

# 3RIVE 3D<sup>®</sup>

APPLICATION SYSTEM

## Application System

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For systems using **Dual Plus<sup>™</sup>** and  
**SafeGuard<sup>™</sup>** consoles

## Operation

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Source Doc: MTS Warranty Statement 080120

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# ***ABOUT THIS MANUAL***

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This manual is specific to the 3RIVE 3D™ application system. The full standard versions of the Dual Plus rate controller and SafeGuard blockage system are available online at

<http://www.micro-trak.com/resources/manuals>

## ***IMPORTANT CONSIDERATIONS***

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### ***WATER QUALITY***

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- Only CLEAN water should be used in water tank! No product mixing occurs in the tank.



Adding other chemicals to the clean water tank that are not approved by FMC may result in poor foam quality and degraded system operation.

The system warranty does not cover performance issues or equipment plugging/damage caused by adding chemicals to the clean water tank!

- Water should have a pH between 5.4-8.5 for best quality foam
- Hard water may produce poor quality foam.
- Rust – water should be free from rust particles. Extreme rust conditions may require additional filter maintenance or customer to find alternate water source.

### ***APPLYING PRODUCT IN-FURROW***

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When testing system with active product follow all chemical handling rules and safety procedures!

- Expanded formulation can be affected by several factors, including water quality (pH, hardness, etc.), application rate of chemical and water, air pressure, air orifice disk size, and ¼ inch tubing length.
- Product being discharged should come out steadily from all rows. Product will break and tear when being tested with planter raised up and not moving.

### ***FREEZE WARNING***

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The 3RIVE Application System uses water (which freezes at 32 degrees F) as a carrier component. The Capture 3RIVE component is safe to temperature of 27 degrees F. To avoid damage caused from freezing, the system should be parked indoors or the Cold Evening procedure should be implemented, if night time temps are expected to be below freezing.

# OVERVIEW

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The 3RIVE 3D™ application system is designed exclusively for use with 3RIVE 3D™ formulations on planters. The 3RIVE 3D™ Application System uses low water volumes to deliver crop protection products to the furrow. The system expands mixtures up to 50 times creating a three-dimensional continuous Zone of Protection delivered directly into the furrow.

The Dual Plus™ controller controls both water and chemical to accurately apply 3RIVE 3D™ formulations at the desired application rates. The water and formulation is mixed at the correct ratio and then flows to the section control manifold. The section manifold contains shutoff valves to control both liquid and air for each section. The mixed liquid then travels to the 3RIVE 3D™ manifolds where the product/water mixture and air are combined and the expanded formulation (foam) is created. The manifold has blockage sensors for each row. The foam flows through the blockage sensor to a row unit and out through a delivery nozzle located in furrow.

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## TANK ASSEMBLY

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The tank assembly contains a 130-gallon water tank, 30-gallon product tank, Pump-Pak™, air compressor, control valves and all plumbing necessary for control and mixing of the water and chemical. It is mounted on the planter frame. The water and product remain separate until combined at the solution pump inlet.



Tank Assembly

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## ***PUMP-PAK™ ASSEMBLY***

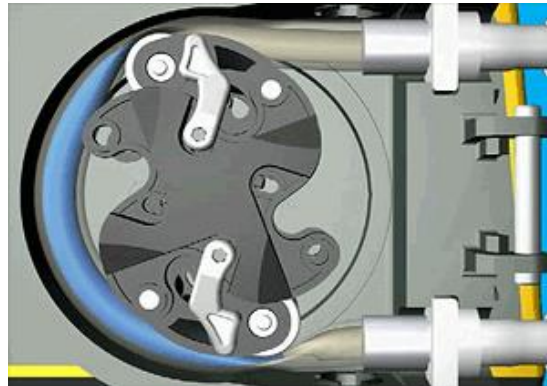
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The Pump-Pak™ is mounted on the tank assembly. It contains both water and chemical pumps, control valves and other devices necessary to precisely apply the product. It consists of:

- Chemical pump
- Solution pump
- Flowmeter
- Strainer
- Three-way valves for calibration/draining of tanks
- Electric motor drivers
- Relay module
- Pressure sensor
- Air compressor

### **CHEMICAL PUMP**

The chemical pump is a precision peristaltic pump. A peristaltic pump is a type of positive displacement pump. The fluid is contained in a flexible tube fitted inside a circular pump casing. A rotor compresses the flexible tube. As the rotor turns, the part of the tube under compression is pinched closed thus forcing fluid to be pumped to move through the tube. Additionally, as the tube opens to its natural shape after the passing of the cam fluid flow is induced to the pump.



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The chemical first passes from the tank through a shutoff valve, mesh filter, and a three-way valve to the pump tube inlet. The controller monitors the rpm of the pump to determine the ounces per minute of chemical flow. The output of the pump goes to the inlet of the solution pump. Here it is mixed with water.

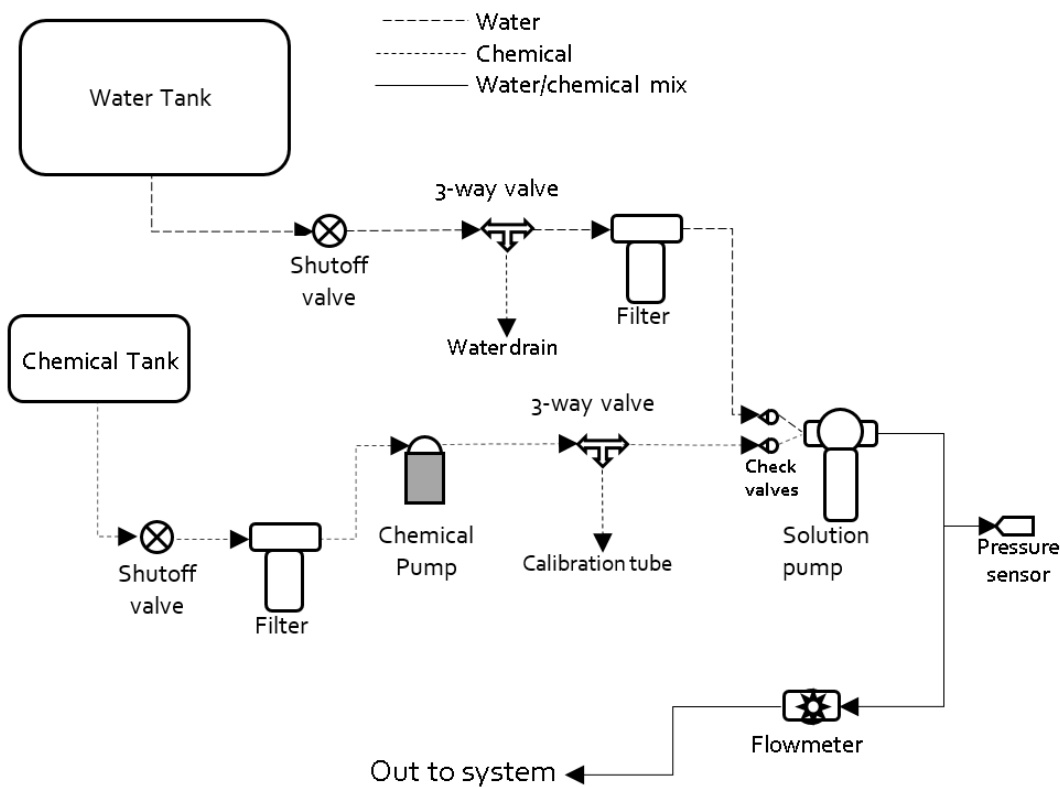
Water flows from the tank through a shutoff valve, filter and a three-way valve to the solution pump inlet. Here it is mixed with the chemical.

Channel 2 controls the chemical pump to the rate of chemical. Channel 1 controls the solution pump to achieve the desired chemical + water total volume. This combined channel 1 volume is typically the desired chemical rate x 5, or 40 ounces per acre, whichever is greater.

The water/chemical solution is then pumped through a precision flowmeter out to the system manifolds. Pressure is monitored by the controller via a pressure sensor mounted on the output side of the solution pump.

The pump is controlled via a 12 VDC electric motor driver module.





**Pump-Pak diagram™**

## **SOLUTION PUMP**

The solution pump is controlled via a 12 VDC electric motor driver module. Water and chemical are supplied to the input side of the pump. The pump is controlled to provide the combined chemical/water rate as set in channel 1. This rate is typically the desired chemical rate in ounces per acre x 5, or 40 ounces whichever is greater. The water and chemical is mixed in the pump and the solution is then pumped out to the manifold assemblies.

## **FLOWMETER**

The flowmeter is a low-volume precision flowmeter. It measures the combined water/chemical solution after it exits the solution pump. From there the solution passes to the manifolds.

## **STRAINERS**

The system uses two #50 mesh strainers to strain the chemical and water before entering the Pump-Pak™. The chemical strainer has a bottom drain to minimize spilling chemical when removing strainer bowl for cleaning.

## **ELECTRIC MOTOR DRIVERS**

The pumps are powered by 10 amp electric motor drivers (EMD). There is one for each pump. The EMD has three connections; battery in, power out to motor, and control. The controller adjusts the RPM of each pump through these EMD modules. It has status and control input indicators. See troubleshooting section for more information

## **RELAY MODULE**

The air compressor is turned on via a relay module. It has three connections; battery in, power out to compressor, and control. The controller turns the compressor on whenever a section is turned on. If all

sections are off, the compressor is turned off. If a second compressor is used, another module will control it turning it on as needed. The relay module has a status indicator that lights when the relay module is on.

### **PRESSURE SENSOR**

The pressure sensor located in the Pump-Pak™ monitors the pressure of the solution as it leaves the Pump-Pak™. This is displayed on the pressure position on the rotary dial with channel 1 selected.

### **AIR COMPRESSOR**

The air compressor turned on whenever the system has at least one section turned on. If all sections are turned off, or the ground speed goes to 0 the compressor is shut off. The compressor is full on or off; there is no variable control of the output pressure. This is adjusted through the air regulator located on the planter. Air pressure is displayed on the pressure position on the rotary dial with channel 2 selected. The air compressor has a replaceable air filter element.

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## 3RIVE 3D™ MANIFOLD ASSEMBLY

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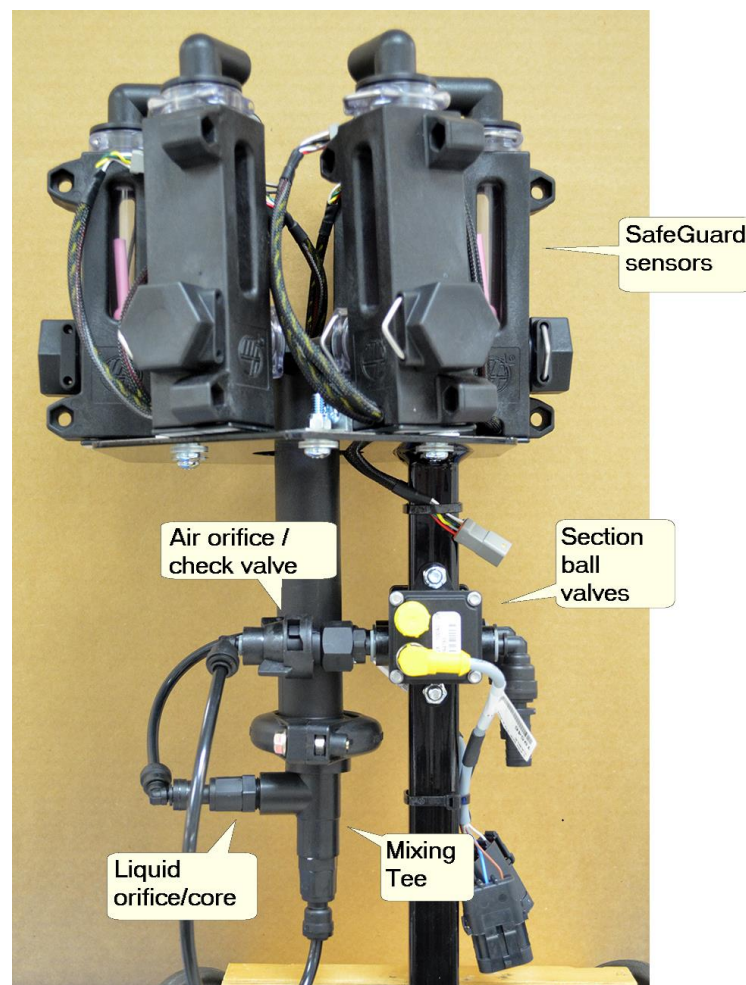
There is one 3RIVE 3D™ manifold assembly per section. The 3RIVE 3D™ manifold assembly generates the foam and distributes it across the individual rows.

It consists of:

- Steel mounting bracket
- SafeGuard™ blockage sensors
- Foam mixing tower
- Air shutoff valve
- Solution shutoff valve

Air enters the mixing tee at the bottom, and the water/product mix enters the side of the mixing tee. Foam is generated inside the tower and is distributed through the SafeGuard™ blockage sensors to the individual rows.

The manifold assembly consists of the bottom mixing tee and upper foam tower. The air is introduced at the bottom of the mixing tee. The chemical solution enters the mixing tee at the side and is sprayed into the airstream. It is easier to remove the mixing tee from the foam tower when cleaning the orifices.



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## ***ROW DELIVERY***

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Foam is delivered to the row via ¼" tubing travelling from the SafeGuard™ blockage sensor. A stainless steel tube is used at the row unit to ensure a uniform bead of foam is applied to each furrow. There is a valve on each row to provide immediate shutoff of foam delivery.



**Row unit seed firmers**

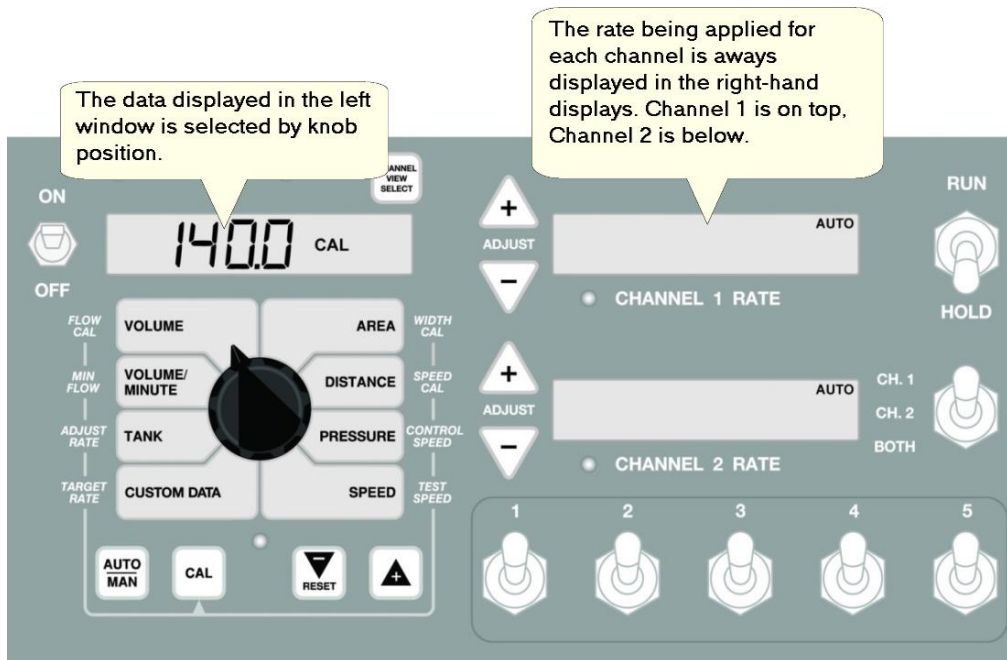


**Foam delivery**

# CONTROL SUMMARY

The following is an overview of the 3RIVE 3D™Dual Plus™ control system. Detailed diagrams and information can be found in the Installation/Service manual. The 3RIVE 3D™controller is a multi-section, dual channel controller. For 3RIVE 3D™application the controller is used in Injection mode. Channel 2 (product) is injected into channel 1 (water). The water is needed to create the expanded foam product formulation. Function selection and display are on the left side of the console.

## DISPLAYS



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## ROTARY DIAL POSITIONS

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Information displayed in the left window corresponds to the knob position

**VOLUME (1) (2) (3) –**

Displays the total volume of product applied in ounces. May be reset.

**VOLUME/MINUTE** – Displays the flow rate from the flowmeter in ounces per minute

**TANK** – Displays ounces of liquid remaining.

**CUSTOM DATA** – Selects data for display based on Special Cal setting – choices are:

Target Rate

Output Drive (STD or PWM)

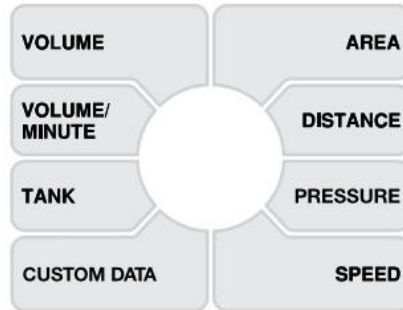
Variable Target Rate

Elapsed Hours

Area per Hour

Total Width

Section Status



**AREA (1) (2) (3) –** Displays the running total of area worked in acres. May be reset.









**DISTANCE** – Displays the running total of distance covered in feet. May be reset.

**PRESSURE** – Display the reading from the pressure sensor.

**SPEED** – Displays ground speed in miles per hour.

## SWITCH FUNCTIONS

### Switch Functions

Console Power Switch	<b>ON</b>  <b>OFF</b>	Switches system between active and standby	<b>RUN</b>  <b>HOLD</b>	Section switches Up=On Down=Off	<b>1</b> 	<b>2</b> 	<b>3</b> 	<b>4</b> 	<b>5</b> 	Channel Select Switch	<b>CH. 1</b> <b>CH. 2</b> <b>BOTH</b>	
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## BUTTON FUNCTIONS

### Button Functions



#### AUTOMATIC/MANUAL

Changes operation from automatic control to manual. (If Manual Control is enabled).



#### CALIBRATION

- Enters & exits calibration mode.
- Selects the Section # in 'Width Cal' position.
- Select the page # in "Special" Calibration.
- Toggles between SPEED CAL and Distance traveled while fine tuning the SPEED CAL factor or between FLOW CAL and Volume when fine tuning the Flow Cal factor.



#### CHANNEL VIEW SELECT

Chooses which channel data is visible in the data window above the rotary dial.



#### INCREASE/DECREASE

- In Volume, Area, or Distance, the "+" button selects the counter set.
- RESET: When in Hold and not in CAL, clears the selected counter set when held for one second.
- When in CAL, the "+" button increases and the "-" button decreases the calibration value displayed.



ADJUST



#### RATE ADJUST

Adjusts the application rate on the individual channels of the controller while in normal operation. The application rate can be adjusted in any position of the rotary dial. (In this manual referred to as Rate Adjust + and Rate Adjust -.)



# OPERATION


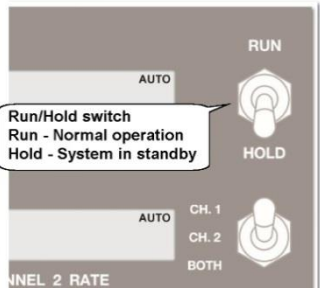
## CHARGE AND RINSE PROCEDURES

### PREPARING FOR OPERATION – CHARGING THE SYSTEM

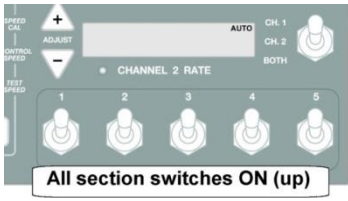
This procedure will get air out of the system, and fill all components with solution or foam making it ready for use. This charge routine will run until one of the following occurs:

- Charge cycle duration timer expires
- The + button is pressed to terminate the routine
- A NO FLOW error persists for greater than 15 seconds after initial flow is established

Placing the system in HOLD pauses the duration timer. The system runs only Channel 1 (water only) until steady water flow is detected before starting the Channel 2 chemical pump. This will prevent flooding the system with 100% chemical before the channel 1 side is primed and pumping.

1.	Make sure adequate formulation is in chemical tank, and fresh clean water is in water tank.	
2.	Open valves on both chemical and water tank.	
3.	Start tractor. This will prevent issues caused by low voltage.	
4.	Lower planter into planting position. This will trip the whisker implement switch to put the system in RUN mode. Planter should be parked on level ground to ensure adequate purging.	
5.	Turn on the 3RIVE 3D™ control console. After a power up sequence it will display a “no speed” indication on the right side displays.	 <p>The image shows the 3RIVE 3D control console. It features a large digital display showing '1400'. To the left of the display is a power switch with 'ON' and 'OFF' positions. Below the switch are buttons for 'FL CAL', 'MIN FLOW', and 'ADJUST RATE'. To the right of the display are buttons for 'VOLUME', 'VOLUME/MINUTE', 'TANK', 'AREA', 'DISTANCE', 'PRESSURE', 'WIDT CAL', 'SPEED CAL', and 'CONT SPEED'. A callout points to the power switch with the text 'Controller power switch'.</p>
6.	Turn on the SafeGuard™ blockage monitor. After a power up sequence it will show <b>ALL BLOCKED</b> .	
7.	Put system in <b>HOLD</b> .	 <p>The image shows the Run/Hold switch and channel selection buttons. The switch has three positions: 'RUN', 'HOLD', and 'AUTO'. A callout points to the switch with the text 'Run/Hold switch Run - Normal operation Hold - System in standby'. Below the switch are buttons for 'CH. 1', 'CH. 2', and 'BOTH'. At the bottom, there is a label 'INEL 2 RATE'.</p>
8.	Turn the knob to <b>SPEED</b> .	



9.	Press and hold the + button located below the knob for 5 seconds. The console will beep for 3 seconds and display CHARGE in the left display window.
10.	Turn all section switches <b>ON</b> . 
11.	Place the system in <b>RUN</b> mode. The air compressor will start and the pumps will begin running.
12.	<p>After a few minutes foam will be seen building in the blockage monitor row units.</p> <p>Foam will <u>not</u> come out of each row unit equally until the system is fully charged with foam. The foam creates back pressure which evens out row-to-row distribution.</p> <p>Foam will typically begin flowing from the two middle sections first, and then foam will develop in the outer sections last.</p> <p>To conserve chemical you can turn individual sections off after all rows in a section are producing good quality foam.</p> <p>If you decide to turn off individual sections, turn all sections back on for a short time after the outer sections are producing quality foam so foam is being generated at each row before exiting the charge routine.</p> <p>In the CHARGE mode the system runs in AUTO mode at a simulated ground speed of 6 mph. This will fill the system with water &amp; chemical solution mixed at the correct ratio based on your programmed rates. Those target rates are displayed on the right side channel displays.</p>
13.	After a steady bead of foam is being generated at each row the blockage monitor should show <b>ALL GOOD</b> .
14.	Switch system to <b>HOLD</b> . SafeGuard™ should show <b>ALL BLOCKED</b> after 2 – 4 seconds.
15.	Press the + button to cancel the CHARGE routine and return to normal operation.

### **END OF DAY – RINSING THE SYSTEM**



It is recommended that the mixed solution of 3RIVE Product and water be rinsed from the system at the end of the day. This rinsing will help prevent plugging of orifices, strainers, and lines. This rinse routine will run until one of the following occurs:

- Rinse cycle duration timer expires
- The - button is pressed to terminate the routine
- A NO FLOW error is detected indicating water tank is empty.

**NOTE:** In rinse mode, with the section switches ON and the system in HOLD, the pumps are turned off but the sections remain ON which allows pressure to bleed off the system. When the system is placed in RUN the rinse mode continues with channel 1 pumping water through the system.

1.	Make sure water tank has adequate clean water, at least 3 gallons.
2.	Switch the Run/Hold switch to HOLD.
3.	Turn the knob to SPEED
4.	Press and hold the - button located below the knob for 5 seconds. The console will beep for 3 seconds and riNSE will be displayed in the left window.
5.	Turn all section switches ON.
6.	<p>Switch the Run/Hold switch to RUN.</p> <ul style="list-style-type: none"> <li>• The air compressor will start</li> <li>• The Channel 1 solution pump will begin pumping water through the system.</li> </ul> <p>The Channel 1 pump will run at the MAX PWM setting during rinse mode. After a section is running clear you can turn it off to increase water flow to the remaining sections.</p>
7.	Run the system in this configuration until each SafeGuard sensor chamber is free of foam and clear water is seen in each sensor chamber.
8.	Place the system in HOLD.
9.	Press the – button to exit the rinse mode
10.	The system is now rinsed of chemical from the solution pump to the row units.


## **END OF SEASON STORAGE/ WINTERIZATION**



The 3RIVE Application System uses water as a carrier component, and the chemical contains ingredients that can cause clogging if allowed to settle out / dry within the system. The entire system **MUST BE THOROUGHLY RINSED AND WINTERIZED** prior to storage.

Perform a RINSE routine of at least 15 minutes duration prior to winterization to ensure the system is clean and free of any chemical residue.

**Note: Even if the system is stored in a heated building, it is imperative that the chemical tank and strainer are cleaned, and a full clean water rinse routine is performed prior to storage. Failure to clean out all chemical residue will cause malfunctions due to sediment and residue.**

1.	Drain the chemical tank and chemical strainer and rinse out residual chemical and debris with clean water making sure tank is empty when complete.   Dispose of all chemical and rinsate/waste water in the proper manner.
2.	Perform a <b>RINSE</b> routine with clean water of at least 15 minutes duration to ensure the system is clean and free of any chemical residue.
3.	Pour 1 gallon of RV antifreeze in the chemical tank and 3 gallons in the water tank.
4.	Run a <b>CHARGE</b> routine, followed by another <b>RINSE</b> routine. This will fill both chemical and water sides of the system with RV antifreeze. Run the RINSE routine until RV antifreeze is seen in the SafeGuard chambers and is running out of the row units.
5.	The system is now ready for storage.

## **COLD EVENING PROCEDURE**



**Important!** The 3RIVE Application System uses water as a carrier component which freezes at 32 degrees F. The Capture 3RIVE component is safe to temperature of 27 degrees F. To avoid damage caused from freezing the system should be parked indoors or the procedure below should be implemented if night time temps are expected to be below freezing.

Follow procedure for **End of Day Rinsing** with the following changes. Prior to starting rinsing procedure:

Drain all water from clean water tank. Add 2 gallons of RV antifreeze to the clean water tank. Run RINSE routine until tank is empty (routine will stop when tank is empty). RV antifreeze should be seen in all SafeGuard sensor chambers.

**NOTE:** Windshield washer fluid with a suitable below freezing rating can be used in lieu of RV antifreeze.

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## ***DEPRESSURIZING THE SYSTEM***

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During maintenance or troubleshooting, it may be necessary to disconnect solution or air lines in the system. To depressurize the system:

1. Turn the knob to SPEED.
2. Place the system in HOLD.
3. Turn at least one section switch ON.
4. Press the – button to enter the RINSE mode.

In rinse mode, with the section switches ON and the system in HOLD section valves are turned on allowing pressure to bleed off the system.

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## ***AUTOMATIC OPERATION***

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This mode sets and maintains a steady application rate - unaffected by changes in speed or section switching.

1. Select a Channel using the Channel View Select button.
2. Press the AUTO/MAN button to select Automatic mode ("AUTO" icon will be displayed).
3. Switch on the desired number of boom sections.
4. Switch the RUN/HOLD switch to RUN.
5. Drive vehicle. (Speed signal will activate system.)
6. Use the Section switches, the RUN/HOLD switch or remote RUN/HOLD sensor to Start or Stop application at any time.

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## ***ON-THE-GO RATE ADJUSTMENTS***

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To adjust the application rate, press the Rate Adjust buttons. The increment of this change is set in the ADJUST RATE position in Calibration. For example, if the calibrated TARGET RATE = 20.0 GPA and ADJUST RATE = 1.0 GPA, pressing ADJUST RATE once will increase the target rate from 20.0 to 21.0. The display will momentarily show the new TARGET (21.0) for two seconds before it resumes showing the ACTUAL application rate. The "adjusted" target rate is maintained until console power is turned off or Calibration mode is entered.

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## ***MANUAL OPERATION***

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This mode sets and maintains a steady flow rate (ounces per minute) **not** affected by changes in vehicle speed. The overall application rate will vary depending on speed (slow vehicle speed = increased application rate, fast speed = lower application rate.) Manual mode is most useful for system set up, spot applications, etc.

- Select a Channel using the Channel View Select button.
- Press the AUTO/MAN button to select Manual mode ("MAN" icon will be displayed).
- Adjust the flow rate by using the Rate Adjust buttons located next to controller channel rate windows. The longer the buttons are held, the faster the valve will move to allow both rapid movement and fine adjustments.

**Note:** Manual control can be disabled by changing the MANUAL ENABLE setting in Special Calibrate.

# PERIODIC MAINTENANCE

## CHEMICAL PUMP ASSEMBLY


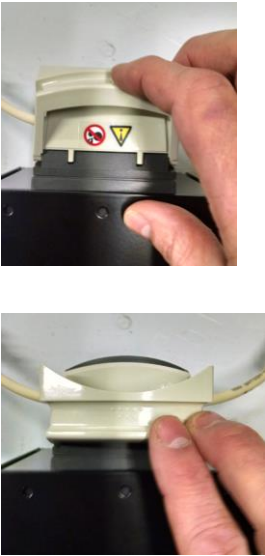
**The metering tube should be changed before each season** to ensure the highest level of accuracy. A worn tube will begin to under-apply as the tube walls become less resilient.

### METERING TUBE

You will not have to change tubing size unless you're significantly changing your application rate from the initial setup. The chemical pump uses a metering tube for precise metering of the chemical. There are three tubes available. Selection is based on ounces per minute required by the system. Each tube size has its own calibration value that's entered into channel 2 flow cal. This calibration value represents pulses per ounce measurement.

P/N	Description	Cal value
16025 A	4.2 METERING TUBE	1301
19893	3.2 METERING TUBE	2944
19894	2.4 METERING TUBE	5071
19385	1.6 METERING TUBE	10963

### CHANGING METERING TUBE

1.	Disconnect the tube from the input and output tubes at the push-to-connect fittings.	 When working on system with active product follow all chemical handling rules and safety procedures! The solution released in this step contains active chemical. Dispose of released solution in an appropriate manner.
2.	Pull down on the front of the pump head to open the tubing jaws.	




## Meter Tube

	Chem Rate	Planter Width in Feet									
		30	40	50	60	70	80	90	100	110	120
4 MPH	4	1.0	1.3	1.6	1.9	2.3	2.6	2.9	3.2	3.6	3.9
	6	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8
	8	1.9	2.6	3.2	3.9	4.5	5.2	5.8	6.5	7.1	7.8
	10	2.4	3.2	4.0	4.8	5.7	6.5	7.3	8.1	8.9	9.7
	12	2.9	3.9	4.8	5.8	6.8	7.8	8.7	9.7	10.7	11.6
	14	3.4	4.5	5.7	6.8	7.9	9.1	10.2	11.3	12.4	13.6
	16	3.9	5.2	6.5	7.8	9.1	10.3	11.6	12.9	14.2	15.5
5 MPH	4	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8
	6	1.8	2.4	3.0	3.6	4.2	4.8	5.5	6.1	6.7	7.3
	8	2.4	3.2	4.0	4.8	5.7	6.5	7.3	8.1	8.9	9.7
	10	3.0	4.0	5.1	6.1	7.1	8.1	9.1	10.1	11.1	12.1
	12	3.6	4.8	6.1	7.3	8.5	9.7	10.9	12.1	13.3	14.5
	14	4.2	5.7	7.1	8.5	9.9	11.3	12.7	14.1	15.6	17.0
	16	4.8	6.5	8.1	9.7	11.3	12.9	14.5	16.2	17.8	19.4
6 MPH	4	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8
	6	2.2	2.9	3.6	4.4	5.1	5.8	6.5	7.3	8.0	8.7
	8	2.9	3.9	4.8	5.8	6.8	7.8	8.7	9.7	10.7	11.6
	10	3.6	4.8	6.1	7.3	8.5	9.7	10.9	12.1	13.3	14.5
	12	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0	17.5
	14	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0	18.7	20.4
	16	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	21.3	23.3
8 MPH	4	1.9	2.6	3.2	3.9	4.5	5.2	5.8	6.5	7.1	7.8
	6	2.9	3.9	4.8	5.8	6.8	7.8	8.7	9.7	10.7	11.6
	8	3.9	5.2	6.5	7.8	9.1	10.3	11.6	12.9	14.2	15.5
	10	4.8	6.5	8.1	9.7	11.3	12.9	14.5	16.2	17.8	19.4
	12	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	21.3	23.3
	14	6.8	9.1	11.3	13.6	15.8	18.1	20.4	22.6	24.9	27.2
	16	7.8	10.3	12.9	15.5	18.1	20.7	23.3	25.9	28.4	31.0
10 MPH	4	2.4	3.2	4.0	4.8	5.7	6.5	7.3	8.1	8.9	9.7
	6	3.6	4.8	6.1	7.3	8.5	9.7	10.9	12.1	13.3	14.5
	8	4.8	6.5	8.1	9.7	11.3	12.9	14.5	16.2	17.8	19.4
	10	6.1	8.1	10.1	12.1	14.1	16.2	18.2	20.2	22.2	24.2
	12	7.3	9.7	12.1	14.5	17.0	19.4	21.8	24.2	26.7	29.1
	14	8.5	11.3	14.1	17.0	19.8	22.6	25.5	28.3	31.1	33.9
	16	9.7	12.9	16.2	19.4	22.6	25.9	29.1	32.3	35.6	38.8
12 MPH	4	2.9	3.9	4.8	5.8	6.8	7.8	8.7	9.7	10.7	11.6
	6	4.4	5.8	7.3	8.7	10.2	11.6	13.1	14.5	16.0	17.5
	8	5.8	7.8	9.7	11.6	13.6	15.5	17.5	19.4	21.3	23.3
	10	7.3	9.7	12.1	14.5	17.0	19.4	21.8	24.2	26.7	29.1
	12	8.7	11.6	14.5	17.5	20.4	23.3	26.2	29.1	32.0	34.9
	14	10.2	13.6	17.0	20.4	23.8	27.2	30.5	33.9	37.3	40.7
	16	11.6	15.5	19.4	23.3	27.2	31.0	34.9	38.8	42.7	46.5

2.4 mm Tube

3.2 mm Tube

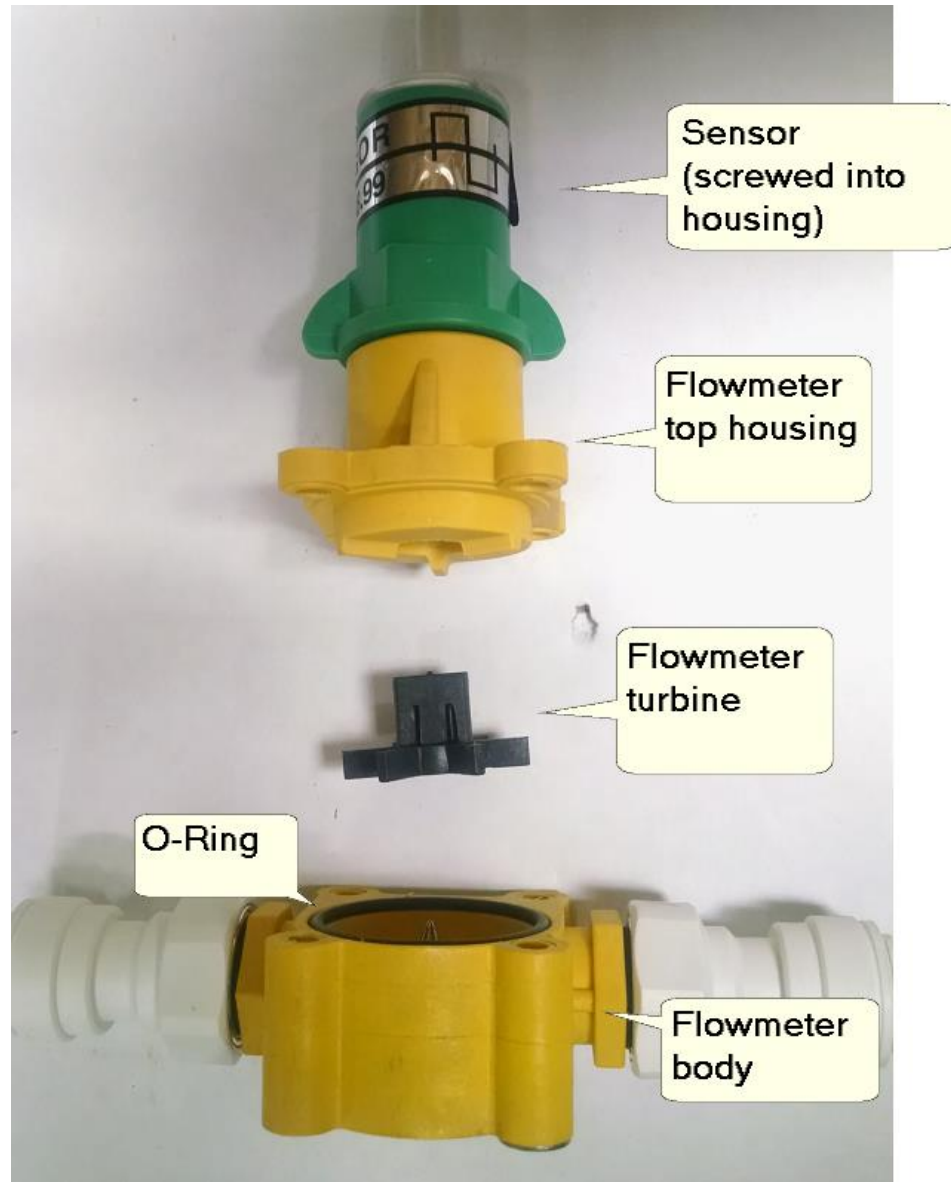
4.8 mm Tube

3.	Lift up on tube to remove from pump jaws.	
4.	Lay the replacement tube into the jaws of the pump. The tube should be approximately centered on roller.	
5.	Gently close the jaws making sure the tube is centered in the V notch of the jaw cover.	

---

## ***CLEANING FLOWMETER***

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1. Remove four nuts, screws and washers holding the top housing on the flowmeter body.
2. Remove the top housing from the flowmeter body.
3. Remove the turbine.
4. Clean any dirt or debris from the turbine, Turbine support pin , and flowmeter housing
5. Reinstall turbine on top of support pin.
6. Reinstall top housing making sure O-ring is correctly placed in groove on flowmeter body
7. Reinstall four nuts, screws and washers.
8. The flow sensor should be screwed completely into the top housing, finger tight.



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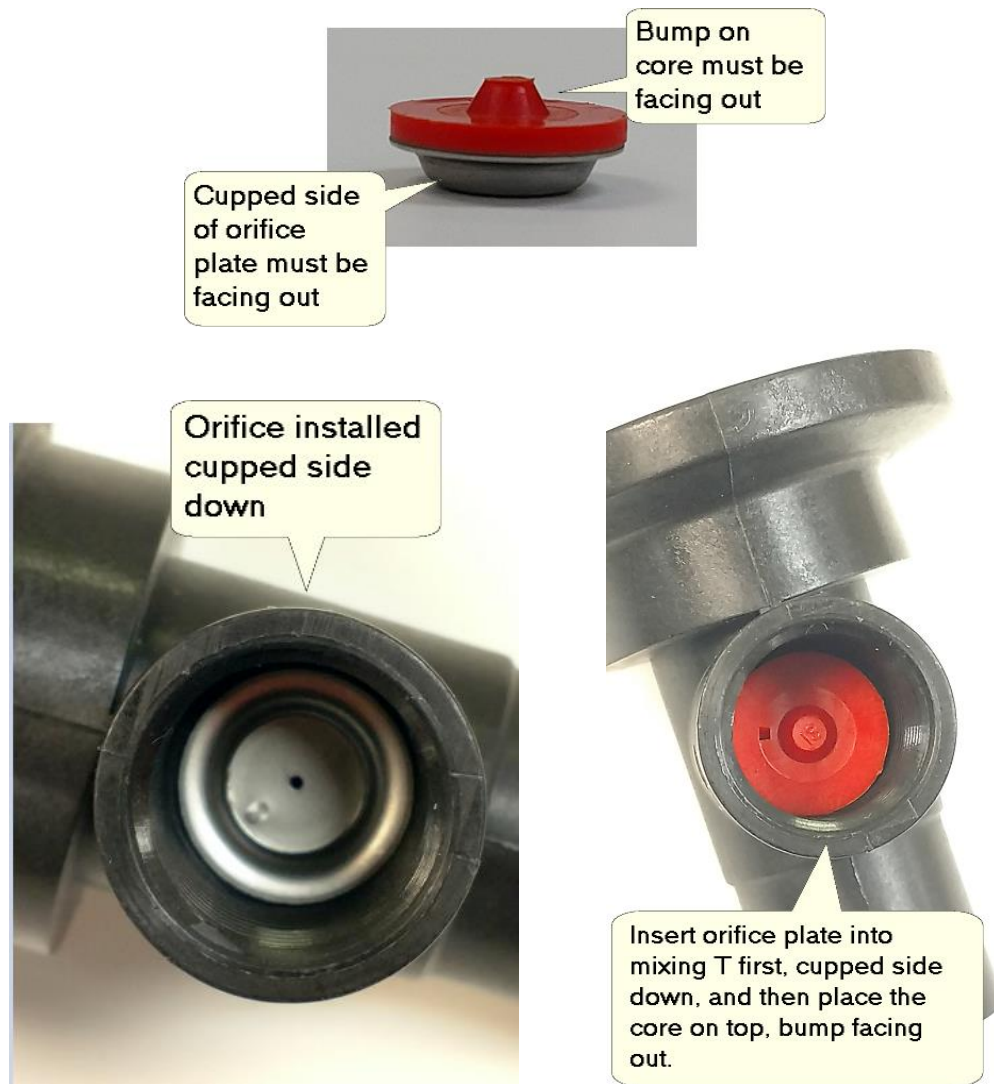
## MANIFOLD ASSEMBLY

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### LIQUID INLET

The water/chemical solution enters the manifold at the side of the mixing tee. The spray pattern of the liquid is controlled by a Tee Jet spray tip core and stainless steel orifice disc.

When cleaning, remove both the core and orifice plate and make sure they are free of chemical residue. Ensure the nylon core is not distorted and the holes in both the core and orifice plates are clear. Make sure they are oriented properly when reinstalling as shown below.



Solution Orifice												
Speed	40				48				50			
	40 Ounce/Acre Solution				48 Ounce/Acre Solution				50 Ounce/Acre Solution			
	Section Width in Inches				Section Width in Inches				Section Width in Inches			
	90	120	150	180	90	120	150	180	90	120	150	180
3.0	1.82	2.42	3.03	3.64	2.18	2.91	3.64	4.36	2.27	3.03	3.79	4.55
4.0	2.42	3.23	4.04	4.85	2.91	3.88	4.85	5.82	3.03	4.04	5.05	6.06
5.0	3.03	4.04	5.05	6.06	3.64	4.85	6.06	7.27	3.79	5.05	6.31	7.58
5.5	3.33	4.44	5.56	6.67	4.00	5.33	6.67	8.00	4.17	5.56	6.94	8.33
6.0	3.64	4.85	6.06	7.27	4.36	5.82	7.27	8.73	4.55	6.06	7.58	9.09
6.5	3.94	5.25	6.57	7.88	4.73	6.30	7.88	9.45	4.92	6.57	8.21	9.85
7.0	4.24	5.66	7.07	8.48	5.09	6.79	8.48	10.18	5.30	7.07	8.84	10.61
7.5	4.55	6.06	7.58	9.09	5.45	7.27	9.09	10.91	5.68	7.58	9.47	11.36
8.0	4.85	6.46	8.08	9.70	5.82	7.76	9.70	11.64	6.06	8.08	10.10	12.12
9.0	5.45	7.27	9.09	10.91	6.55	8.73	10.91	13.09	6.82	9.09	11.36	13.64
10.0	6.06	8.08	10.10	12.12	7.27	9.70	12.12	14.55	7.58	10.10	12.63	15.15
11.0	6.67	8.89	11.11	13.33	8.00	10.67	13.33	16.00	8.33	11.11	13.89	16.67
12.0	7.27	9.70	12.12	14.55	8.73	11.64	14.55	17.45	9.09	12.12	15.15	18.18

D1

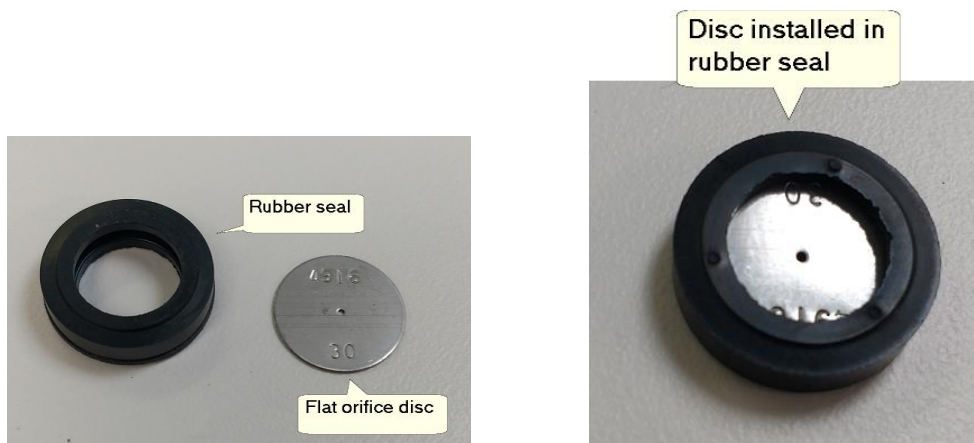
D2

D4

Air Orifice	
Chem Rate	Air Orifice
4	25
6	25
8	30
10	30
12	30
14	30
16	35

## **AIR INLET**

The air enters the manifold at the bottom of the mixing tee. The volume and velocity of the air is controlled by a Tee Jet flat orifice plate. The orifice plate is installed in an EPDM rubber seal as shown below.



The air inlet also has a check valve which prevents liquid from filling the air line when the system is off. Put the disc with seal into the mixing tee first, with the check valve installed last.

Ensure the orifice plate hole is clear, and the check valve is free of sediment.

## **SECTION VALVES**

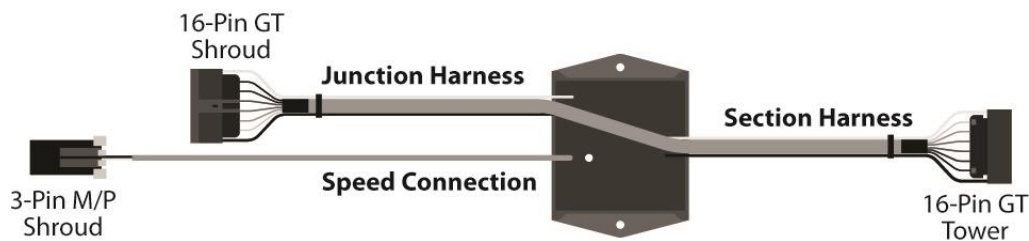
The manifold assembly uses 1/4" ball valves to turn the section on or off. These are three wire ball valves.

**Pin A** – constant 12 VDC – always present.

**Pin B** – ground

**Pin C** – switched 12 VDC – when present the valve opens. When removed the valve closes.

## **SECTION RELAY MODULE**



This module controls the supply of electricity to the 3RIVE 3D system preventing battery drain when not in use. When vehicle voltage is present at the accessory power line at the Speed Connection, a relay turns on main power to the system - and vice versa.

A green LED on the potted enclosure will light when power is turned on.

**Note:** if the Speed input on the ISOmod harness is in use, install a "Y" cable - available from Micro-Trak, PN 18048.

# TROUBLESHOOTING

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This troubleshooting guide covers common error messages that may be seen on the 3RIVE 3D™ system. The full troubleshooting data is in the Installation/Service manual.

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## PUMPS NOT RUNNING

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Check LEDs on Electric Motor Driver modules connected to the pump motors.

### Power LED (Green):

LED on steady     Unit turned on and operating normally

1 Flash/pause     Unit in HOLD.

After 5 consecutive minutes in HOLD position, the Power LED will automatically turn off & stay off until module is in RUN again.

When troubleshooting, if Power LED is not on, check supply voltage at main power input connection to module.

**Status LED (RED):** flashing code repeats every 4 sec. - cycle controller power to clear fault code

2 Flashes/pause     Output short circuit detected. Check connections.

3 Flashes/pause     Over-current condition. Check total load.

4 Flashes/pause     Input power fault. Check input voltage and/or power wiring.

5 Flashes/pause     PWM control input frequency out of range. Check settings.

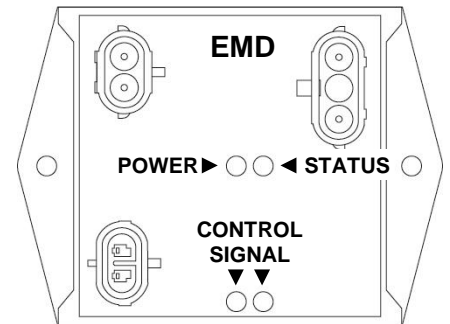
6 Flashes/pause     Internal processor fault.

7 Flashes/pause     Thermal shutdown fault. Unit is overheated.

### Control Signal LEDs:

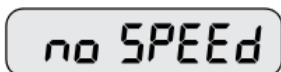
**Green:** On when control signal is present and increasing

**Red:** On when control signal is present and decreasing.



## NO SPEED

---



A NO SPEED message indicates there's no feedback from the speed sensor. This is normal when in auto mode, and the vehicle is not moving. If the vehicle is moving and there's a NO SPEED indication check the following:

### ASTRO GPS SPEED SENSOR

The Astro GPS has a module near the connector. This module has two red indicators.

- Both indicators off
  - Verify there's 12 volts DC at the harness connection between pins C (ground) and B (power).
  - If power is present, replace GPS sensor
- One indicator on steady, the other is off
  - Replace GPS sensor
- One indicator on steady, the other is flashing
  - GPS trying to acquire signal. Make sure GPS sensor has clear view of sky (i.e. not in building). If flashing does not stop after two minutes replace GPS sensor

The Astro GPS sensor is repairable. Return to Micro-Trak for a repair evaluation.

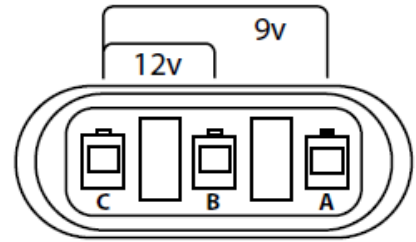
Checking for possible harness or connectivity problem:

Pin A – Signal

Pin B – Power

Pin C – Ground

- Check for 9 volts DC between pins A and C. Pin A is the signal input to the console.
- Check for 12 volts DC between pins B and C. Pin B is the power to the sensor.
- Turn the knob to SPEED. Tapping between pins A and C simulates pulses coming from the sensor. You should get an erratic reading on the console if it is receiving these pulses.



If voltage and tap test are good, this usually indicates a bad sensor.

---

## ***No FLOW***

---

A digital display with a black background and white text. The text reads "no FLO" in a stylized, blocky font.

A NO FLOW message indicates there's no flow reading from the flowmeter when liquid flow is expected.

### **TESTING CHANNEL 1 FLOWMETER SENSOR**

Unscrew flow sensor from flowmeter body. With console turned on, place sensor flat against metal plate. A red LED should illuminate beneath the clear top cover.

Does the red LED turn on when placed against metal plate?

Yes – Move the sensor away from the metal plate. The LED should turn off.

If this checks good, proceed to pulse test.

Pulse test

Place sensor flat against metal bracket. Red LED should turn on.

Move sensor away from plate. LED should turn off. Repeat this several times rapidly (simulating pulses from flowmeter). This should produce an erratic reading under channel 1 volume per minute display.

If this produces erratic reading on console, the sensor and cabling to the controller are good. Disassemble and clean flowmeter. If it does not, proceed with tap test as outlined below in *possible harness or connectivity problem procedure*.

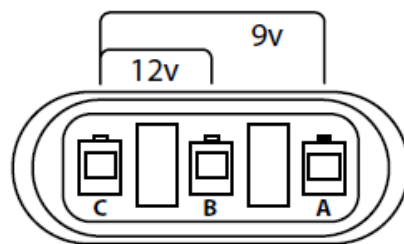
Checking for possible harness or connectivity problem:

Pin A – Signal

Pin B – Power

Pin C – Ground

- Check for 9 volts DC between pins A and C. Pin A is the signal input to the console.
- Check for 12 volts DC between pins B and C. Pin B is the power to the sensor.
- Turn the knob to VOLUME/MINUTE. Tapping between pins A and C simulates pulses coming from the sensor. You should get an erratic reading on the console if it is receiving these pulses.



If voltage and tap test are good, this indicates a bad sensor.

### **TESTING CHANNEL 2 FLOW SENSOR**

Channel 2 uses feedback from an internal encoder on the chemical pump. Perform connection and tap test as outlined above in *possible harness or connectivity problem* procedure. If tap test and voltages check ok, return pump assembly for repair.

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## **3RIVE 3D™ PRODUCT DELIVERY**

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When testing system with active product follow all chemical handling rules and safety procedures! The solution released in this step contains active chemical. Dispose of released solution in an appropriate manner.

### **NO FOAM – SINGLE ROWS**

Put the system in CHARGE mode. Cycle the system from HOLD to RUN.

Can you hear row shutoff valve operating?

Yes – Place the system in HOLD and remove liquid tube from output of row shutoff valve.

Place the system in RUN. Does liquid flow from row shutoff valve output?

Yes – check for plugged or kinked row unit tubing

No – Verify liquid is present at row valve input.

No – If 12 VDC is present on pins A & C at connector when the system is in RUN, replace valve. If 12 VDC is not present, troubleshoot wiring.

Pin A – constant 12 VDC (needed to close valve. Always present)

Pin B – ground

Pin C – switched 12 VDC (12 volts present opens valve)

### **NO FOAM – ENTIRE SINGLE SECTION**

Is liquid bubbling up in the section manifold SafeGuard™ sensor tubes?

Yes – Is there air pressure present at the tube going into the section air shutoff valve?

Yes – Verify manifold air inlet screen and orifice are clean. Verify fittings on manifold are not leaking

No – Troubleshoot kinked or leaking air tube.

No – Verify operation of section liquid shutoff valve. Place the system in CHARGE mode, Cycle the system between HOLD and RUN mode. Can you hear the valve operating?

Yes – Place the system in HOLD. Remove liquid tube from output of section shutoff valve. Place the system in RUN. Does liquid flow from shutoff valve output?

Yes – Verify section manifold liquid inlet orifices are clean. Check for plugged or kinked tubing

No - Troubleshoot liquid supply line for kinks or leaks.

No – If 12 VDC is present on pins A & C at connector when the system is in RUN, replace valve. If 12 VDC is not present, troubleshoot wiring.

Pin A – constant 12 VDC (needed to close valve. Always present)

Pin B – ground

Pin C – switched 12 VDC (12 volts present opens valve)

### **NO FOAM – ENTIRE PLANTER**

Is there liquid bubbling up in the section blockage sensor tubes?

Yes – Is there air pressure at the air regulator?

Yes – Verify section air shutoff valves are operating. If not, troubleshoot wiring.

No – Is the air compressor running?

Yes – Check for kinked or disconnected air line between compressor and air regulator manifold.

Verify air is being supplied by compressor.

Verify air compressor relief shutoff valve is not stuck on. This will vent compressor output to outside system.

No – Verify LED is lit on relay module indicating “ON” condition. Check for power at output of relay module. If green LED on relay module is lit and there’s no 12 VDC at output, check fuse at battery connection.

No – Verify tank shutoff valves are open. Verify both pumps are running. Check channel 1 pressure. If pressure is building very high (> 60 psi) check section liquid shutoff valves for proper operation.



## COMPLETE ERROR MESSAGE LIST

<b>bad</b> <small>CAL</small>	Indicates a corrupt calibration value. Can only be cleared by entering Calibration or Special Calibration modes, checking and/or changing settings and exiting to save.
<b>CLEAR</b>	The message alerts the user that the currently selected counter will be cleared if the reset button is held for 2 seconds. Also serves as a reminder to use "+" button to select counters.
<b>Error</b>	Error message displayed if Open Loop is selected when Flow @ Max. PW = 0. Also shown in Open Loop and Override if Flow @ Max. PW < Flow @ Min. PW
<b>FILL</b>	Tank level is below 'Tank Alarm Setting'.
<b>h iPSI</b>	High Pressure warning message. The input pressure exceeds the specified High Pressure Limit.
<b>HoId</b>	Visible in channel rate window. Channel is ON and Run/Hold switch is set to Hold.
<b>LoP</b>	Low Power. Check all power and ground connections.
<b>LoPSI</b>	Low Pressure warning message. The input pressure is less than the specified Low Pressure Limit.
<b>no FLO</b>	(Alternating no/Flo) Flow Signal not detected. Check flowmeter and verify there is liquid flow and the tank is not empty. After 15 seconds, system will disable (Emergency Stop).
<b>no PSI</b>	In Pressure Control mode - no pressure detected at sensor. After 15 seconds, system will disable (Emergency Stop).
<b>no SPEED</b>	(Alternating no/Speed) Speed Signal not detected - visible in RATE position.
<b>OFF</b>	Visible in channel rate window. Channel is OFF.
<b>OPEn</b>	In Pressure Control mode - no pressure sensor detected (circuit is "open").
<b>PHoLd</b>	Prescription Hold - GPS/Mapping controller is sending '0' rate command.
<b>PULSE</b>	System configured for Pulse Width Modulation 12V drive mode. Message is shown during start-up screens.
<b>rHoLd</b>	Remote Run/Hold is connected and set to "Hold".
<b>SPEC</b>	Special Calibration Mode is active.
<b>Std</b>	System configured for Standard 12V drive mode. Message is shown during start-up screens.
<b>V CAL</b>	The Live Calibration mode (PWM Only) is active.
<b>3WAY</b>	(3 WAY) The system is configured for three-way valves. Message is shown during start-up screens.
<b>99999</b>	Counters (DISTANCE or AREA or VOLUME) have reached their maximum. RESET to clear counters and resume counting.
<b>-----</b>	Indicates an unused Special Calibrate or Live Calibrate position.

### Indicator LED

Lit when console is in Calibration or Special Calibration mode.

### Rate Warning LEDs

Channel Rate Warning LEDs flash when the Rate error is over 10%, Volume/Minute is below the Minimum, Tank level is at less than Tank Set Point, or Pressure readings are over/under set alarm limits.

### Audible Alarm

Alarm will sound 3X if Alarm Enable is ON and the Tank Level is below minimum, Application Rate error rate is greater than 10%, or if Pressure is too low or too high for prescribed limits.



# CALIBRATION

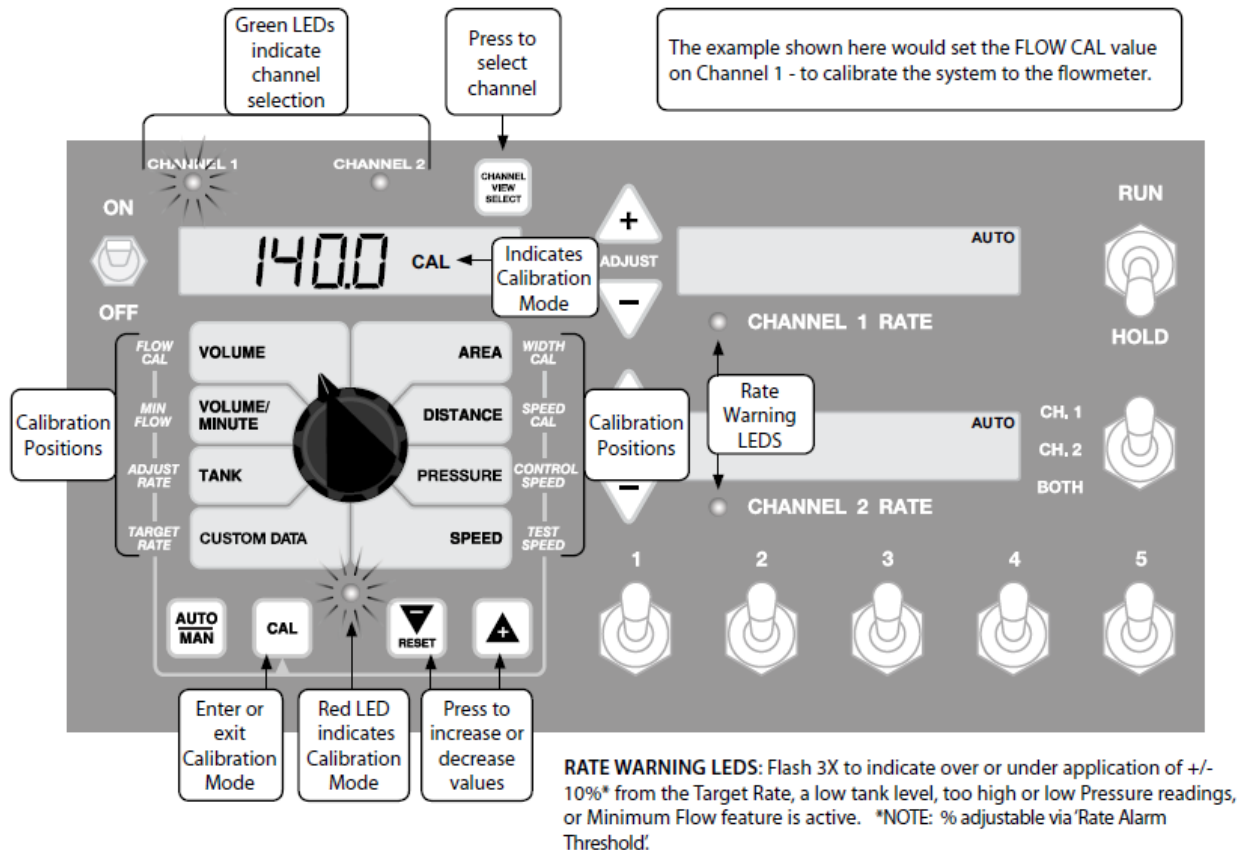
## VERIFYING / CHANGING CALIBRATION SETTINGS

The controller is programmed for optimal performance with the 3RIVE 3D™ system from the factory. If it is necessary to verify or adjust settings under the advice of a technician follow these steps.

### CALIBRATION STEPS:

1. Stop the vehicle, if moving.
2. Switch console to HOLD.
3. Press and hold the CAL button about 1 second until the 'CAL' icon appears on screen and Red LED light is on.
4. Select calibration position on rotary selector (see explanations of each position starting on page 20).
5. Select channel with Channel View Select. In Speed Cal and Test Speed positions, any changes apply to both channels and both channel LEDs will remain lit.
6. Adjust values using Increase/Decrease buttons.
7. To exit Calibration without saving changes - turn console OFF.
8. To save changes and exit Calibration - press and hold the CAL button for 1 second - 'CAL' icon on screen will turn off and red LED light will turn off.

NOTE: If console is locked, Calibration values can be viewed but not adjusted. Test Speed position is always active.



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## **STANDARD CALIBRATION SETTINGS**

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### ***Flow Cal***

This position calibrates the system to the flowmeter factory setting. The flowmeter is calibrated with water at the factory and assigned a “Liquid Cal” number. Adjust to this number - printed on the plastic tag attached to the flowmeter. This number represents pulses per ounce of liquid. To fine tune the calibration value for the flowmeter, perform the procedure Appendix D – Fine Tuning Flow Meter Calibration.

### ***Min Flow***

This setting controls total minimum gallons per minute flow. The min. flow setting is adjusted dynamically, *proportional* to the number of active sections. Example: if min. flow is set to 2 GPM and half the sections are turned off, the flow will be 1 GPM.

### ***Adjust Rate***

Adjust the value for the desired amount of change to be used for making on-the-go rate adjustments. When operating in AUTO control, pressing Rate Adjust buttons will change the TARGET RATE by the amount entered for ADJUST RATE. This allows the operator to make incremental changes to the TARGET RATE. To disable this feature, simply enter a value of zero.

### ***Target Rate***

Adjust the value for the desired target application rate in ounces per acre (milliliters per hectare). This is the application rate that the console will lock onto when operating in AUTO.

### ***Width Cal***

Adjust the effective working width, in inches (meters) for each section. Channel 1 has 5 to 7 sections depending on model, Channel 2 has 1 section. With the 3RIVE 3D™ system Channel 2 uses Channel 1 widths. Enter a value of “0” (.000) for any unused sections. To adjust WIDTH CAL, quickly press and release the CAL key until the desired Section Number is on, then adjust the value.

### ***Speed Cal***

This calibrates the system to the speed sensor. This value represents pulses per inch (pulses per centimeter). To fine tune your existing calibration, or to determine a new calibration value perform the procedure Appendix C – Fine Tuning Speed/Distance Calibration Value.

### ***Control Speed***

This position adjusts valve response time to fine-tune the system. Example: increase Control Speed if the system is responding slowly to rate changes because of slow-moving valves. The range is -12 to 3. **NOTE: Exercise caution when increasing the valve response speed - the system may become unstable with higher control speed numbers entered.**

### ***Test Speed***

TEST SPEED is not a CALIBRATION setting. It internally simulates a speed signal to test the system without the vehicle moving. It allows you to test a spraying application with water to make certain that all of the equipment is operating properly while remaining stationary. Test speed is cancelled by exiting CAL. Test speed will not accumulate Distance/Area measurements and can be used if the console is locked.

---

## **DETERMINING CHANNEL 1 AND 2 TARGET RATES**

---

3RIVE 3D™ is applied in ounces per acre. The product is injected into water which is necessary to facilitate the generation of foam.

- Channel 1 controls the ounces of water per acre being used as the carrier. Channel 1 supplements the chemical to bring the total combined flow rate to the value calculated below..
- Channel 2 controls the ounces of chemical being applied per acre.
- Minimum combined volume of chemical and water is 40 ounces per acre.
- It is recommended that the ratio of WATER to 3RIVE product be maintained at 4 to 1 whenever possible.

Determining Channel 1 Rate: 3RIVE 3D™ Rate x 5 or 40 ounces per acre **whichever is greater**.

Examples

1. # 1: If 3RIVE 3D™ Product rate is 4-8 ounces per acre Channel 1 Rate (total volume) should be 40 ounces per acre.
2. # 2: If 3RIVE 3D™ Product rate is 10 ounces per acre Channel 1 Rate should be 50 ounces per acre.
3. # 3: If 3RIVE 3D™ Product rate is 12 ounces per acre Channel 1 Rate should be 60 ounces per acre.
4. # 4: If 3RIVE 3D™ Product rate is 16 ounces per acre Channel 1 Rate should be 80 ounces per acre.

### **CHANNEL 1 TARGET RATE**

Channel 1 measures the combined water/chemical solution prior to it being turned into foam. It injects water into the chemical stream to bring the total volume up to the desired level.

3RIVE 3D™ target (oz. per acre) \_\_\_\_\_ X 5 = \_\_\_\_\_ Channel 1 Target Rate (40 minimum setting)

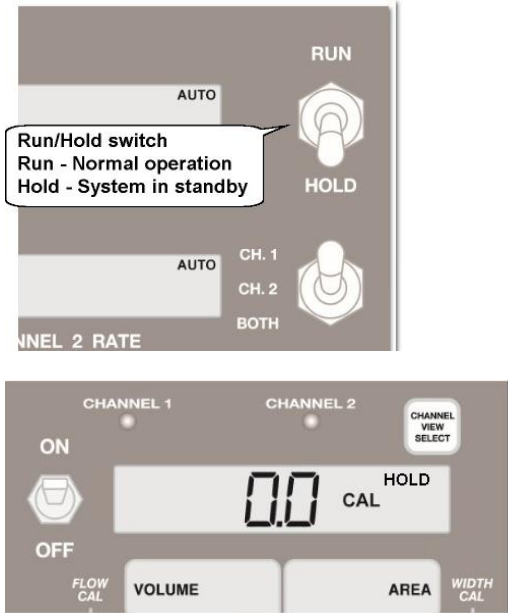
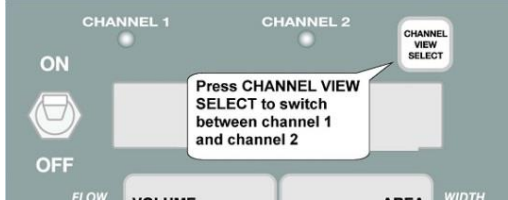
### **CHANNEL 2 TARGET RATE**

Channel Target Rate = \_\_\_\_\_ 3RIVE 3D™ ounces per acre

These rates can be adjusted to improve foam protection band delivery. Increasing the water rate can help make up for poor foam quality due to hard water, but **NEVER** exceed water to 3RIVE 3D™ ratio of 10 to 1.

Example: If satisfactory foam delivery is not achievable with CH2 rate of 4 ounces per acre and a CH1 Rate of 44 ounces per acre higher quality water or an increase in 3RIVE 3D™ product will be needed.

## ENTERING TARGET RATES INTO CONTROLLER

<p>1. Place the console in HOLD The left display will display CAL and HOLD.</p>	 <p>The diagram shows two parts of the controller. The top part is a close-up of the Run/Hold switch, which is a rotary knob with 'RUN' and 'HOLD' positions. A callout box explains: 'Run/Hold switch Run - Normal operation Hold - System in standby'. Below this is the 'CHANNEL 2 RATE' display, which shows '0.0' and 'CAL'. The bottom part of the diagram shows the main control panel with 'CHANNEL 1' and 'CHANNEL 2' indicators, a 'CHANNEL VIEW SELECT' button, and various function buttons like 'ON', 'OFF', 'FLOW CAL', 'VOLUME', 'AREA', and 'WIDTH CAL'.</p>
<p>2. Press the CHANNEL VIEW SELECT button to select the desired controller channel as shown by the channel 1 and channel 2 indicators.</p>	 <p>This diagram shows the main control panel with a callout box pointing to the 'CHANNEL VIEW SELECT' button. The callout says: 'Press CHANNEL VIEW SELECT to switch between channel 1 and channel 2'. The 'CHANNEL 1' and 'CHANNEL 2' indicators are shown as small circles.</p>
<p>3. Rotate the knob to the lower left TARGET RATE position.</p>	
<p>4. Enter your desired rate, in ounces per acre using the + or – buttons located below the knob / left display area. Press the CHANNEL VIEW SELECT button to switch between channel 1 and 2.</p> <p><b>Channel 2 chemical</b> – desired ounces per acre of chemical</p> <p><b>Channel 1 water</b> – ounces per acre of chemical X 5, or 40 whichever is greater.</p>	
<p>5. Press and hold the CAL button until the CAL indicator on the left screen goes out. Your settings are now saved and you are back to normal operating mode.</p>	

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## ***SPECIAL CALIBRATION***

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Special Calibration mode accesses important system parameters and settings. It is important to remember to select the appropriate channel you wish to adjust - some parameters affect both channels.

The UNITS position must be set before changing any other Calibration or Special Calibration settings.

These settings enable or disable other setting options to adjust applicable parameters:

- **UNITS:** determines which unit of measurement is used. For 3RIVE 3D™ use gallons/acre.
- **MATERIAL:** choice of H<sub>2</sub>O or NH<sub>3</sub>. For 3RIVE 3D™ select H<sub>2</sub>O.
- **OUTPUT TYPE** - PWM or STD: defines electronic drive signal for the control valve. For 3RIVE 3D™ select PWM.
- **MULTIFUNCTION A or B:** defines MULTIFUNCTION output configurations

Special Calibration settings are accessed by selecting the row position with the main rotary knob and then pressing the CAL button to access Pages. Numbers displayed on the screen indicate which Page is active. Pressing the AUTO/MAN button once displays an abbreviated parameter title. Pressing and holding the AUTO/MAN button for 3 seconds enables Supervisor Lockout.



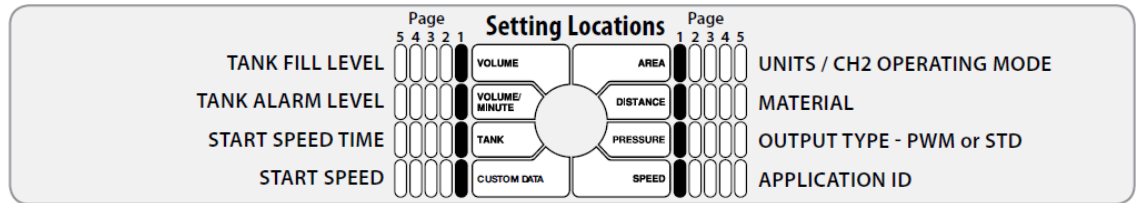
Note: Changing UNITS loads default calibration values and resets all counters to 0.

### **CHANGING/VIEWING SPECIAL CALIBRATION SETTINGS**

1. Turn ON console while pressing the CAL button - screen will display "SPEC", then 'CAL' and number 1 (Page 1).
2. Select the Channel to be calibrated. (Some Special Calibration parameters affect both channels - see description.)
3. Select a Special Calibration position using rotary knob. (See explanations of settings starting below)
4. Adjust Page 1 value or press the CAL button to access Pages 2-5.
5. Adjust value using Increase/Decrease buttons.
6. To exit Special Calibration without saving changes - turn console OFF.
7. To save changes and exit Special Calibration - press and hold the CAL button for 1 second - 'CAL' icon on screen will turn off and red LED light will turn off.

NOTE: Supervisor Lockout - Press and hold Auto/Man button 3 seconds to enter Supervisor Lockout control - use Increase/Decrease buttons to enable/disable this feature. Once locked, Special Calibration values can be viewed but not adjusted. Press CAL button to exit.

## Special Calibration Settings - Page 1



### Tank Fill Level

**Location:** PAGE 1 - VOLUME

**Description:** Adjust this setting to the known capacity of the tank. This value will be automatically entered when in Tank position by pressing the Increase (+) button. This can be set to OFF (0) up to 65535. Parameter units: ounces

### Tank Alarm Level

**Location:** PAGE 1 - VOLUME/MINUTE

**Description:** Enables and adjusts value for Tank Alarm - set value to notify operator when level is reached. This can be set to OFF (0) or between 1 - 65535. Parameter units: ounces

### Start Speed Time

**Location:** PAGE 1 - TANK

**Description:** Enables "Quick Start - Speed" function and defines the duration of the simulated speed - up to 6 seconds. Setting to 0 (Off) will disable the function.

### Start Speed

**Location:** PAGE 1 - CUSTOM DATA

**Description:** Enables "Quick Start - Speed" function and defines the intended simulated speed in MPH (km/H). Setting to 0 (Off) will disable the function.

### Units

**Location:** PAGE 1 - AREA

**Description:** Defines unit of measurement – 3RIVE 3D™ uses English. Changing UNITS setting also loads system default settings and clears all counters. (This affects both channels.)

To restore default calibration values and clear all counters (Tank, Volume, Area and Distance):

1. Change the UNITS value.
2. Turn the rotary knob to a different calibration page.
3. Turn the rotary knob back to UNITS.
4. Reset UNITS value to original choice.

## ***Operating Mode***

**Location:** PAGE 1 - AREA

**Description:** Chooses operating mode. For 3RIVE 3D™ this must be set to **Injection**.

## ***Material***

**Location:** PAGE 1 - DISTANCE

**Description:** Chooses material for application- Must be set to H2O for 3RIVE 3D.

## ***Output Type***

**Location:** PAGE 1 - PRESSURE

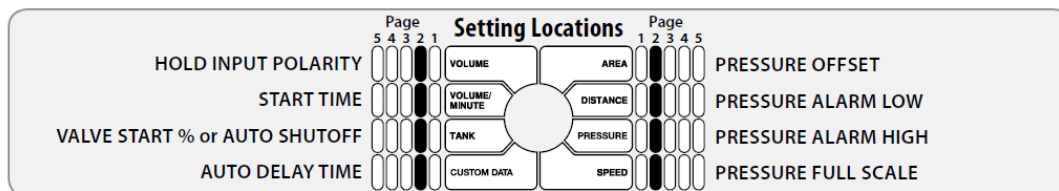
**Description:** Choose PULSE for use with 3RIVE 3D™ system.

## ***Application ID***

**Location:** PAGE 1 - SPEED

**Description:** Enter an ID number to identify the console if desired. (This number could also represent an application or a vehicle.) If you connect the console to another device via serial port, the APPLICATION ID is included with the Totals Data List and Equipment List information. (Micro-Trak® protocol only)

## ***Special Calibration Settings - Page 2***



## ***Hold Input Polarity***

**Location:** PAGE 2 - VOLUME

**Description:** On Remote Run/Hold connection – allows user to reverse the circuit function. The default setting is CLOSED - meaning that 3RIVE 3D™ Dual Plus will be in HOLD when the circuit is closed. (Affects both channels. Both channels must be the same setting.)

## ***Start Time***

**Location:** PAGE 2 - VOLUME/MINUTE

**Description:** Enables “Quick Start - Valve” function and defines the duration of the “Quick Start”. Setting to 0 (Off) will disable the function.

## ***Valve Start Percentage***

Applies to PWM mode only. Set to 10% for the 3RIVE 3D™ system.

**Location:** PAGE 2 - TANK

**Description:** Enables “Quick Start - Valve” function and defines the percentage of the PWM duty cycle during the “Quick Start - Valve” feature.

## ***Auto Delay Time***

**Location:** PAGE 2 - CUSTOM DATA

Set to 1 second for the 3RIVE 3D™system.

**Description:** Enables and adjusts value for Auto Delay feature. When transitioning from HOLD to RUN, it provides time for motorized valves to operate and allows the flow to stabilize before AUTO control begins. This can be set to OFF (0) or between 1 - 4 seconds. **NOTE:** If a “Quick Start” feature is enabled, then AUTO DELAY TIME should be set to 0.

## ***Pressure Offset***

**Location:** PAGE 2 – AREA

Set to 0 for the 3RIVE 3D™system.

Description: This adjusts the system accurately read a pressure sensor.

Note: Leave at 0 when using optional Micro-Trak pressure sensor(s) P/N 18757-18758, they are “gauge” type sensors and self-adjust for ambient atmospheric pressure. To adjust system to calculate pressure readings when using an “Absolute” style pressure sensor, input Absolute Atmospheric Pressure in PSI (bar) for your location.

## ***Pressure Alarm Low***

**Location:** PAGE 2 - DISTANCE

**Description:** Enables and adjusts value for Pressure Alarm - set value to notify operator when low level is reached. This can be set to OFF (0) or up to 50% of FULL SCALE setting. Parameter units: English = PSI.

## ***Pressure Alarm High***

**Location:** PAGE 2 - PRESSURE

**Description:** Enables and adjusts value for Pressure Alarm - set value to notify operator when high level is reached. This can be set to OFF (0) or up to 100% of FULL SCALE setting. Parameter units: English = PSI.

## ***Pressure Full Scale***

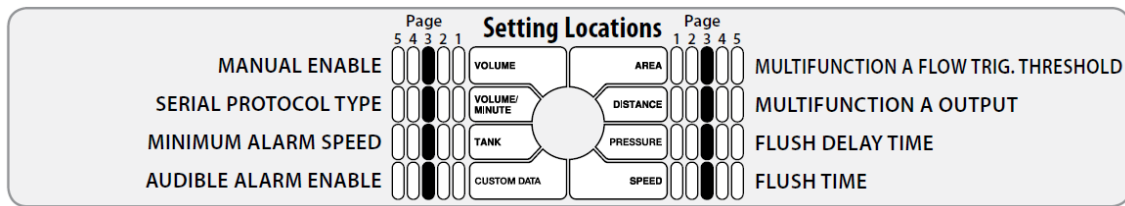
**Location:** PAGE 2 – SPEED

Set to 100 for the 3RIVE 3D™system.

**Description:** Displays and adjusts FULL SCALE (maximum) value for Pressure Sensor. Default setting is 150 PSI for Micro-Trak Pressure Sensor P/N 18757. Adjust it to 300 PSI for Micro-Trak P/N 18758. This measurement is always rated in PSI.



## Special Calibration Settings - Page 3



### Manual Enable

**Location:** PAGE 3 - VOLUME

**Description:** Enables (ON) or disables (OFF) Manual Control mode. Disabling this function means the console will only run in AUTO mode and the AUTO/MAN switch will be inactive.

### Serial Protocol Type

**Location:** PAGE 3 - VOLUME/MINUTE

**Description:** Chooses serial protocol used for communicating VRA information through the serial port. Choices are Micro-Trak or Raven (model 660) Default is Micro-Trak protocol. (This affects both channels.)

### Minimum Alarm Speed

**Location:** PAGE 3 - TANK

**Description:** Enables and adjusts a minimum speed threshold for the audible alarm - this prevents unneeded warnings while stopping and starting. This can be set to OFF (0) or from 0.1 to 99.9 mph (km/h). Affected alarms are Application Rate Error and Minimum Flow. (Affects both channels.)

### Audible Alarm Enable

**Location:** PAGE 3 - CUSTOM DATA

**Description:** Enables (ON) or disables (OFF) Audible Alarm function - allows user to operate system without hearing any system warnings. Flush cycle completion alert is not affected by this setting.

### Multifunction A Flow Trigger Threshold

**Location:** PAGE 3 - AREA

**Description:** When Multifunction A output is set to Fixed Flow Trigger (F-FLO) or Proportional Flow Trigger (P-FLO), this adjusts the threshold value for activating the voltage output.

**F-FLO:** Threshold value turns on power to Multifunction A output based on the fixed total flow rate, regardless of active width.

**P-FLO:** Threshold value turns on power to Multifunction A output based on flow rate, proportional to active width. Example: If the threshold is set to 10GPM while running only 2 out of 5 sections, the trigger will be on at 4GPM -  $(2/5 \times 10)$ . (Note: System must be in Inj. Mode to choose P-Flo on Chan 2.)

## ***Multifunction A Output***

**Location:** PAGE 3 - DISTANCE

**Description:** Selects mode of 12VDC power sent to Multifunction Output A connection on branch harness.

1. **OFF** = Always off
2. **ON** = Always on
3. **RELIEF VALVE** = On in Hold
4. **MASTER** = On in Run and at least 1 section on (Note: there is a 1/2 second delay switching from HOLD to RUN)
5. **FLUSH** = Enables Flush cycle to purge chemicals from lines when switching from Run to Hold - see below
6. **F-FLO** = Fixed Flow Trigger - see above
7. **P-FLO** = Proportional Flow Trigger- see above

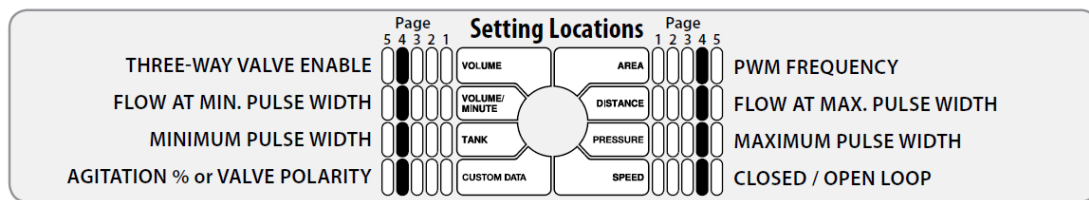
## ***Flush Delay Time***

Not used with 3RIVE 3D.

## ***Flush Time***

Not used with 3RIVE 3D.

## ***Special Calibration Settings - Page 4***



## ***Three-way Valve Enable***

Not used with 3RIVE 3D.

## ***Flow at Minimum Pulse Width-PWM only***

Not used with 3RIVE 3D.

## ***Minimum Pulse Width***

**Location:** PAGE 4 - TANK

**Description:** In PWM Output, this adjusts value for Minimum Pulse Width. This setting can be useful to maintain hydraulic motor minimum rpms or to ensure nozzle minimum flows are maintained. This can be set from 0 to 100%.

## ***Agitation Percentage***

Not used with 3RIVE 3D.

## ***PWM Frequency***

**Location:** PAGE 4 - AREA

**Description:** In PWM Output, this adjusts value for PWM Frequency. This can be set from 50 to 500Hz. Consult your PWM device information for optimal frequency. Default frequency is 200Hz.

### ***Flow at Maximum Pulse Width***

Not used with 3RIVE 3D.

### ***Maximum Pulse Width***

**Location:** PAGE 4 – PRESSURE

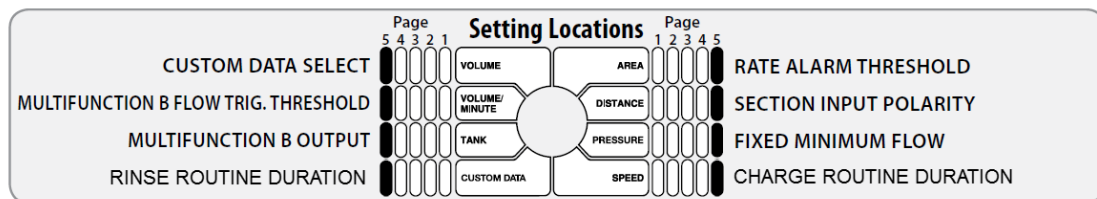
Set to 100% for the 3RIVE 3D™ system.

**Description:** In PWM Output, this adjusts value for Maximum Pulse Width. This can be set from 0 to 100%. (This value must be larger than the Minimum Pulse Width.)

### ***Closed/Open Loop***

Not used with 3RIVE 3D. System default set to Closed Loop.

## ***Special Calibration Settings - Page 5***



### ***Custom Data Select***

**Location:** PAGE 5 - VOLUME

**Description:** Choose the information displayed in the data window.

Choose from:

**Rate** - Calibrated Target Rate

**Output Drive** - STD or PWM **VRA** - VRA target rate, connection status etc.

**Hours** - Number of elapsed hours on console

**APH** - Area per hour

**Width** - Total of calibrated width

**Section** - Shows which sections are active

## ***Multifunction B Trigger Threshold***

**Location:** PAGE 5 - VOLUME/MINUTE

**Description:** When Multifunction B output is set to Fixed Flow Trigger (F-FLO) or Proportional Flow Trigger

(P-FLO), this adjusts the threshold value for activating the voltage output.

**F-FLO:** Threshold value turns on power to Multifunction B output based on the fixed total flow rate, regardless of active width.

**P-FLO:** Threshold value turns on power to Multifunction B output based on flow rate, proportional to active width. Example: If the threshold is set to 10GPM while running only 2 out of 5 sections, the trigger would engage at 4GPM -  $(2/5 \times 10)$ . (Note: System must be in Inj. Mode to choose P-Flo on Chan 2.)

## ***Multifunction B Output***

**Location:** PAGE 5 - TANK

**Description:** Selects mode of 12VDC power sent to Multifunction Output B connection on branch harness.

1. **OFF** = Always off
2. **ON** = Always on
3. **RELIEF VALVE** = On in Hold
4. **MASTER** = On in Run and at least 1 section on (Note: there is a 1/2 second delay switching from HOLD to RUN)
5. **F-FLO** = Fixed Flow Trigger - see above
6. **P-FLO** = Proportional Flow Trigger - see above

## ***Rate Alarm Threshold***

**Location:** PAGE 5 - AREA

**Description:** Adjusts threshold value for the Rate Alarm - can be set from 10% - 30%. This value is the percentage of difference between the actual rate of application and the target rate.

## ***Section Input Polarity***

Set to 12V for 3RIVE 3D.

**Location:** PAGE 5 - DISTANCE

**Description:** This setting allows the user to reverse the polarity of section inputs. This may be useful when connecting a separate device to the 3RIVE 3D™Dual Plus system for automatic section control. Default is 12v. (Affects both channels.)

## ***Fixed Minimum Flow***

**Location:** PAGE 5 - PRESSURE

**Description:** Sets an absolute minimum flow for the system. This ensures that the flow rate is never less than the lowest range of the flowmeter – preventing the flowmeter from stalling.

## ***Maximum Rinse Timer***

This sets the maximum duration for the Rinse routine. This can be set from 0-99 minutes.

### ***Maximum Charge Timer***

This sets the maximum duration for the Charge routine. This can be set from 0-99 minutes.

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## ***RESTORING DEFAULT CALIBRATION VALUES***

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**Location:** PAGE 1 - AREA

This is performed at the UNITS setting.

To restore default calibration values and clear all counters (Tank, Volume, Area and Distance):

1. Change the UNITS value.
2. Turn the rotary knob to a different calibration setting.
3. Turn the rotary knob back to UNITS.
4. Reset UNITS value to original choice.

# ***SAFE GUARD™ BLOCKAGE MONITOR***

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SafeGuard™ is an electronic blockage monitor that will help you operate more cost-effectively by providing the information you need to maintain proper application rates of liquid chemicals. SafeGuard™ has been designed for easy installation and operation.

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## ***COMPONENTS***

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### ***SAFE GUARD™ CONSOLE***

This is the main unit of the SafeGuard™™ system. It continually scans for a blocked indication.

### ***SAFE GUARD™ SENSOR***

The sensor assembly is a liquid flow chamber surrounded by a blockage detection shroud. The bottom openings of the sensor assembly accommodate a variety of plugs (male) and caps (female). The chamber contains a detection cartridge which rises with flow, and drops when flow is interrupted.

### ***IMPLEMENT SWITCH & MODULE***

SafeGuard™ can accept an optional Implement Switch and Module. This option silences the audible alarm on the SafeGuard™ when the implement is not in use. The Module provides the interface between an implement switch and SafeGuard™ wiring and can be placed at any point in the chained sensor connections.

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## ***NORMAL OPERATION***

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When the console is turned on it searches for sensors and implement switch modules installed on the data line. During the power up sequence the console displays the number of sensors found, for example: **S 48** indicates 48 sensors were detected during power up. If the number of detected sensors has changed since the last power-up sequence, the console will pause, display the new sensor count, and beep to alert the operator.

**Operator must acknowledge the new sensor count by pressing either volume button to continue the power-up sequence.**

Devices are numbered sequentially based on their position on the data line starting with # 1 being closest to the console end of the cable.

Sensors and implement switch modules are numbered separately so the first implement switch module on the data line is always module # 1.

The console continually monitors the sensors for a blocked indication. When a blockage is detected the console immediately alerts you by flashing the red warning LED, sounding an audible alarm, and displaying the number of the sensor that is blocked. This alert will remain until the blockage is cleared. With the implement switch activated the display should show that all runs are blocked, and HOLD is displayed (audible alarm muted). This serves as confirmation that the system is working properly.

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## **TROUBLESHOOTING**

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### **DISPLAY FREEZES DURING STARTUP**

When the console is turned on it searches for sensors and implement switch modules installed on the data line. During the power up sequence the console displays the number of sensors found, for example: **S 48** indicates 48 sensors were detected during power up. If the number of detected sensors has changed since the last power-up sequence, the console will pause, display the new sensor count, and beep to alert the operator. **Operator must acknowledge the new sensor count by pressing either volume button to continue the power-up sequence.**

### **CONSOLE WON'T TURN ON**

Is there power on the console power cable? Pin A is +12 VDC, Pin B is ground.

5. **NO** Troubleshoot for possible blown fuse, broken wiring or bad connections on power cable. Verify there's power at cable connection point.
6. **YES** Disconnect data cable and try to turn on the console. If it turns on with data cable disconnected troubleshoot damaged cable or sensor assembly. If it does not turn on with data cable disconnected, replace console.

### **SENSORS NOT DETECTED**

7. **Several sensors in a row missing** - Check connection between last good sensor and first bad sensor. Bypass first bad sensor in string with extension cable or adjacent sensor leads.
8. **Single sensors not detected** - Isolate or verify bad sensor by bypassing suspect sensor with extension cable or sensor leads. Cycle power on console to re-scan for sensors.

### **SENSOR NOT DETECTING BLOCKAGE**

If the cartridge is at the bottom of the sensor assembly and the sensor does not indicate BLOCKED, verify cartridge is in the sensor tube with tail on top/ball on bottom. If this is correct, replace sensor.

### **SENSOR DOESN'T READ GOOD**

Remove cartridge from sensor chamber. If sensor doesn't read good with cartridge removed, replace sensor.

### **OPEN**

No sensors detected during power up sequence. Check connection and cables between console and first sensor.

### **NET**

Displayed when operating and communication with all sensors is lost

### **ERROR**

Sensor was present at power-up, and is now not talking to the console. The sensor number will be displayed. If an H is displayed the error is originating from an implement switch module. The number of the module will be displayed.

# APPENDICES

## APPENDIX A – DEFAULT SETTINGS

NOTE: These settings are based on requirements for a 24-row planter

Calibration Factor	Channel 1			Channel 2		
	English	Turf	Metric	English	Turf	Metric
Flow Cal (Edges/Ounce)	52.0	52.0	6658.0	5071	5071	649.1
Min Flow	0.0 (Off)	0.0 (Off)	0.0 (Off)	0.0 (Off)	0.0 (Off)	0.0 (Off)
Target Rate	40.0 Ounces/Acre	0.93 Oz/1000 Ft <sup>2</sup>	3.00 liters/ha	8.00 Ounces/Acre	0.20 Oz/1000 Ft <sup>2</sup>	600 ml/ha
Adjust Rate	1.00 Ounces/Acre	0.05 Oz/1000 Ft <sup>2</sup>	0.10 liters/ha	1.00 Ounces/Acre	0.02 Oz/1000 Ft <sup>2</sup>	0.25 ml/ha
Section 1 Width	180 in	180 in	4.600 m			
Section 2 Width	180 in	0	4.600 m			
Section 3 Width	180 in	0	4.600 m			
Section 4 Width	180 in	0	4.600 m			
Section 5 Width	0	0	0			
Section 6 Width	0	0	0			
Section 7 Width	0	0	0			
Tank Alarm Level	Off	Off	Off	Off	Off	Off
Tank Fill Level	Off	Off	Off	Off	Off	Off
Control Response	-1	-1	-1	-1	-1	-1
PWM Frequency	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
Minimum PW	8%	8%	8%	8%	8%	8%
Flow @ MIN PW	0	0	0	0	0	0
Maximum PW	95%	95%	95%	100%	100%	100%
Flow @ MAX PW	0	0	0	0	0	0
Flowmeter Scale	1	1	1	1	1	1

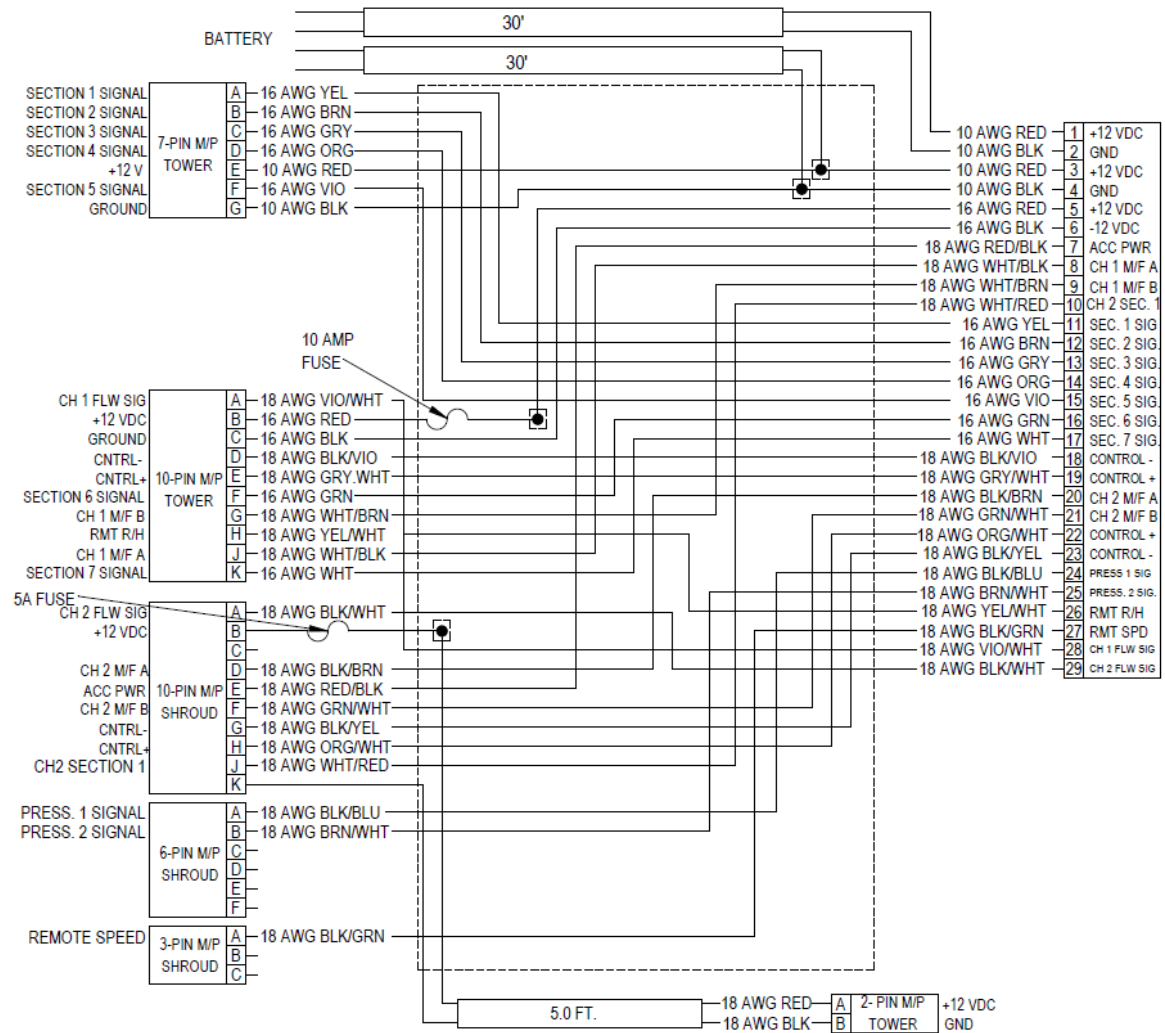


Start Speed	0 mph(Off)	0 mph(Off)	0 km/h(Off)	0 mph(Off)	0 mph(Off)	0 km/h(Off)
Start Speed Time	0 s	0 s	0 s	0 s	0 s	0 s
Start Up Time	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)
Valve Start %	10	10	10	10	10	10
Flush Delay Time	3 s	3 s	3 s	3 s	3 s	3 s
Flush Time	5 s	5 s	5 s	5 s	5 s	5 s
Multi Function-A	Off in Hold	Off in Hold	Off in Hold	Off in Hold	Off in Hold	Off in Hold
Multi Function-B	F-FLO	F-FLO	F-FLO	Off in Hold	Off in Hold	Off in Hold
Trig Threshold-A	15.0 OPM	0.35 OPM	1.20 l/m	15.0 OPM	0.35 OPM	1.20 l/m
Trig Threshold B	15.0 OPM	15.0 OPM	1.20 l/m	15.0 OPM	0.35 OPM	1.20 l/m
Rate Alarm Threshold	15%	15%	15%	15%	15%	15%
Agitate %	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)
Auto Delay Time	1 sec	1 sec	1 sec	1 sec	1 sec	1 sec
Pressure Alarm Lo	0 psi (Off)	0 psi (Off)	0 bar (Off)	0 psi (Off)	0 psi (Off)	0 bar (Off)
Pressure Alarm Hi	0 psi (Off)	0 psi (Off)	0 psi (Off)	0 psi (Off)	0 psi (Off)	0 psi (Off)
Min Pressure	10.0 psi	10.0 psi	1.00 bar	10.0 psi	10.0 psi	1.00 bar
Pressure Offset	0 psi	0 psi	0.0 bar	0 psi	0 psi	0.0 bar
Pressure Full Span PSI	100	100	100	100	100	100
Fixed Min Flow	10.0	10.0	10.0	1.5	1.5	44
Custom Data	Duty Cycle	Duty Cycle	Duty Cycle	Duty Cycle	Duty Cycle	Duty Cycle
Material (H <sub>2</sub> O / NH <sub>3</sub> )	H <sub>2</sub> O	H <sub>2</sub> O	H <sub>2</sub> O	H <sub>2</sub> O	H <sub>2</sub> O	H <sub>2</sub> O
Valve Polarity	Bypass	Bypass	Bypass	Bypass	Bypass	Bypass
Auto Shut-Off	Off	Off	Off	Off	Off	Off
Drive Type (Std / PWM)	PWM	PWM	PWM	PWM	PWM	PWM
FTW Mode	Off	Off	Off	Off	Off	Off
VRA Protocol	Micro-Trak	Micro-Trak	Micro-Trak	Micro-Trak	Micro-Trak	Micro-Trak
Closed / Open Loop	Closed	Closed	Closed	Closed	Closed	Closed
Charge Time	5 minutes	5 minutes	5 minutes	5 minutes	5 minutes	5 minutes

Rinse Time	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes	15 minutes
Manual Control Enable	Off	Off	Off	Off	Off	Off
Audible Alarm Enable	On	On	On	On	On	On
Mode Flags	Hold, Manual	Hold, Manual	Hold, Manual	Hold, Manual	Hold, Manual	Hold, Manual
Channel Select 1 / 2)	1	1	1	1	1	1
Units (C1 selected)	00 (Eng)	10 (Turf)	01 (Metric)			
Ch 2 Mode (C2 selected)				Inj	Inj	Inj
Speed Cal	0.189 (in/edge)	0.189 (in/edge)	0.48 (cm/edge)	<p>← Global Cal factors apply to both Channels</p>		
Rem Hold Input Polarity	Closed	Closed	Closed			
Minimum Alarm Speed	2 mph	2 mph	3 kph			
Section Input Polarity	12v	12v	12v			
Application ID	1	1	1			
Console Lock	Unlocked	Unlocked	Unlocked			

# APPENDIX B – WIRING DIAGRAMS

## CONSOLE TO PLANTER

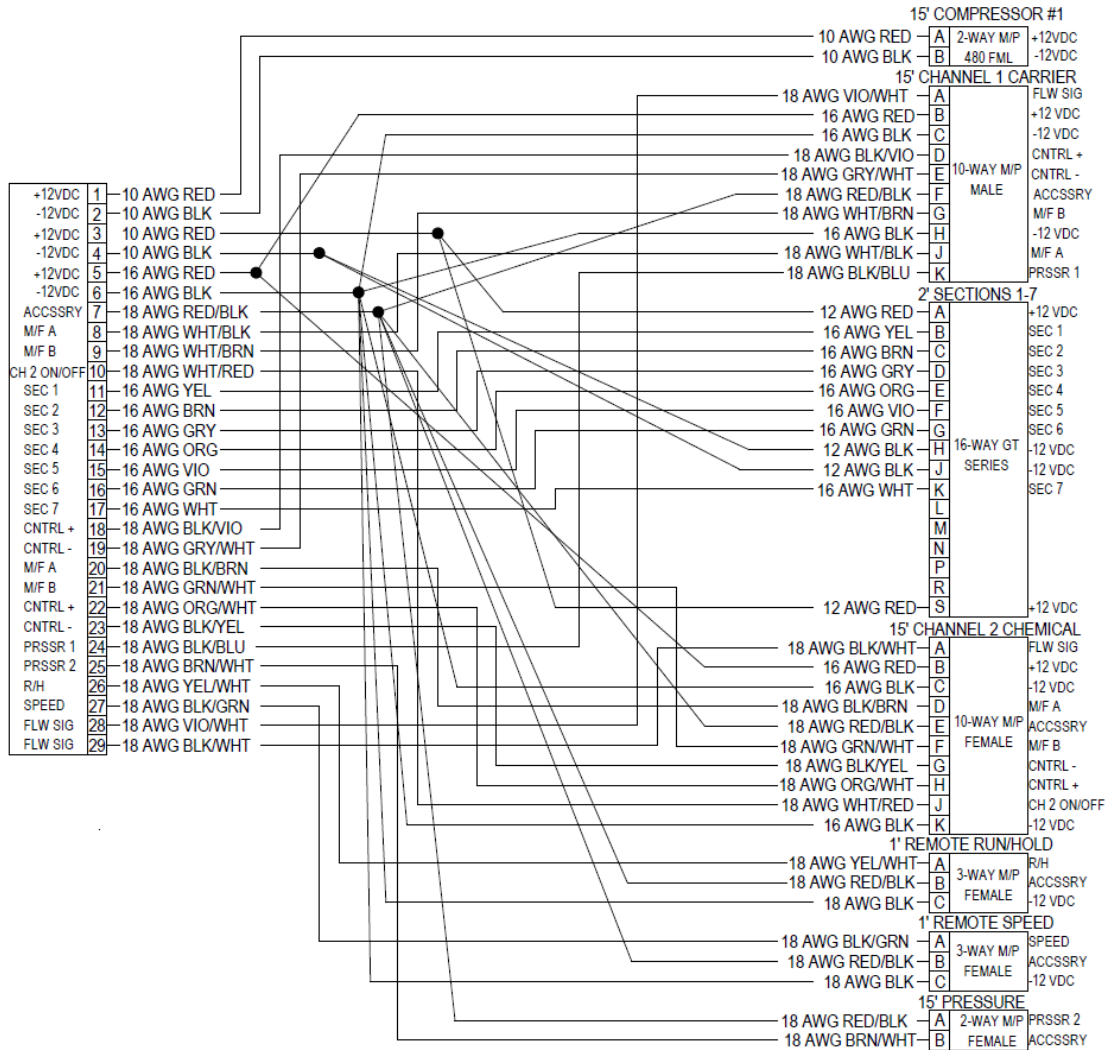


## **IMPLEMENT HARNESS**

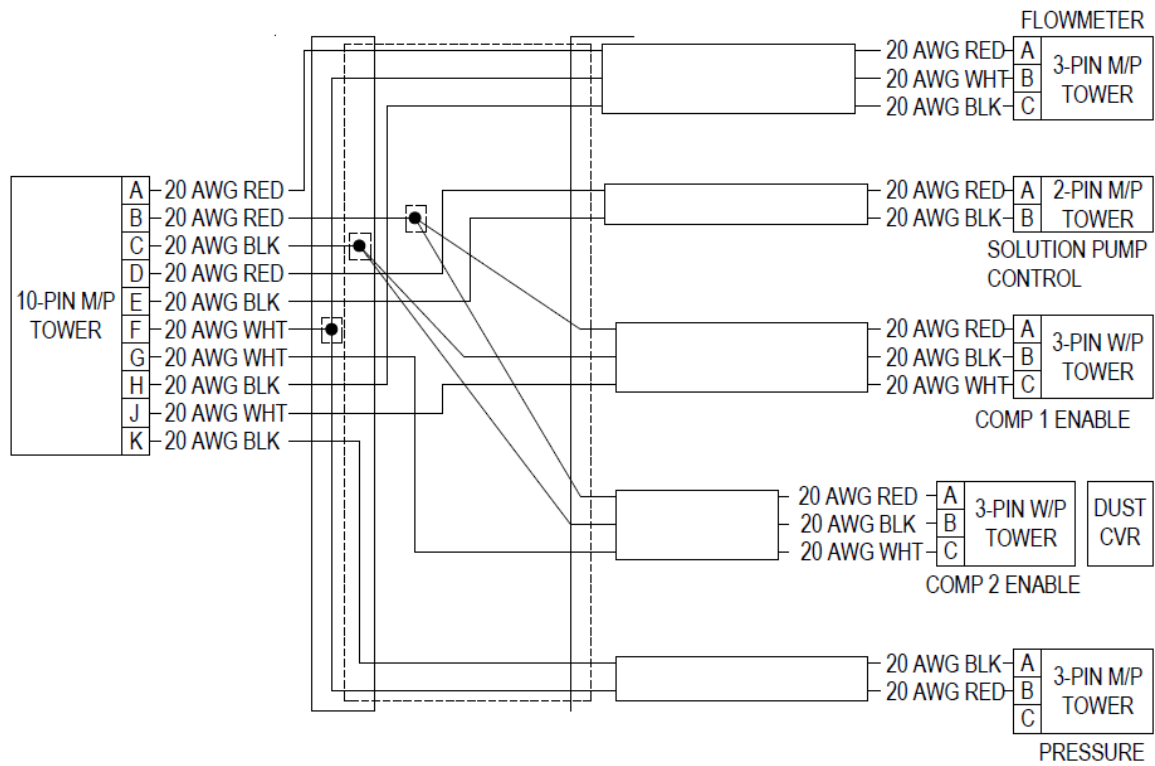
(Extension between hitch and junction harness)

DEUTSCH HDP26-24-29PE	1	10 AWG RED (14096) +12VDC 30AMPS A	1
	2	10 AWG BLK (14095) -12VDC 30AMPS A	2
	3	10 AWG RED (14096) +12VDC 30AMPS B	3
	4	10 AWG BLK (14095) -12VDC 30AMPS B	4
	5	16 AWG RED (18364) +12VDC 10AMPS C	5
	6	16 AWG BLK (18362) -12VDC 10AMPS C	6
	7	18 AWG RED/BLK (18395) ACCESSORY POWER	7
	8	18 AWG WHT/BLK (18396) MULTIFUNCTION A CHANNEL 1	8
	9	18 AWG WHT/BRN (18397) MULTIFUNCTION B CHANNEL 1	9
	10	18 AWG WHT/RED (18398) CHANNEL 2 ON/OFF	10
	11	16 AWG YEL (18365) SECTION 1	11
	12	16 AWG BRN (18363) SECTION 2	12
	13	16 AWG GRY (18368) SECTION 3	13
	14	16 AWG ORG (11787) SECTION 4	14
	15	16 AWG VIO (18367) SECTION 5	15
	16	16 AWG GRN (18366) SECTION 6	16
	17	16 AWG WHT (18369) SECTION 7	17
	18	18 AWG BLK/VIO (18411) CONTROL+ CHANNEL 1	18
	19	18 AWG GRY/WHT (18433) CONTROL- CHANNEL 1	19
	20	18 AWG BLK/BRN (18405) MULTIFUNCTION A CHANNEL 2	20
	21	18 AWG GRN/WHT (18430) MULTIFUNCTION B CHANNEL 2	21
	22	18 AWG ORG/WHT (18428) CONTROL+ CHANNEL 2	22
	23	18 AWG BLK/YEL (18408) CONTROL- CHANNEL 2	23
	24	18 AWG BLK/BLU (18410) PRESSURE CHANNEL 1	24
	25	18 AWG BRN/WHT (18426) PRESSURE CHANNEL 2	25
	26	18 AWG YEL/WHT (18429) REMOTE RUN/HOLD	26
	27	18 AWG BLK/GRN (18409) REMOTE SPEED	27
	28	18 AWG VIO/WHT (18432) FLOW SIGNAL CHANNEL 1	28
	29	18 AWG BLK/WHT (18412) FLOW SIGNAL CHANNEL 2	29
			DEUTSCH HDP24-24-29SE

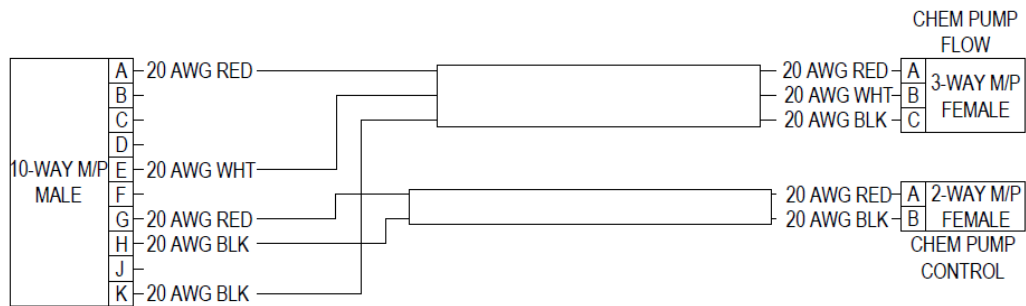
# JUNCTION HARNESS



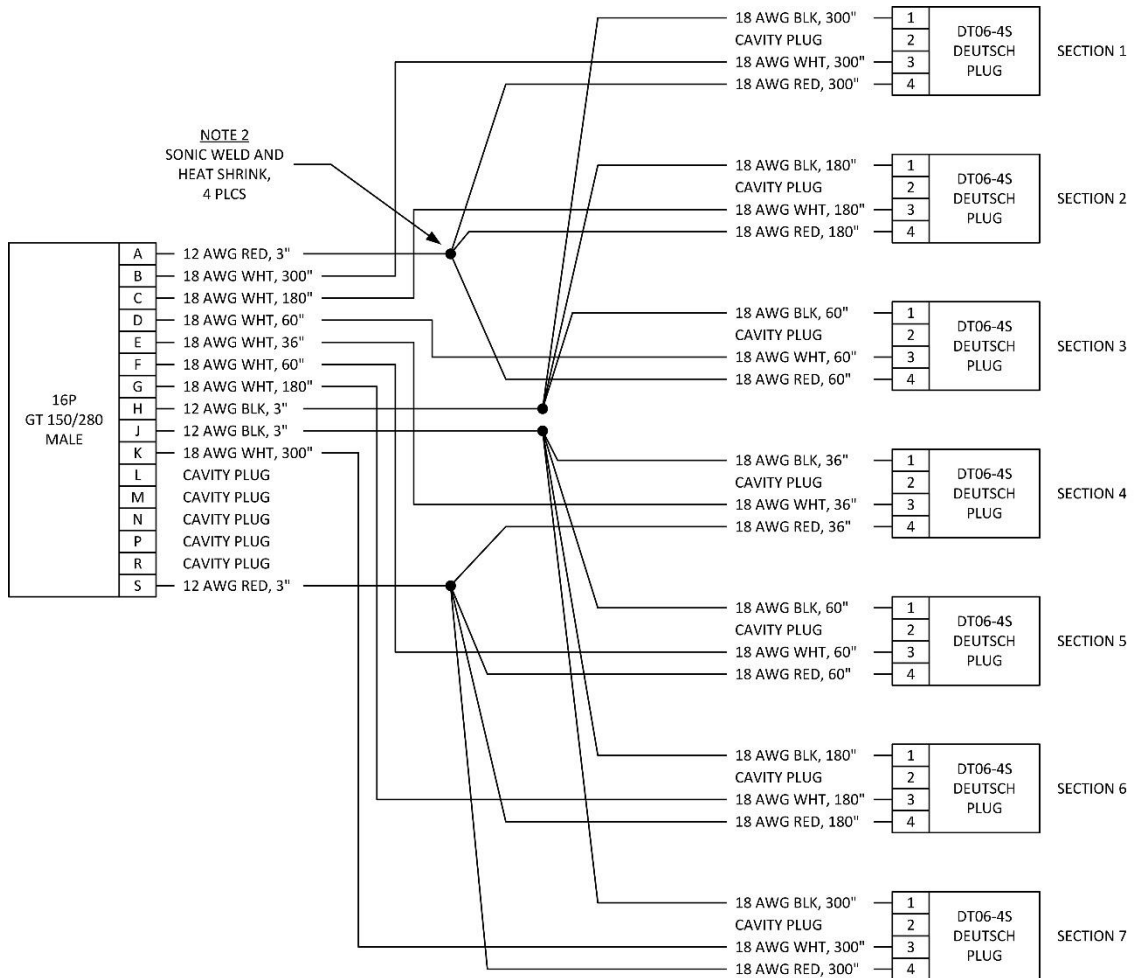
## **CHANNEL 1 BRANCH**



## **WIRING DIAGRAM – CHANNEL 2 BRANCH**



## **SECTION HARNESS**



### Valve Connections

Pin A – constant 12 volts DC

Pin B – ground

Pin C – switched 12 volts DC

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## **APPENDIX C – FINE TUNING SPEED/DISTANCE CALIBRATION**

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Accurately measure a distance of 1000 feet (300 meters). Clearly mark the beginning and end points with flags or something highly visible to the operator.

### PROCEDURE

1. With the console turned ON, place the Run/Hold switch in the HOLD position. (The HOLD icon will be displayed).
2. Turn the rotary dial to the DISTANCE position. Reset the distance counter by pressing and holding "RESET" until the display returns to 0. (CLEAR will be displayed when reset is pressed). Make sure pump is off. Turn on the section switches.
3. You are now ready to drive the measured course. Pick a location on the vehicle to use as a marker for starting and stopping the distance counting function (door handle, mirror, step, etc.). You should begin driving the course well ahead of the starting flag and drive past the ending flag, using the Run/Hold switch to start and stop the counting function. It is not recommended to start from a dead stop at the starting flag and stop at the ending flag.
4. Place the Run/Hold switch in RUN when the marker on the vehicle passes the starting flag to activate the distance counting function. The console display numbers will increase, adding to the distance total as you drive.
5. Drive the pre-measured course and place the Run/Hold switch in HOLD when the marker on the vehicle passes the ending flag, to stop the distance counting function. The console display should display "HOLD".
9. With the rotary dial still at DISTANCE (SPEED CAL), press and hold the CAL button for one second. Once the console is in "CAL," the speed calibration value will be displayed. Momentarily press the CAL button and the word "CAL" will begin to flash and the distance travelled will be displayed. *See figure 28 below.*
10. When the display shows distance ("CAL" is flashing), verify whether the number displayed is the exact distance you drove (+/- 1 - 2 %). If not, press the Increase or Decrease button to adjust the figure to match the distance driven.
11. When the number shown on the display matches (as closely as possible) the actual distance driven, you have arrived at the correct calibration value. If you cannot adjust the displayed distance to exactly match the actual distance driven, adjust the figure as close as possible to the actual distance. You may check the calibration number by momentarily pressing the CAL button. The word "CAL" will stop flashing and the SPEED CAL number will appear. Exit "CAL" by pressing the CAL button for one second.
12. The speed sensor is now calibrated. To verify proper calibration, repeat the procedure a second time. Write down the new speed calibration number and keep it in a safe place. If the calibration values are ever accidentally changed, you can simply reenter this number.



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## ***APPENDIX D – FINE TUNING FLOW METER CALIBRATION***

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### **CHEMICAL PUMP FLOW CALIBRATION**



When working on system with active product follow all chemical handling rules and safety procedures!

This procedure involves running the chemical pump and collecting the chemical in a graduated container. The console is reading out in ounces, so a beaker marked in ounces is preferable. If the product is collected in a gallon container remember to multiple gallons collected by 128 to get the ounces collected. I.E. 1 quart collected = 32 ounces on display

1. Remove the front cover from the Pump-Pak.
2. Place the calibration tube into a graduated container to collect the chemical. As long as a clean container is used the chemical collected can be put back into the chemical tank when test is complete.
  13. Note: the system will also pump water out of the row units, but all chemical is diverted to the catch container.
3. Move the three-way valve to the calibrate position.
4. Turn on the console.
5. Place the console run/hold switch into the HOLD position.
6. Press and hold the CAL button until CAL is displayed on left screen. Release button.
7. Turn knob to SPEED.
8. Using the + button, adjust the test speed to the speed you plan on planting.
9. Place the controller select switch to BOTH.
10. Press the CHANNEL VIEW SELECT to select CHANNEL 2.
11. Turn the knob to VOLUME.
12. Press and hold the “- RESET” button until the volume counter resets to 0.0.
13. Place the run/hold switch in the RUN position.
14. The system will begin to pump chemical into the graduated container. Water and air will also be coming out of row units.
15. After collecting a measureable sample of chemical ( a minimum of 32 ounces, or 1 quart, is recommended) compare the amount collected with the volume counter for channel 2. If the two measurements vary by more than 3 % perform the following:
  - a. Place the run/hold switch to HOLD
  - b. Press and hold the CAL button until the CAL indicator is displayed on screen.
  - c. With the knob turned to volume, the flow calibration value is displayed.
  - d. Press the CAL button once, and the display will now show the volume counter.
  - e. Press the + or – button as needed to make the channel 2 volume match the actual amount collected.
  - f. Press the CAL button once, and your new calibration value is displayed.
  - g. Press and hold the CAL button until the CAL indicator goes out on the display. Your new cal value is now saved.

## **SOLUTION FLOWMETER FINE TUNING CALIBRATION**



When working on system with active product follow all chemical handling rules and safety procedures!

This procedure involves running the solution pump and collecting the liquid in a graduated container. The console is reading out in ounces, so a beaker marked in ounces is preferable. If the product is collected in a gallon container remember to multiple gallons collected by 128 to get the ounces collected. I.E. 1 quart collected = 32 ounces on display

1. Remove the front cover from the Pump-Pak.
2. Disconnect a liquid supply line from one section. Run that tube into a graduated container to collect the liquid.
3. Turn on the console.
4. Place the console run/hold switch into the HOLD position.
5. Turn off all sections with the exception of the section you disconnected the supply line from in step 2.
6. Press and hold the CAL button until CAL is displayed on left screen. Release button.
7. Turn knob to SPEED.
8. Using the + button, adjust the test speed to the speed you plan on planting.
9. Place the controller select switch to CH. 1.
10. Press the CHANNEL VIEW SELECT to select CHANNEL 1.
11. Turn the knob to VOLUME.
12. Press and hold the "- RESET" button until the volume counter resets to 0.0.
13. Place the run/hold switch in the RUN position.
14. The system will begin to pump liquid into the graduated container.



Chemical will be present in the liquid.

15. After collecting a measurable sample of liquid (a minimum of 1 gallon is recommended) compare the amount collected with the volume counter for channel 1. If the two measurements vary by more than 3 % perform the following:
  - a. Place the run/hold switch to HOLD
  - b. Press and hold the CAL button until the CAL indicator is displayed on screen.
  - c. With the knob turned to volume, the flow calibration value is displayed.
  - d. Press the CAL button once, and the display will now show the volume counter.
  - e. Press the + or – button as needed to make the channel 1 volume match the actual amount collected, in ounces.
  - f. Press the CAL button once, and your new calibration value is displayed.
  - g. Press and hold the CAL button until the CAL indicator goes out on the display. Your new cal value is now saved.

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## ***APPENDIX D – REPLACEMENT PARTS***

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### **In The Cab On the Tractor Parts**

13774	Dual Console Mount Kit
18805	3RIVE 3D™ Dual Console (5 section)
19362	3RIVE 3D™ Dual Console (7 section)
19174	15' 29Pin 3RIVE 3D™ Tractor Harness
19175	25' 29Pin 3RIVE 3D™ Tractor Harness
19289	3RIVE 3D™ Dual Manual (Net Price only)
50340	3RIVE 3D™ Installation Manual (Net price only)
50394	Cab Card (Net price only)
13181	SafeGuard Console Mount Kit
19360	3RIVE 3D™ SafeGuard Console
18982	3RIVE 3D™ SafeGuard Power Cable
18526	6Pin 5' M/P to JWPF Adapter Cable
19361	3RIVE 3D™ SafeGuard Manual (Net price only)

### **On The Planter Parts**

19226	15' 29Pin 3RIVE 3D™ Dual Junction Harness
01998	SafeGuard Implement Switch Kit
19625 A	Implement Switch Module
18541	Whisker Switch w/Bracket & Mag Mount
19162	1/2" x 50 Mesh Water Strainer (Red)
19238	1/2" PolyPro Water/Chem Tank Valve
19144	3/4" PolyPro Water Rinse Valve
19234	3/4" 50 Mesh Chem Strainer
19108	Air Regulator Mount Bracket
19129	100 PSI Pressure Sensor
19131	Air Pressure Regulator
19163	60 PSI Pressure Gauge
19286	2' Pressure Sensor Adapter cable
19429	UBolt, 3/8" x 7" x 7" x 7"
12522	1/2" MPT x 1/2" Barb Tee PP Black
12526	1/2" FPT x 1/2" FPT Tee PP Black
12527	1/2" MPT x 1/2" MPT Nipple Black
13947	1/2" MPT x 1/2" Barb PP Black
18104	10Amp PWM EMD Module

### **PumpPak Related Parts**

19110	1/4" 3Way Solenoid Valve
19285	PumpPak Channel 1 Branch Cable
19287	PumpPak Channel 2 Branch Cable
19356	PumpPak Power Branch Cable
19359	Gear Motor Interface Cable
22034	Crouzet Chemical Gear Motor
22035	Watson Marlow Pumphead
19363	Remco Water Pump
19425	Flowmeter Sensor Cable 6"
22032	FM250 P Flowmeter
19371	1/2" Side Load Banjo Valve
16025 A	4.2 Metering Tube
19383	3.2 Metering Tube
19384	2.4 Metering Tube
19385	1.6 Metering Tube
19611	Single Relay Control Module
18837	Air Compressor w/Adapter
19126	Air Compressor Air Filter 1/4"
19164	1/4" S.S Street Elbow
19151	1/2" Braided Vinyl Hose
19153	3/8" Braided Vinyl Hose
19576	DZUS 1/4 Turn Fastener Stud
19577	DZUS 1/4 Turn Receptacle
19442	1/2" Quick Coupler Panel Mount
19443	3/4" Quick Coupler Insert
19373	Tubing 1/4" ID x 3/8" OD Blue
19374	Tubing 1/4" ID x 3/8" OD White
19375	Tubing 1/4" ID x 3/8" OD Black
19477	Tubing 1/4" ID x 3/8" OD Green
19548	3/8" Stem x 1/2" Barb Black
19596	1/4" MPT x 3/8" PTC Black
19597	1/4" MPT x 3/8" PTC Swivel 90 <sup>0</sup> Black
19148	3/8" Stem x 3/8" PTC Black
19202	3/8" Stem x 3/8" Barb Black
19251	1/4" FPT x 3/8" PTC Black

19557	1/2" x 1/2" x 1/2" Barb Tee Black
19560	1/2" MPT x 3/8" PTC Black
19561	3/8" PTC x 3/8" MPT Tee Black
19170	Big Air 30 Amp Power Fuse Holder Kit
19295	Big Air 30' 2pin M/P 480 Power Cable

### **Chemical & Water Tank Related Parts**

19144	3/4" FP 4Bolt PolyPro Valve
19162	1/2" x 50 Mesh Red Strainer
19234	3/4" 50 Mesh Micro Strainer
19238	1/2" FP Union PolyPro Valve
12527	1/2" MPT x 1/2" MPT Nipple Black
19165	3/4" MPT x 3/4" MPT Nipple Black
19185	3/4" FPT x 3/4" FPT Tee PP Black
19186	3/4" MPT x 1/2" MPT Nipple Black
19242	3/4" MPT x 3/4" Barb PP Black
19560	1/2" MPT x 3/8" PTC Black
19233	3/4" MPT x 3/4" Barb 90° PP Black
19594	3/4" Rubber Spiral Hose
10509	3/4" MPT x 1/2" Barb PP Black
19148	3/8" Stem x 3/8" PTC 90° Black
19441	3/4" MPT x 1/2" FPT Bushing
12526	1/2" FPT x 1/2" PFT Tee PP Black
12527	1/2" MPT x 1/2" MPT Nipple Black
13947	1/2" MPT x 1/2" Barb PP Black

### **Section Tower Related Parts**

19619 B	6pin 20' JWPF Extension Cable
18510	SafeGuard Sensor UClip, S.S
18514	SafeGuard Sensor Retainer Clip
18627	Plug Fitting 3/8" John Guest 90°
18687	Pink Cartridge (Net price only)
18822	3RIVE 3D™ Foam Blockage Sensor
19083	Mixing Tee Fitting
19119	Mixing Tee 1" Gasket
19120	Mixing Tee Clamp
19148	3/8" Stem x 3/8" PTC 90° Black
19151	1/2" Braided Vinyl Hose

19153	3/8" Braided Vinyl Hose
19192	Foam Manifold Assembly
19202	3/8" Stem x 3/8" Barb Black
19219	UBolt, 3/8" x 7" x 9"
19194	Liquid Core Disc
19244	Liquid Disc D1
19246	Liquid Disc D2
19247	Liquid Disc D4
19195	Air Disc 1 #30
19248	Air Disc 2 #35
19249	Air Disc 3 #40
19250	Nipple, 11/16" x 1/4" PP
19375	Tubing 1/4" ID x 3/8" OD Black
19409	3/8" Stem x 1/4" PTC
19410	1/4" Tubing
19512	4Row Splitter Cable
19513	6Row Splitter Cable
19541	Coiling Bracket
19542	1/4" Zip Valve
19544	Row Valve Bracket
19545	Section Tower Bracket
19546	3pin W/P to 4pin M12 cable
19599	M12 Dust Cover
19547	1/4" Stem x 1/4" PTC 90° Black
19548	3/8" Stem x 1/2" Barb Black
19549	1/4" FPT x 1/4" PTC
19550	1/4" PTC Straight Quick Cap Black
19551	1/4" FPT Quick Body Black
19552	EPDM Rubber Seal
19553	1/4" MPT x 3/8" Stem Black

#### **In-Furrow Delivery Related Parts**

19121	S.S Foam Tube Straight
19122	S.S Foam Tube Bent
19497	3/8" PTC x 1/4" PTC Union Black
19464	Seed Firmer Curved Accessory Kit, John Deere & Rebounder (1 per row)

- 19465 A    Seed Firmer Straight Accessory Kit, Keeton (1 per row)
- 15994 A    Brass Reducer Accessory Kit, Case IH 2150 (1 per row)
- 15995 A    Curved Accessory Kit, Case IH (1 per row)
- 19476      Adapter, 1/8" PTC x 3/8" PTC Union, Totally Tubular
- 15992 A    Fitting, Case IH 2150, Brass Reducer
- 19742      Tubing, Nylon, 1/4", (to in-furrow foam delivery tube)

NOTES:




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