fig. 1

GX40 SIGHT COLUMN BRACKETS		
PN#		DESCRIPTION
A	406	UP TO 6R WHT BACKDROP
	414	UP TO 8R WHT BACKDROP
	20106	UP TO 12R WHT BACKDROP
B	18082	MOUNTING BRACKET FOR PN#406
	18088	MOUNTING BRACKET FOR PN#414
	18083	MOUNTING BRACKET FOR PN#20106
SIGHT COLUMN HARDWARE KIT - PN#38324 HARDWARE KIT USED FOR MOUNTING UP TO 12R ONTO GX1 CHASSIS BRACKET		

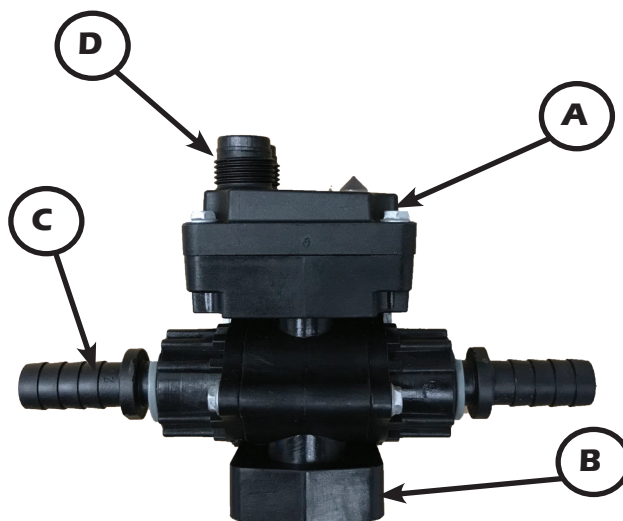
HARDWARE TO MOUNT SHUTOFF ASSEMBLY		
1 OF EACH REQUIRED PER ROW	PN#	DESCRIPTION
	715	6-32 NYLON LOCK NUT
	714	6-32X1" PHIL RH MS
	18182	#6 SAE FLAT WASHER

C	25709	1/4 PTC TOPS
D	37721	DIVIDER W/MOUNT HOLE
	19920	EVA14
	19848	1/4" PTC SHUTOFF (QTY 2)
	55918	**GX40 SHUTOFF ASSEMBLY (KIT)
E	18039	COLUMN END CAP & CLIP
F	38260	GX1 CHASSIS (TOMAHAWK ONLY)
G	18042	ISOLATED FEED
H	32264	3/8 MNPT TO 3/8 HOSE BARB
I	18033	3/8" HOSE SHANK-90 DEG
	25682	LOCK U-CLIP
J	17701	GX1SHUTOFFBRACKET
COMMON UBOLT(S)	17703	GXUBOLT 6 X 5 1/2" x 1/2"
	37726	GXUBOLT 4 X 7 X 5/8"
	55222	GXUBOLT 6 X 8 1/2" x 5/8"
	20554	GXUBOLT 6 X 8 X 5/8"



Implements that are less than 60 ft. wide need to be setup as one section in order to prevent range dropping below flow meter capabilities at lower speeds. Using more sections is not recommended.

GX40 PRO STOP HARNESSING		
PN#	SIZE	M12 TO 3 PIN CONNECTORS
54406	3FT	
54408	6.5FT	
55410	9.8FT	
54412	13FT	
54414	19FT	
54416	29FT	
54418	39FT	
**CUSTOM GX40 BOOM EXTENSIONS AVAILABLE AT EXTRA COST **		



GX40 VALVE BODY ASSEMBLY			
	PN#	DESCRIPTION	COMPLETE Gx40 BASE VALVE ASSEMBLY PN# 709
A	55716	GX30PROSTOP - E VALVE M12 (VALVE ONLY)	
B	17720	PRO STOP BODY BRACKET (NOT SHOWN)	
C	20808	3/8 TUBE TO 3/8 BARB (2 REQ'D)	
D	37665	GX40 M12CAP (NOT SHOWN)	

GX40 SIGHT COLUMNS		
PN#	DESCRIPTION	
LOW FLOW	25689	Wilger Low Flow Column Only
	25687	Wilger Low Flow Column W/balls, clip, retainer (No Top)
	37617	Wilger Low Flow Complete Column(s) - 4 pack w/ End cap, clips & 1/4QC Tops
BALL SELECTION FOR THE GX40		
1-3 GPA	18077	Green Plastic* Ball
2-4 GPA	18078	Red Plastic* Ball
*For 32 oz/acre at 7mph or less the Green ball works the best. Higher speeds may work better with the Red ball **		



PN#	DESCRIPTION
55634	GX40 DUAL TUBING - 12 FT SKY/NAVY
55938	GX40 DUAL TUBING - 12 FT GREY/NAVY
38251	GXMT GREEN (SOLD BY THE FT) NOTE: GX40 USES 4FT OF GREEN MT PER ROW.
20121	1/4 PTC DIVIDER
55212	.3 LB X 1/4" QC CHECK VALVE

MICRO TUBE PLUMBING KITS

(Read Instructions Completely before Beginning Installation)

The GX40 Synergist system comes with a Dual micro tube distribution system. These plumbing kits will contain everything you need to distribute product from the flowmeter outlet down to the ground application device.

For most applications of NutriSphere-N NH3 at 32 oz/acre on 30" rows, the Gray micro tube will be what is used. When applying in cold weather and/or at high speeds, it may be necessary to use the Navy Blue micro tube. The system will work at pressures up to 50 psi, but for prolonged use above 45 psi, consider switching to a larger tube.

FIELD OPERATION OF DUAL MICRO TUBE

The best micro tube to use may change based upon temperature, application speed and product batch.

AgXcel recommends you start with the Gray tube (for typical 32 oz/acre and 30" row spacing). Conduct a test using calibration mode to determine your system pressure. Recommended pressure is between 10-40 psi.

The system will operate up to 50 psi. However, if prolonged application with pressure above 45 is anticipated consider changing to the Navy Blue Metering tube.

NOTE: Flow Tests with water will have very different pressure readings than what the system will have with NutriSphere-N. The pressure will be much less with water for a given flow than with NutriSphere-N.

ADVANTAGE OF DUAL MICRO TUBE

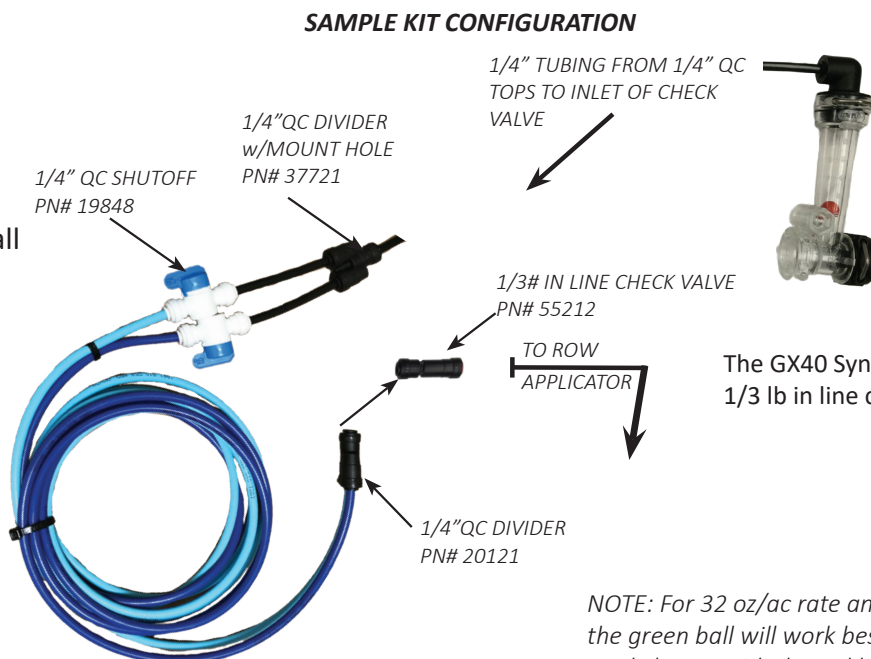
Micro tubes provides a larger passage way diameter than a comparable orifice. Typical NutriSphere-N NH3 applications apply around 1 to 1.5 oz/min/row. An orifice of this rate would have a 0.015" diameter opening. The GX40 Synergist uses micro tubes Navy Blue and Gray. This 12' tube with more than 3 times the diameter creates a system excellent in providing low volume row to row distribution.

By using two micro tubes, the system can provide proper application as the product properties change due to temperature, mixtures and other factors.

CHECK VALVES

(Read Instructions Completely before Beginning Installation)

A standard dual check valve system with two micro tubes as shown on the left. This allows the flow to be directed to the small tube, large tube or to both tubes by opening or closing the valves by twisting the blue caps.



The GX40 Synergist will come with a 1/3 lb in line check valve.

NOTE: For 32 oz/ac rate and speeds 7 mph or less, the green ball will work best. Higher speeds may work better with the red ball

Dual Navy Blue/Grey - PN# 55938 * - Standard kit

Dual Navy/Sky - PN# 55634 - Situational and dependent on speed of implement

12' lengths per row are standard for the GX40 Synergist and included in all kits.

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TYPICAL PLUMBING SETUP

(Read Instructions Completely before Beginning Installation)

Your shanks and plumbing setup may vary from those shown here.

The 4' green tube delivers the product to the shank.

1. Slide a 2' piece of 3/8" hose over the green tube along with 2 clamps.
2. Slide the green hose in the tube on the shank as far as it will go.
3. Slide the 3/8" hose down over the tube. Clamp 3/8" hose at the top and at the bottom.
4. Connect Gray tube 1/4" QC x 1/4" QC. *Navy Blue tube will be used when cold weather and/or high speeds create too high pressure in the Gray tube.
5. Connect Navy blue tube to outlet side check valve provided.
6. Connect the black 1/4" tubing from top of flow indicator to inlet of check valve.



2



3



4



5



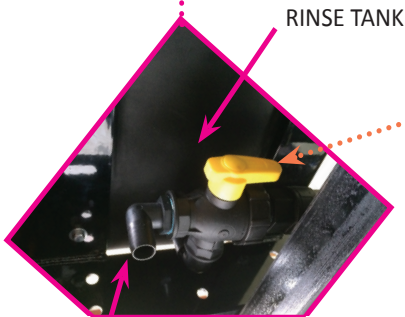
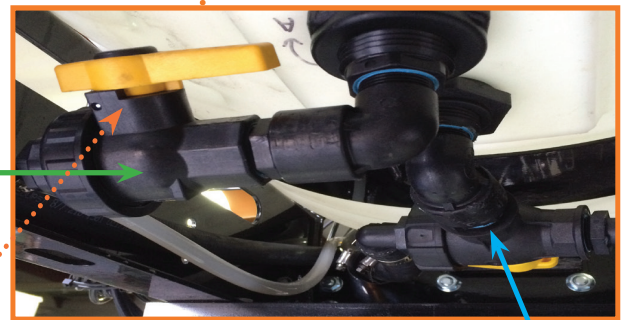
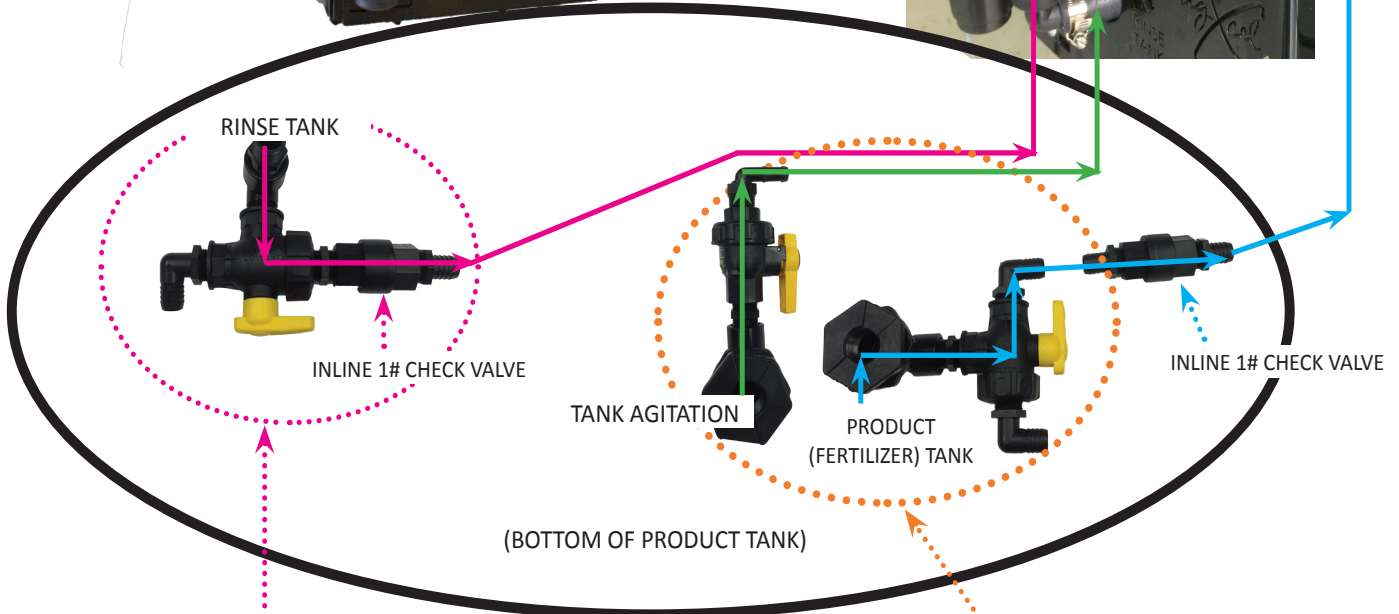
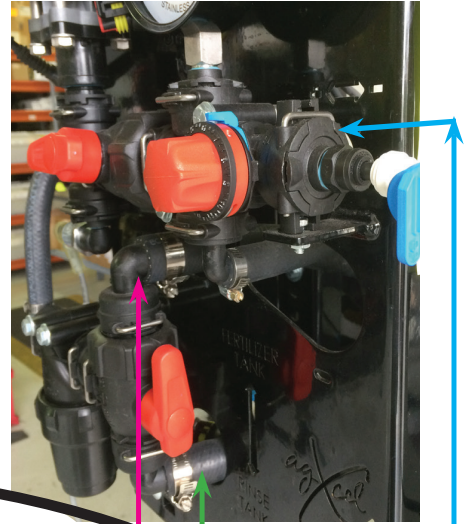
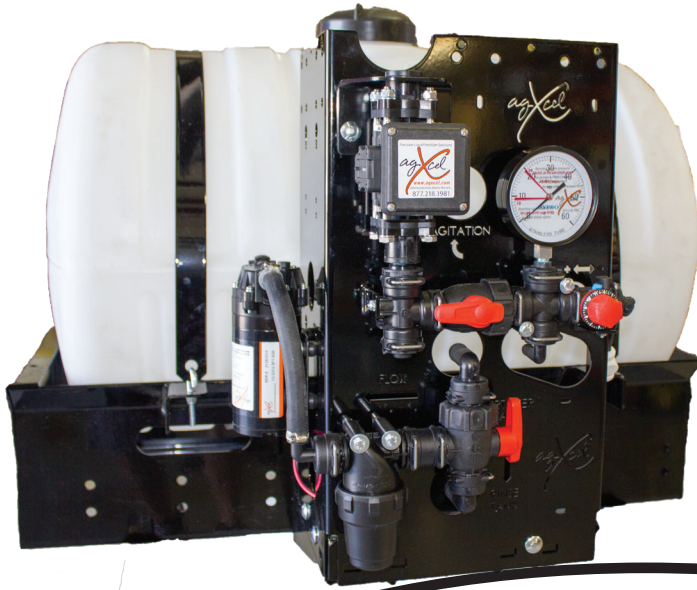
1/3# IN LINE CHECK VALVE
PN# 55212

NOTE: For 32 oz/ac rate and speeds 7 mph or less, the green ball will work best. Higher speeds may work better with the red ball



GX40 TANK PLUMBING DETAIL

(Read Instructions Completely before Beginning Installation)



TANK AGITATION

3 WAY BALL VALVE

RINSE TANK

RINSE TANK OUTLET

PRODUCT
(FERTILIZER) TANK

- ➔ RINSE TANK
- ➔ PRODUCT (FERTILIZER) TANK
- ➔ TANK AGITATION

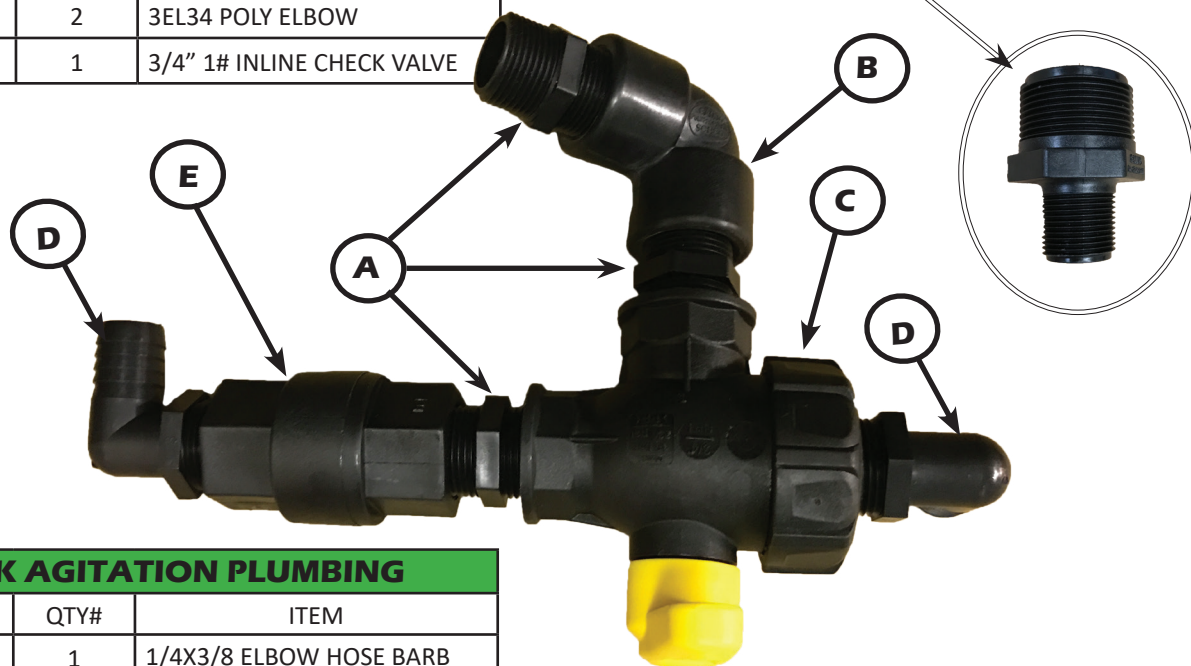


PRODUCT TANK PLUMBING

	PN#	QTY#	ITEM
A	32399	3	3/4 THREADED NIPPLE
B	50577	1	3/4 PIPE ELBOW
C	37667	1	3-WAY BALL VALVE
D	32331	2	3EL34 POLY ELBOW
E	54022	1	3/4" 1# INLINE CHECK VALVE

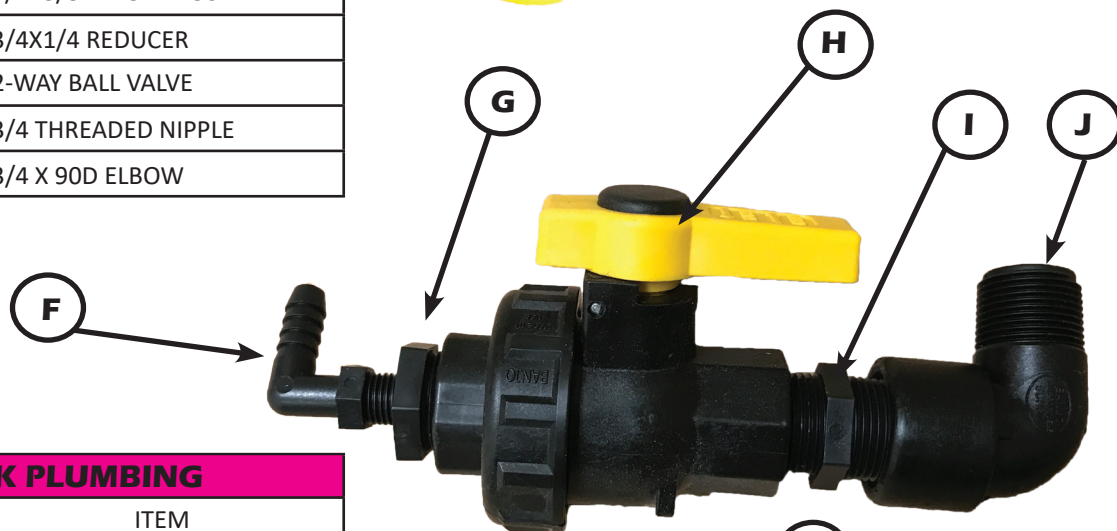
A & B are used with
a 55 gal tank.

For a 110 gal tank
substitute A & B for
PN# 52108 (shown)
1-1/4 X 3/4 REDUCER



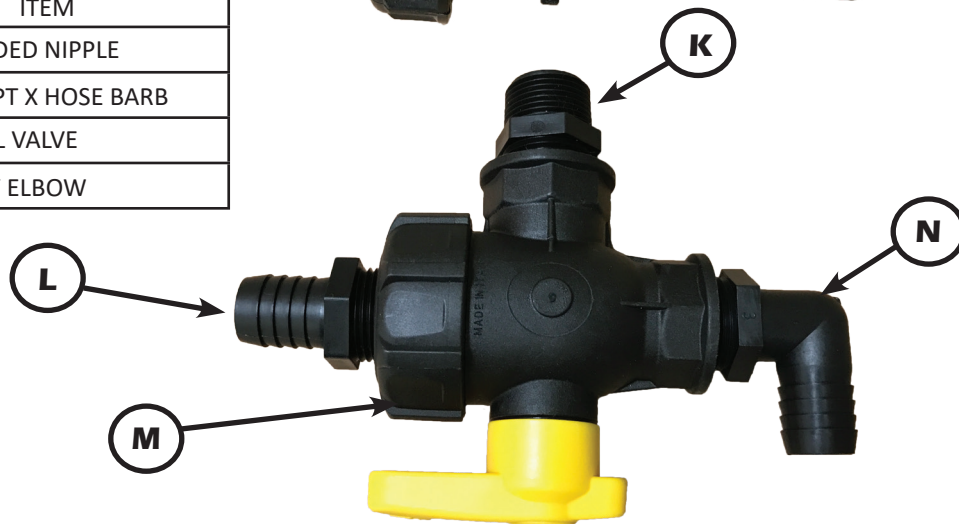
TANK AGITATION PLUMBING

	PN#	QTY#	ITEM
F	32324	1	1/4X3/8 ELBOW HOSE BARB
G	32433	1	3/4X1/4 REDUCER
H	52169	1	2-WAY BALL VALVE
I	32399	1	3/4 THREADED NIPPLE
J	52146	1	3/4 X 90D ELBOW



RINSE TANK PLUMBING

	PN#	QTY#	ITEM
K	32399	1	3/4 THREADED NIPPLE
L	18005	1	3/4x3/4 MPT X HOSE BARB
M	37667	1	3-WAY BALL VALVE
N	32331	1	3EL34 POLY ELBOW

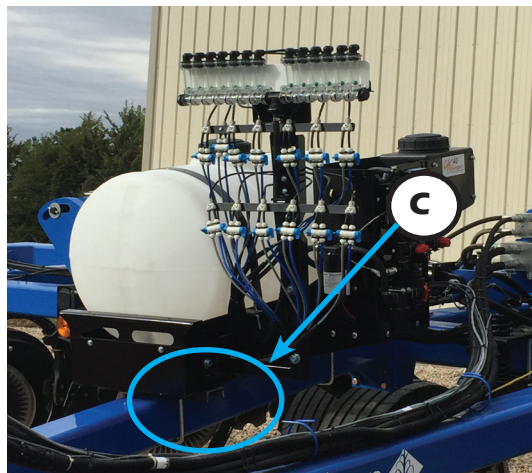
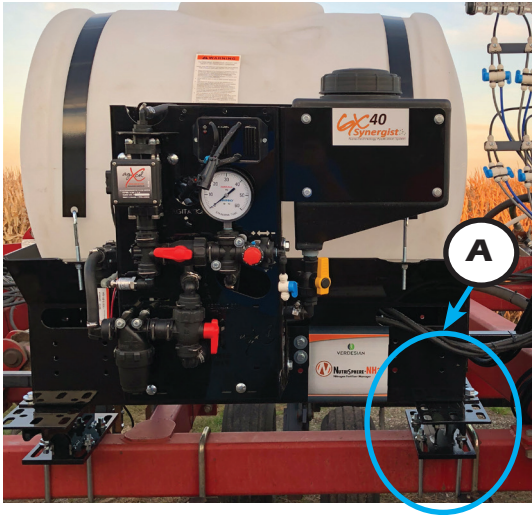


AGXCEL SYNERGIST MOUNTING OPTIONS

Various brackets and u-bolts are available to provide a way to mount the GX40 Synergist to almost any implement. Your AgXcel configuration specialist will get your implement information at ordering time to make sure that all of the hardware needed for your system is included.

ITEM#	PN#	DESCRIPTION
A	55598	GX40_UNIVERSALTANKMOUNT 6"
B	55597	GX40_UNIVERSALTANKMOUNT 16"
	55596	GX40_UNIVERSALTANKMOUNT 24" (NOT SHOWN)
	38327	GXUNIVERSALTANKMOUNTBOLT KIT

PN#38327 = BRACKET HARDWARE PACKAGE
(USED TO MOUNT GX40 SYNERGIST TANK CRADLE
TO UNIVERSAL MOUNT BRACKET 6", 16", 24" OR
LOW PROFILE BRACKET)



The most common mounting options are shown here. Also GX40 systems can be mounted directly to the tool bar as shown above. Agxcel carries a variety of sizes to fit majority of tool bar sizes.

ITEM#	PN#	DESCRIPTION
C	55625	GX40_LOWPROFILEBARMOUNT
	53719	9" BOLTS 5/8"
	38402	5/8" WASHER
	37601	5/8" SPIN NUT
	38327	GXUNIVERSALTANKMOUNTBOLT KIT



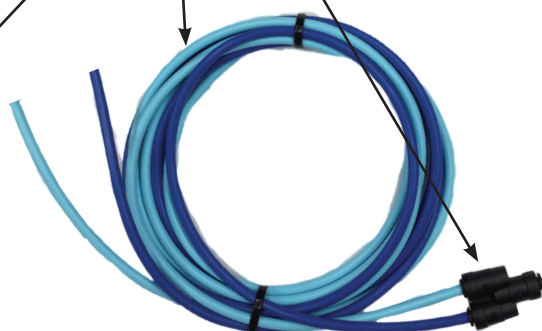
SYNERGIST FIELD KIT - PN#55558



COMPLETE AGXCEL GX40 SYNERGIST FIELD KIT
CONTAINING CRITICAL COMPONENTS TO KEEP YOU
RUNNING IN THE FIELD.

KIT INCLUDES:

SYNERGIST FIELD KIT PN#55558		
PN#	ITEM	QTY
25709	WILGER 1/4" CAP QC	1
37614	WILGER LOW FLOW COLUMN	1
262	QC3 (1/4" TO 1/4" QC)	4
55212	1/3# IN LINE CHECK VALVE	2
38412	SST #6 CLAMPS	2
55938	GX6MT DUAL NAVY/GREY 12FT	2R
37721	1/4" DIVIDER WITH MOUNT HOLE	2
20121	1/4" DIVIDER	2
32324	QA PUMP FITTINGS 3/8" BARB	2
709	MICRO-VALVE W/BODY	1
20064	2.0 QA PUMP	1



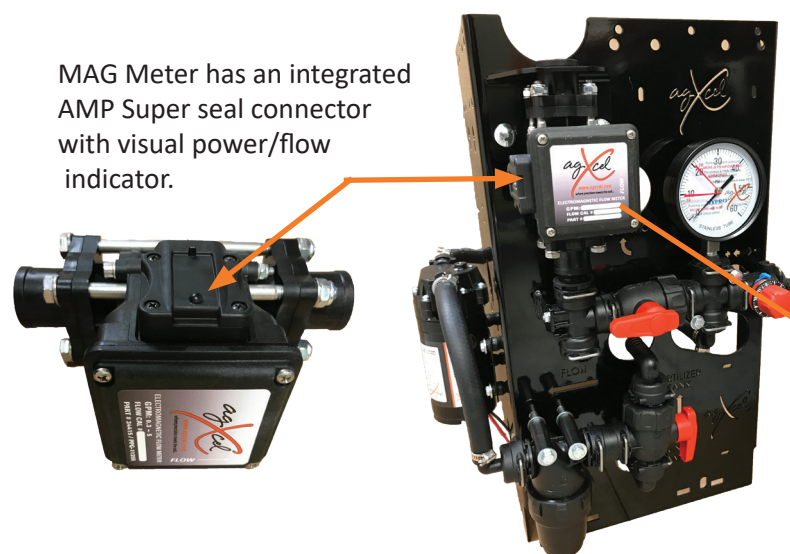
****OPTIONAL FIELD KIT AVAILABLE BEYOND BASIC
FIELD KIT PROVIDED WITH EVERY SYSTEM****

FLOWMETER OVERVIEW

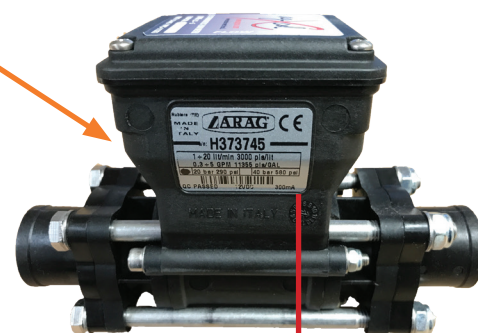
(Read Instructions Completely before Beginning Installation)

AGXCEL MAG FLOWMETER

The AgXcel Mag Flow meter is a magnetic flow meter, also technically known as an electromagnetic flow meter. 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 dirt 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.

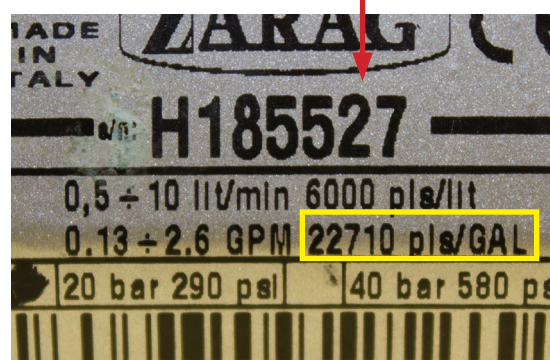


The Synergist uses special quick attach fittings that lock n clip into place making easy part replacement.

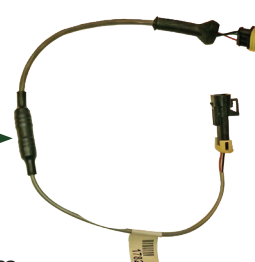


On the magnetic flowmeter there will be a sticker located on one of the sides. Find the pulses per gallon and use the chart in your OEM manual to determine your flowmeter calibration number.

FLOW RANGE (GPM)	PULSES PER GALLON
0.08 - 1.6*	22710
0.13 - 2.6	22710
0.3 - 5	11355
0.6 - 13	4542
1.3 - 26	2271
2.6 - 53	1135



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.



*GX40 Synergist exclusively uses the .08-1.6 flowmeter. Special settings to read in oz/acre. See OEM manual for details.



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GX ACCESSORY - RECIRCULATION KIT

(Read Instructions Completely before Beginning Installation)

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

Do I need recirculation flow?

Recirculation flow allows the pump to run faster than if the total pump flow was applied to the ground. This may be helpful when operating at very low rates. The Synergist will typically operate with the recirculation valve closed. The metering tube on the recirculation loop can be changed to allow for more or less recirculation. Too much recirculation can result in unstable flow reading on the display.

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.

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.

Recirculation Regulation Valve



3300 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 3300 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.

⚠ 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.

⚠ 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-

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 3300 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 ²] (or heavier)	SEE PUMP MOTOR LABEL
36 DC	Black (negative -)		
115 AC	Black (common)	#16 AWG [1 Mm ²] 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?



WARRANTY:

AgXcel manufactured systems come with a 1 year limited warranty. Electronic components from our OEM vendors come with a 1 year limited warranty and some components only have a 90 day warranty. (e.g. the Garmin GPS devices)

AgXcel warrants that the products or services sold here shall be free from defects in material and workmanship under normal use and services when correctly installed, used, and maintained. This warranty of quality shall terminate 1 year after delivery of the product, and shall not apply to products which have been subject to misuse, abuse, neglect, improper storage, handling, or maintenance. If the product proves to be defective within the warranty period the purchaser must contact AgXcel technical support team to troubleshoot the product to verify the defect. If technical support feels there is an issue, at AgXcel's discretion a new or factory refurbished part will be shipped to replace the part in question. All product(s) replaced or repaired under warranty shall carry the remainder of the warranty left on the original purchase. Under no circumstances shall AgXcel be liable for special, indirect, or consequential damages. In particular AgXcel shall not be liable for damage to crops as the result of misuse or negligence in the application of chemicals or operation of AgXcel products.

Our warranty process is as follows:

- When a warranty claim is made; at AgXcel's discretion a new or factory refurbished part will be shipped and invoiced. It is very important to note that the invoice is due in full within 30 days from the invoice date. Finance charges will be applied if not paid in full. Credit to your account will be processed when OEM validates and approves your warranty claim.
- It is the Authorized Dealers'/Customers' responsibility to return the warranty part to AgXcel for review within 15 days. (Note return procedure below)
- Once the part is received AgXcel will test the part to justify the claim.
- Part is then shipped to the original manufacturer to validate for warranty.
- If the original manufacturer determines that the part qualifies; your account will be credited for the new part sent.
- If the manufacture denies warranty and the part is in working order it will be returned to the authorized dealer.
- If the part is not in working order it will be discarded unless you request that it be returned to you.

RETURNS:

AgXcel will gladly accept returns for new items purchased directly from us if returned within 30 days of receipt. However returned items must be accompanied by the original product packaging, any associated components and informational tags (such as flow meter calibration tag). Metal brackets are not returnable unless they are in new condition and are not scratched. Authorized Dealers/Customers wishing to return items must contact AgXcel at 877-218-1981 or info@agxcel.com prior to returning any items to request a RMA number. **Packages sent with no RMA number are UNAUTHORIZED and will be refused by our receiving department and returned to sender at sender's expense.**

Once the return has been approved and a RMA number is obtained, AgXcel will contact the Authorized Dealer/Customer with RMA number and instructions on how to return the items.

Ensure that items are properly packaged; taking special care with items that can be scratched, damaged or broken during

shipping. Clearly write the RMA number on the outside of the package and return to AgXcel. {Return shipping and handling fees are the customer's responsibility and will not be reimbursed by AgXcel.} AgXcel highly recommends that a traceable method of shipping is used for your protection. AgXcel is not responsible for damaged or lost items due to shipping. Upon receipt of returned items AgXcel will inspect all the items and give the Authorized Dealer/Customer credit for the approved return within 30 days. Credit will not be given on items that are damaged, broken or used. This does not apply to warranty returns.

Credit for the RMA will be placed on the Authorized Dealers' account. To receive credit in the form of a check the Authorized Dealer must request this through AgXcel accounting. Customers' credit for the RMA will be issued when approved.

Returns will not be accepted for credit on items that are:

- Opened or used
- Special orders - Items that are specially ordered from an outside vendor not normally held in AgXcel stock
- Returned more than 30 days after delivery
- Returned without an RMA
- Returned in a package not well suited for the item
- Partial return of items sold as a kit

Products returned to AgXcel must be thoroughly cleaned and free of all chemical contamination. Items not properly cleaned will be returned to the owner at their expense.

A 20% re-stocking fee will be applied on all returned parts.

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