SnowEx

LIQUID SOLUTIONS

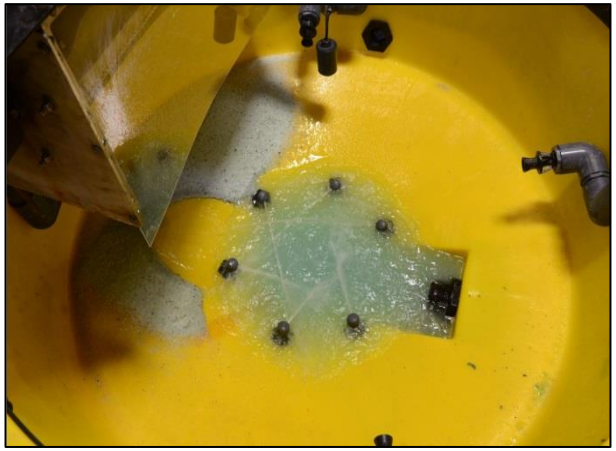
Equipment Materials Training

2017 CERTIFIED TRAINING COURSE

BRINE PRO™ 2000

Basics of Brine Making

Start with the Best Quality Salt/Water Mix Available



- The purer the salt, the more efficient the brine maker will be and will yield better results faster.
- Clean water: A water filter may be needed at water intake valve.
- Use Sodium Chloride Only
- Salt brine works most actively when pavement temperature is above 15°F
- Store salt inside if possible

Factor Value Adjustment for desired Salinity

- 30 minutes or longer to reach 23.3% salinity
- **Do not interrupt the machine during startup cycle**
- 4” to 10” Salt build-up in mixing tank is normal depending on quality of salt.
- Start measuring salinity 15 minutes after salt flow begins

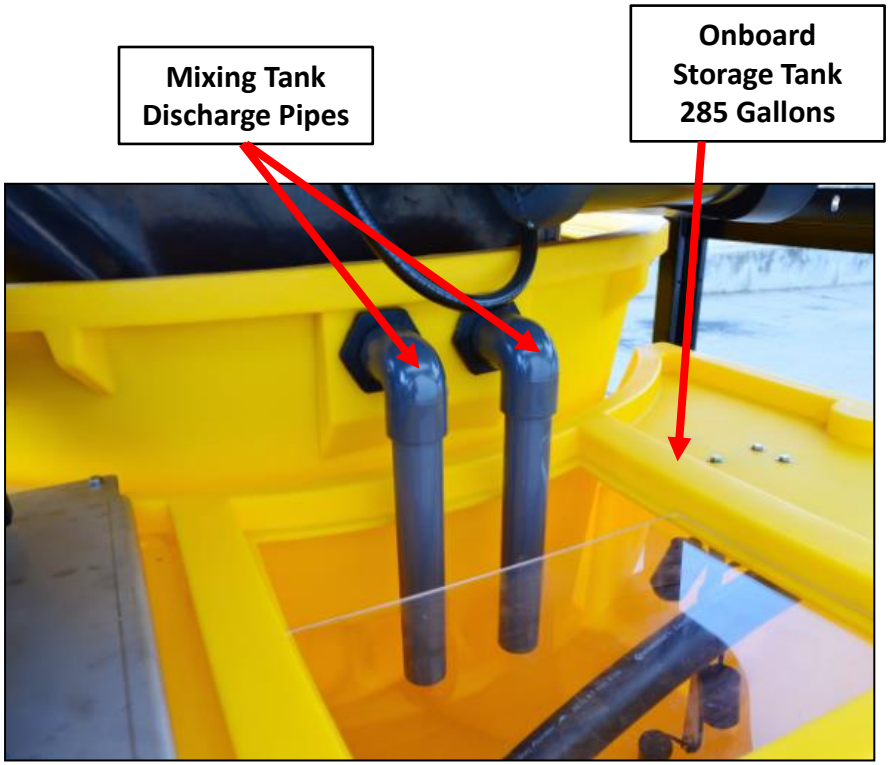
System Maintenance

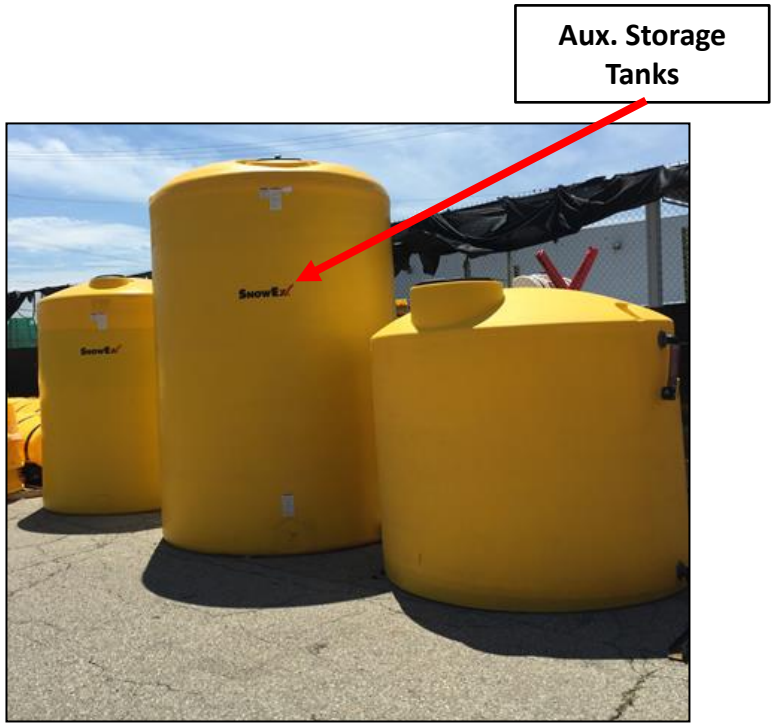
- Keep unit clean
- Clean eductor nozzles regularly
- Run CIRCULATE mode periodically to prevent excessive salt build up in the mixing tank
- Wash down with hose (fresh water)
- Drain brine from system
- Grease all bearings every 10 hours
- Prime circulation pump on dry startup

Basics of Brine Making

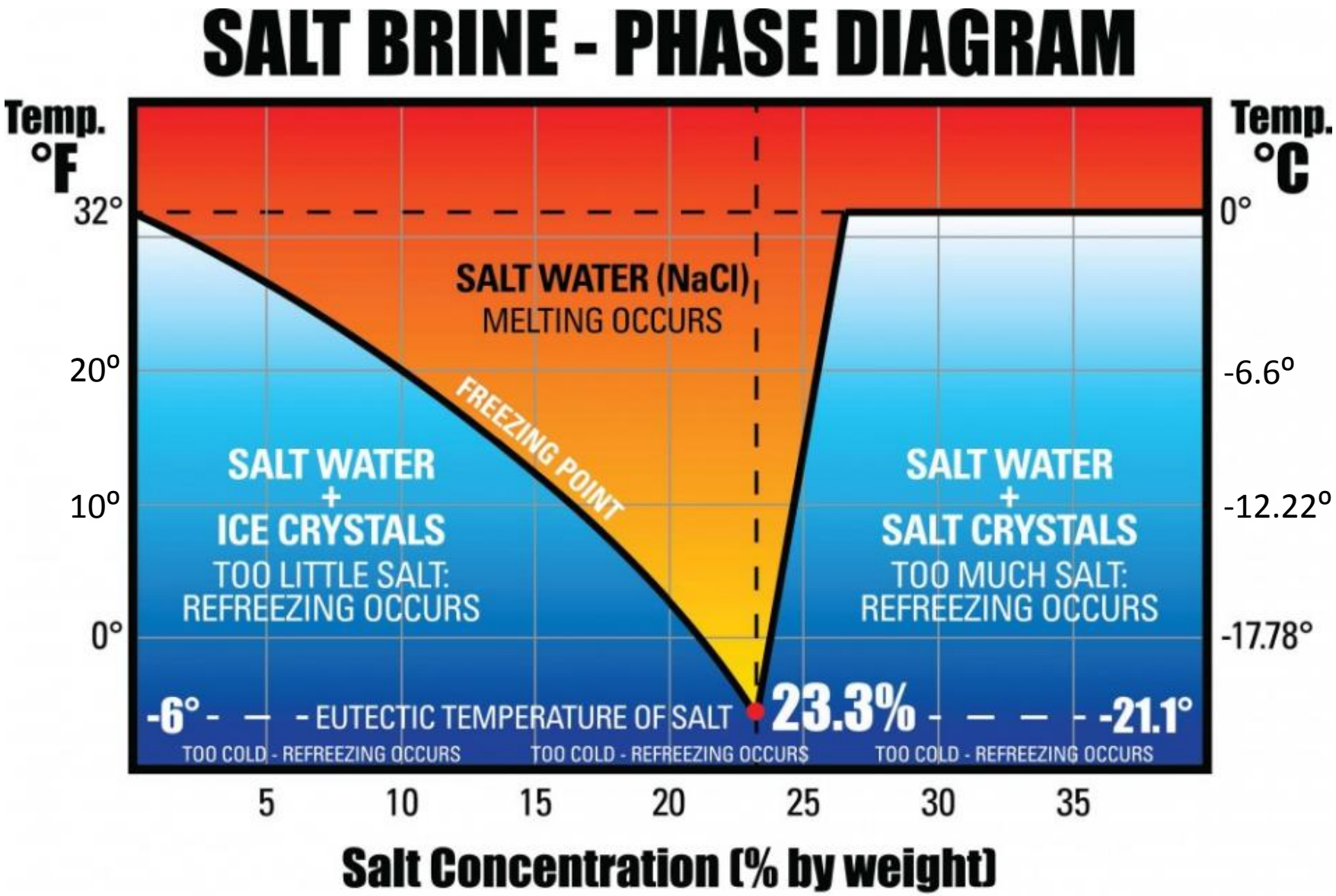
- Once the brine maker has sensed the desired salinity the unit will automatically transfer good brine to the onboard storage tank through the discharge pipes.
- **<u>Refractometer is required to calibrate the desired salinity</u>**

- **<u>In Batch Mode:</u>** the machine will stop brine production when the rear storage tank is full.
- **<u>In Automatic Mode:</u>** the discharge pump will turn on when the rear storage tank is full. The unit will continue to discharge brine to an external storage tank until the preset limit is reached.



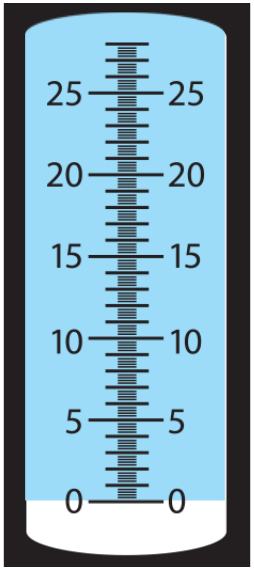


Basics of Brine Making

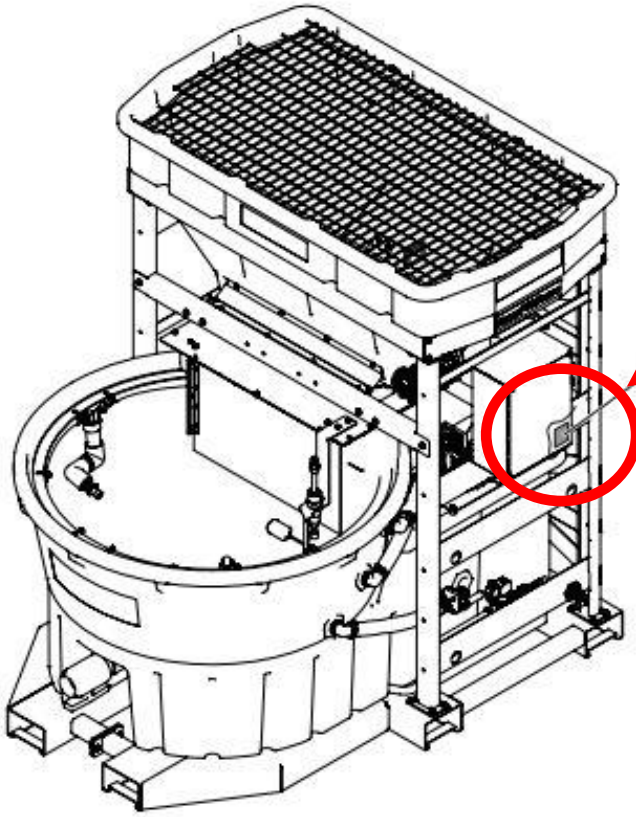


Basics of Brine Making

Refractometer



BRINE PRO™ 2000



Inside Cover

Code	Definition
YY	2-Digit Year
MM	2-Digit Month
DD	2-Digit Day
LL	2-Digit Location Code
XXXX	4-Digit Sequential Number
ZZZZZZ	Model #

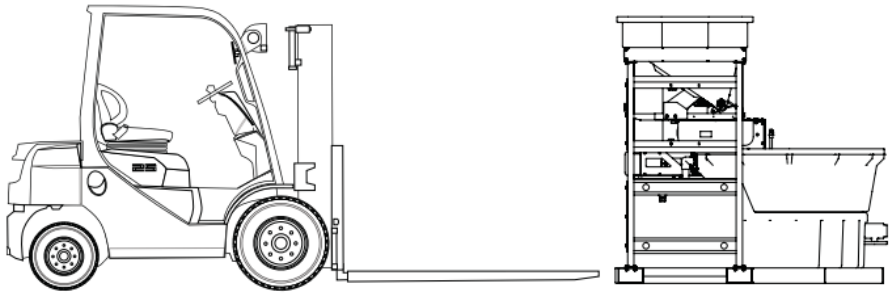
Set-Up

- The brine maker must be installed indoors, on a hard flat/level surface, and in an area that is suitable for spray-down cleaning with enough over head space to load the machine safely
- The Ambient Temperature must be kept above freezing or significant damage will result
- The brine maker requires a forklift with a minimum of 3,300 lbs. lifting capacity and 72” fork extensions are recommended
- Once in place the unit requires a 220 volt AC single phase connection and must be installed in compliance with all OSHA and local laws and regulations
- **All electrical connections must be made by a Licensed Electrician and installed with a 50A breaker**
- Damage caused by installing or storing in an unsuitable environment may violate the warranty

Brine Pro 2000 Specifications	
Input Requirements	
Inlet Flow Rate	3–15 gpm
Electrical Connection	220 V AC, 50 A Service, Single Phase
Dimensions	
Length	100 in
Width	86 in
Height	90 in
Weight	
Empty	1,500 lb
One Cubic Yard of Salt	2,000 lb
One Gallon Brine	10 lb
Unit with Brine and Salt	9,000 lb
Capacity	
Mixing Tank	265 gal
Brine Tank	285 gal
Hopper	1 cu yd
Brine Creation	3–15 gpm
All values are approximate.	

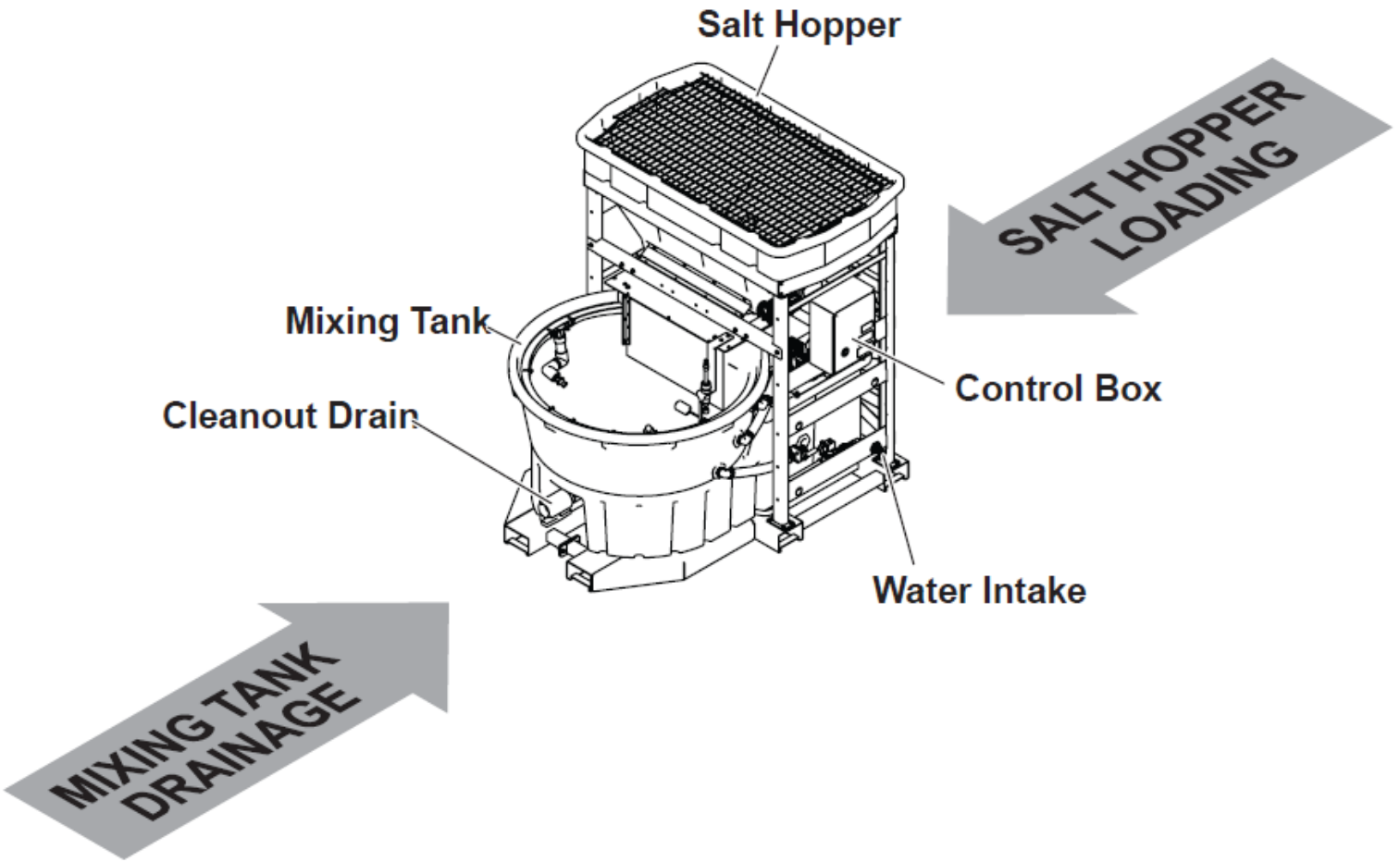
⚠ CAUTION

Failure to install in the proper environment may cause damage, malfunction, and may violate the manufacturer's warranty.



BRINE PRO™ 2000 Set-Up

Accessibility



Walk-Through

Hopper
(1 cubic yard)

Hammer Mill

Spray Bar

Rubber
Dust Shield
Covering
Hammer Mill

Mixing Tank
(265 Gallon)

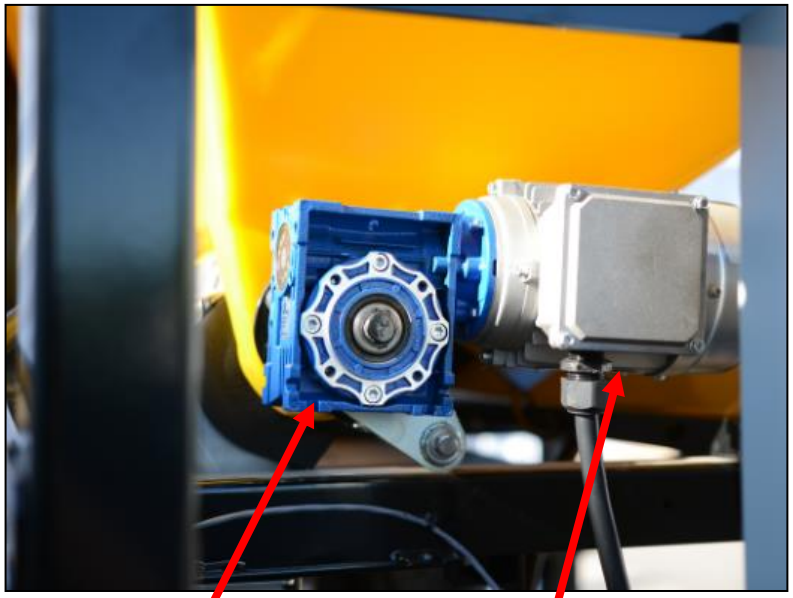
Storage Tank
(285 Gallon)

Cleanout Drain

Walk-Through

Hopper Auger

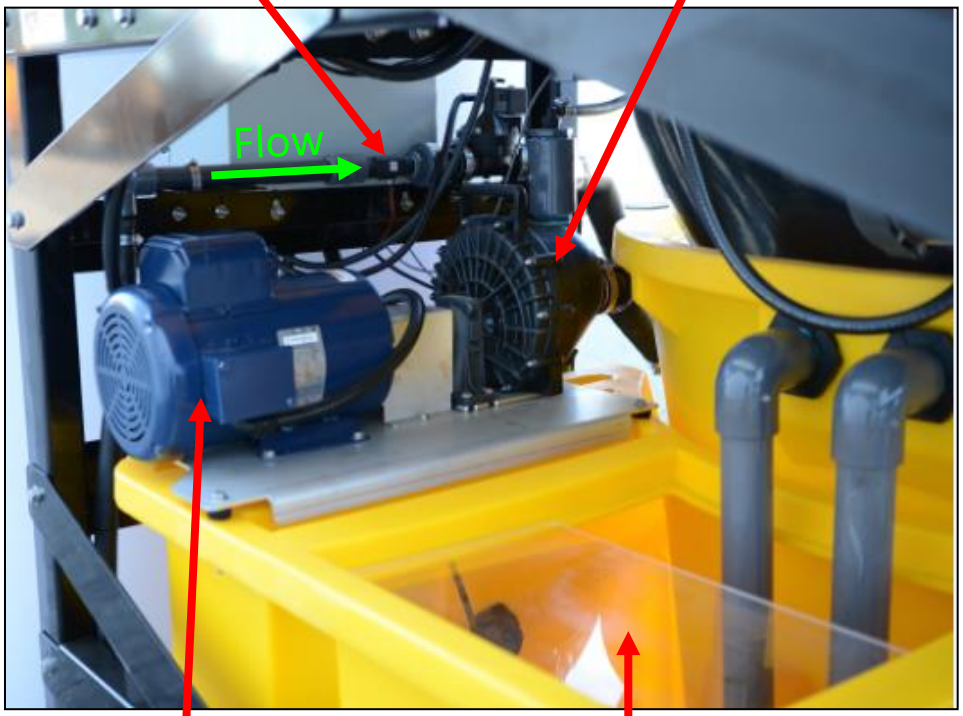
Auger Motor/Trans Kit

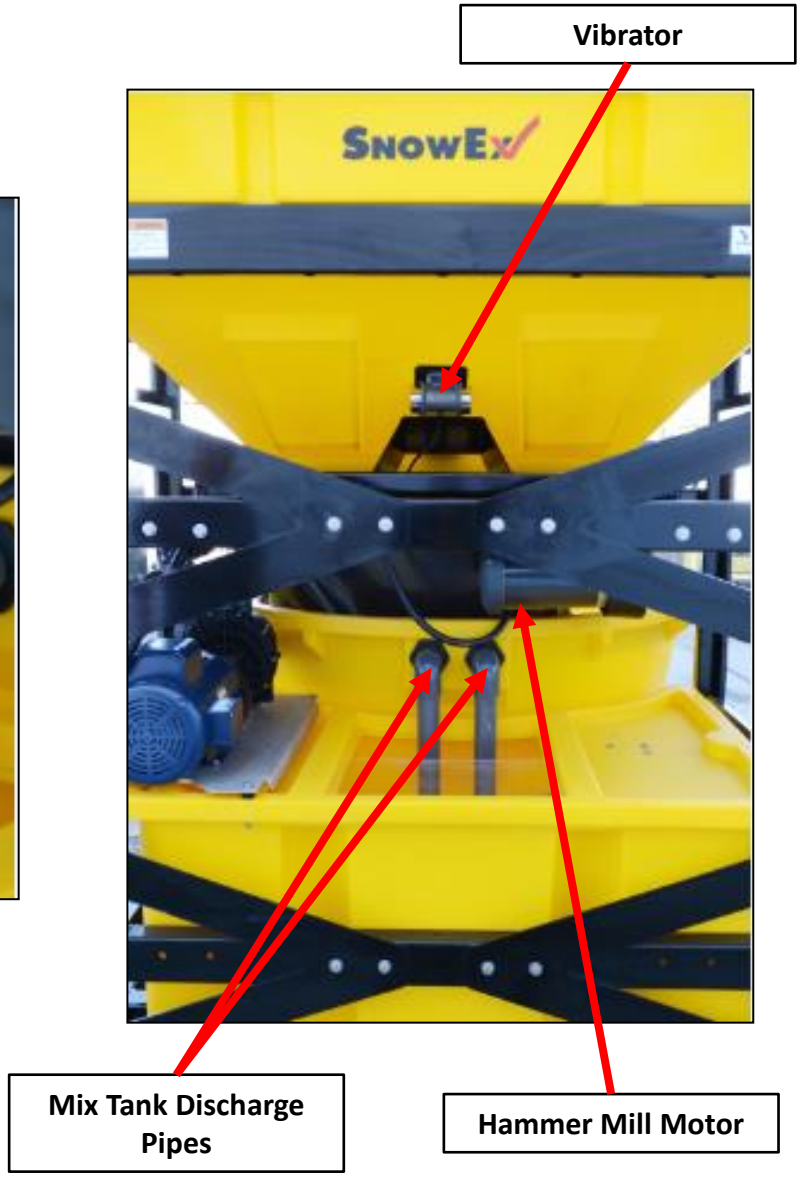


Auger Transmission

Auger Motor

Walk-Through





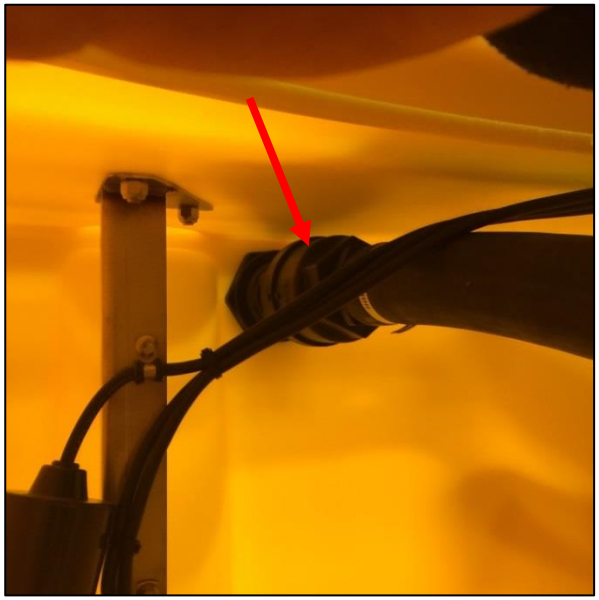
Walk-Through

Inside of Brine Storage Tank

Brine Outlet Pump

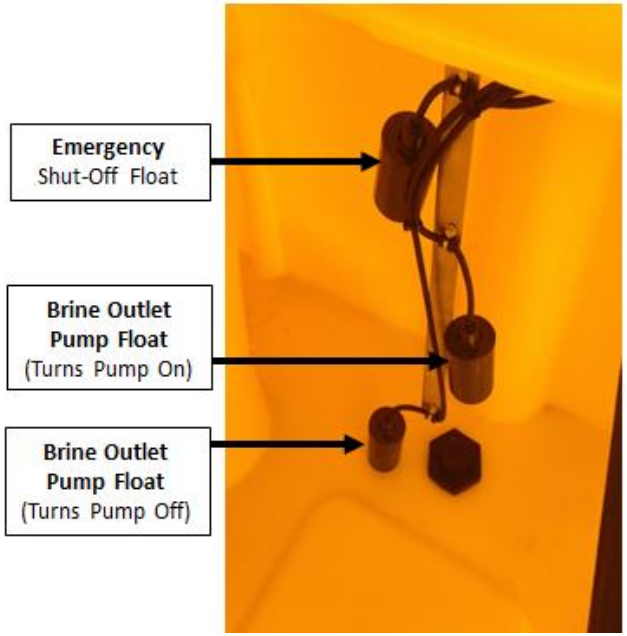
- Outlet pump is a 66 gal/min Sump Pump
- Transfer hose to the Check Valve

Check Valve



- Check Valve on the transfer hose to prevent back flow to the Outlet Pump

Float Switches



Float switch free cord length

i. Mixing tank: 3”
ii. Holding tank:
    1. Low: 2”
    2. Mid: 4”
    3. High: 1.5”

Walk-Through

Touch Screen Control

- Simple and easy to use touch screen interface to set batching, automated, or cleaning modes. (Ex. Jog Functions)

Auger

- Guarantees precise salt delivery to mixing tank for proper brine mixture.
- Rotary Vane feeder to accurately measure salt delivery

Hammer Mill Salt Grinder

- Creates consistent particle sizes.
- Helps dissolve the salt into the water faster

Walk-Through

Follow Lock Out Tag Out Procedures

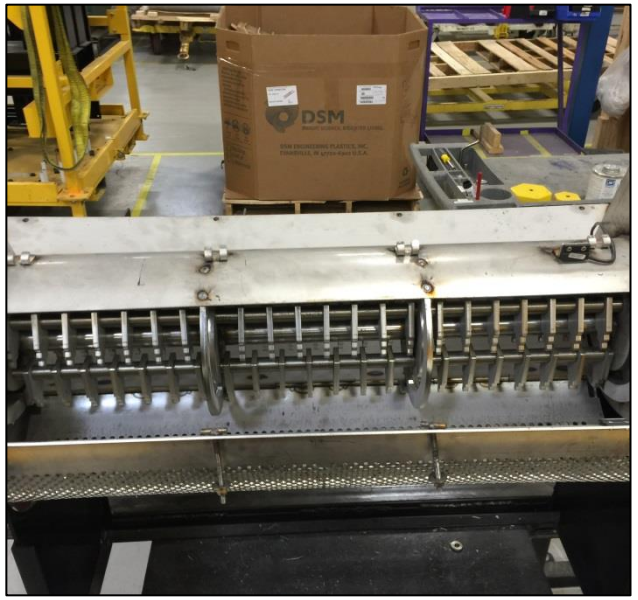
Closed Hammer Mill

- Hammer Mill Door is secured with four T-Bolt style latches and a door safety switch

Door Safety Switch

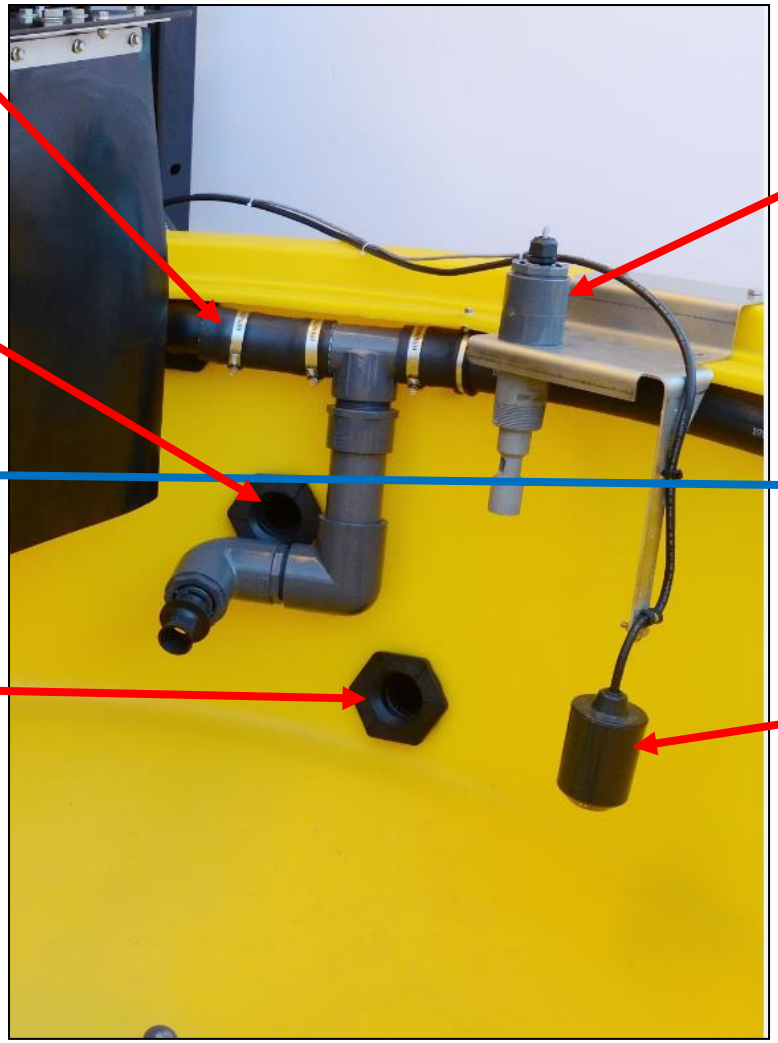
- Safety Switch is a magnetic switch
- Gap up to 5/8”
- To open door simply unscrew all four T-Bolts

Hammer Mill Internals



- Simple and easy to clean the internals of the hammer mill with a garden hose

Walk-Through



Circulation Pump Outlet

Circulation Pump Inlet

Transfer Inlet (Drain mix tank to storage tank)

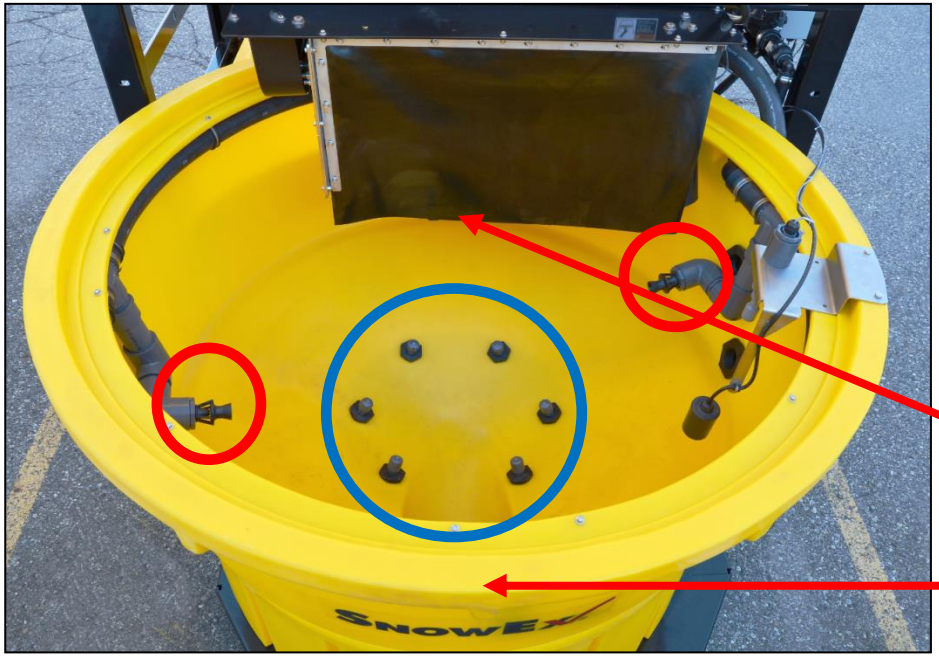
Conductivity Sensor (Measures Salinity)
Wipe sensor after sitting

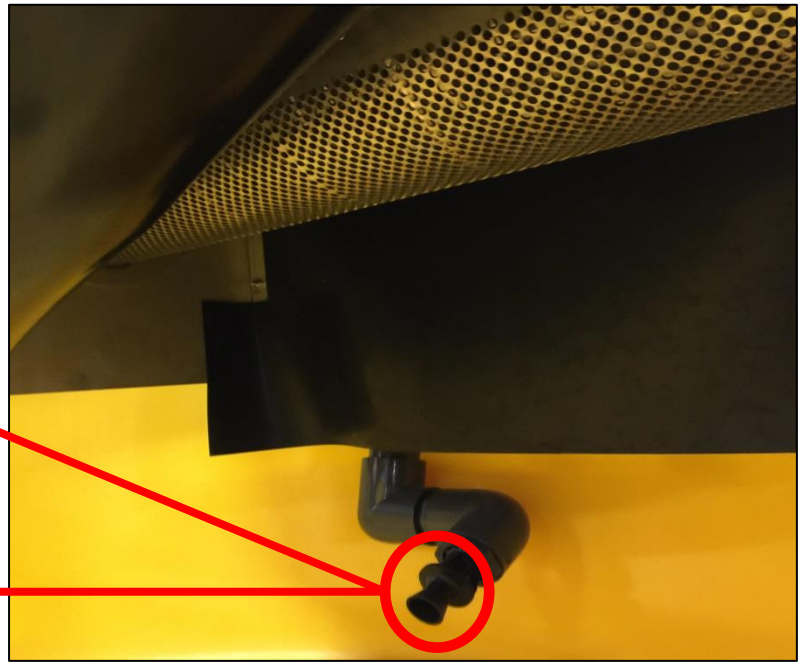
Pump Prime Level

Float Switch (Circulation Pump)

Walk-Through

- The unit has four Eductor Nozzles located in the Mixing Tank
- It is equipped with 6 Fresh Water Nozzles (4 Tee & 2 Elbow)





Walk-Through

Mixing Tank

- High Volume Pump
- Helps to generate a uniform brine mixture.
- Eductor nozzles to agitate brine mixture.
- Mixing Tank is concave to assist with clean-out

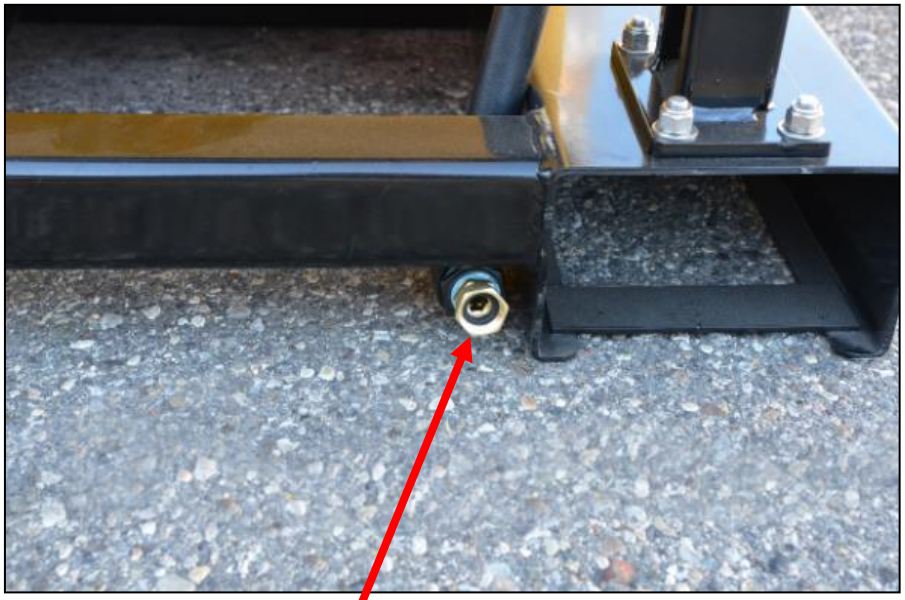
Hopper

- Uses an industry leading design for a no-splash salt application.
- 1 cubic yard capacity
- Visual salt level indicator.

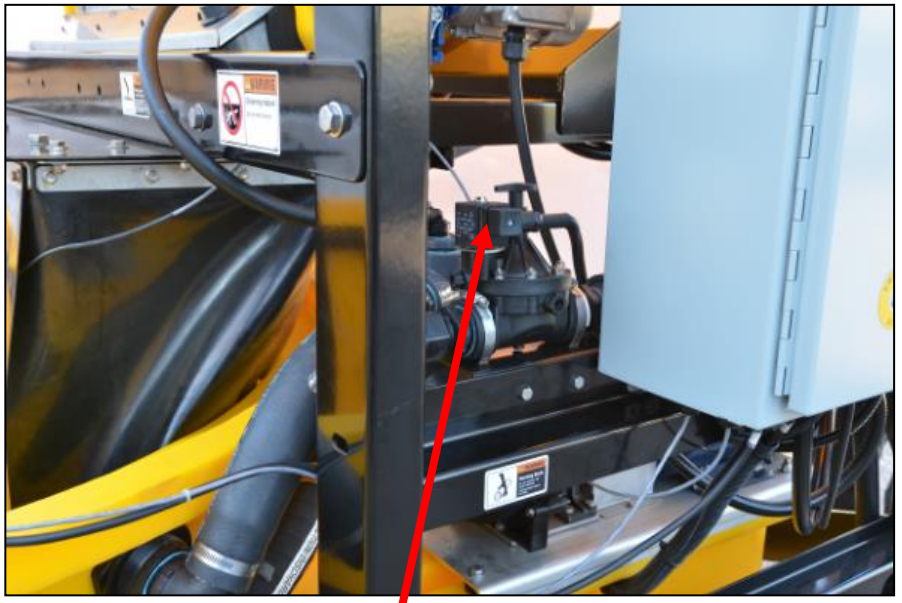
Easy Clean-Out

- 3” clean out valve allows for simple draining of waste material out of the mixing chamber.

Water Supply



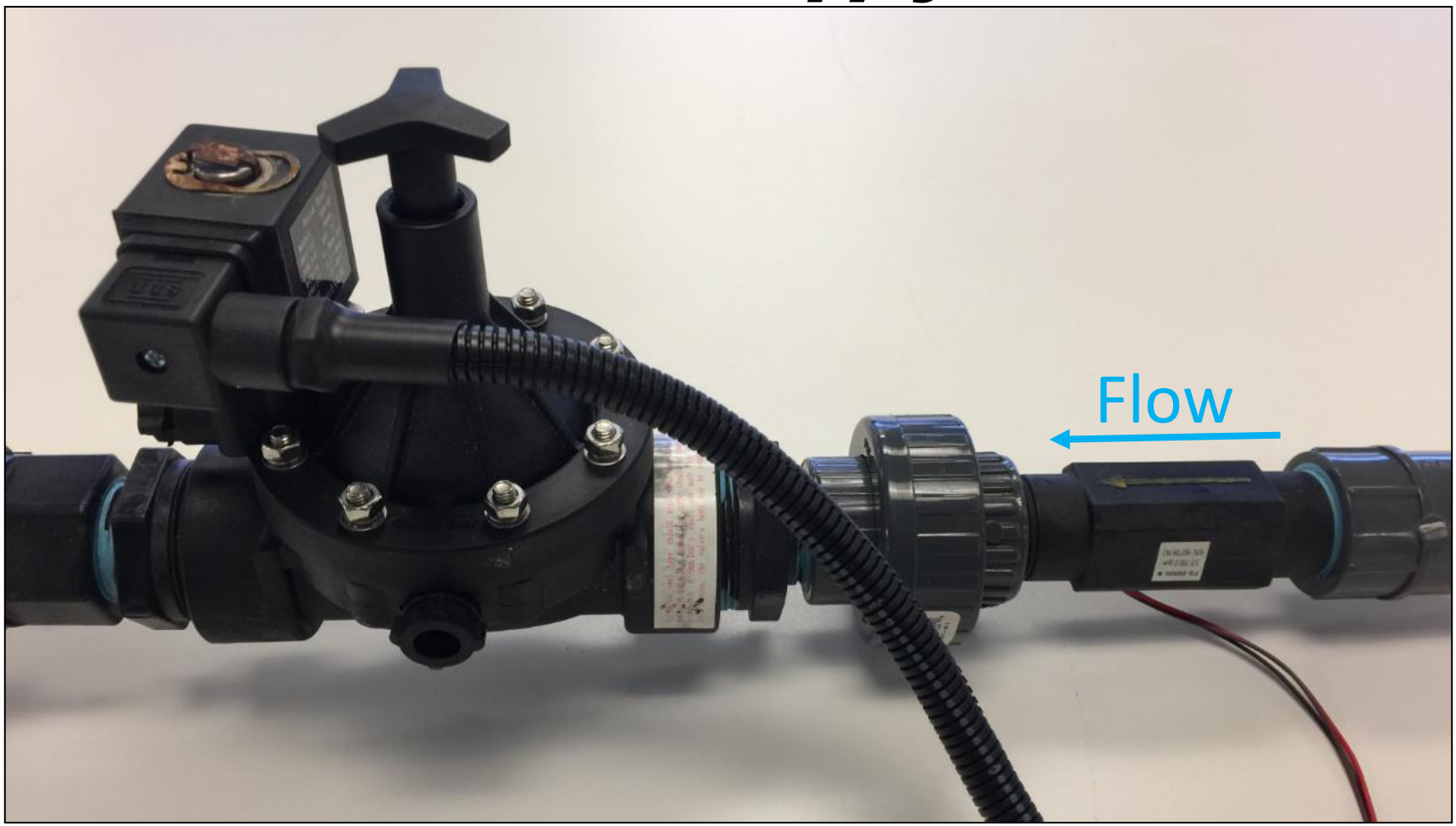
Water Line Input
(3 to 18 GPM is required)



Control Valve
Ability to regulate the flow of water from the touch screen.

IMPORTANT
Inline filter maybe required depending on water quality.

Water Supply

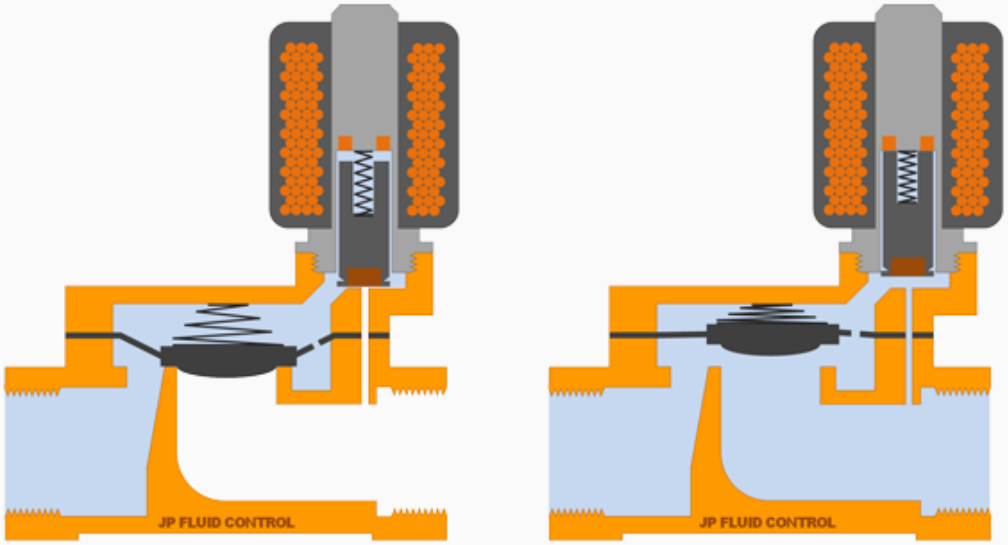


Indirect operated solenoid valve

Walk-Through

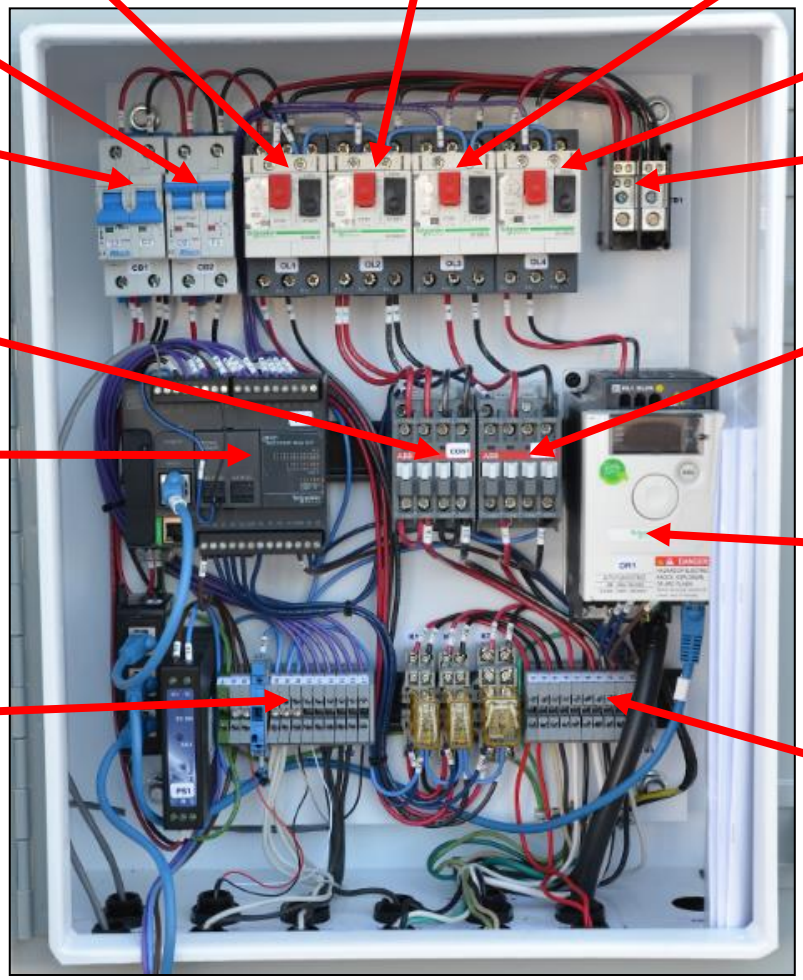
Indirect Operated (Servo Or Pilot Operated)

Indirect operated solenoid valves (also called servo operated, or pilot operated) use the differential pressure of the medium over the valve ports to open and close. Usually these valves need a minimum pressure differential of around 0.5 bar. The inlet and outlet are separated by a rubber membrane, also called diaphragm. The membrane has a small hole so that the medium can flow to the upper compartment. The pressure and supporting spring above the membrane will ensure that the valve remains closed. The chamber above the membrane is connected by a small channel to the low pressure port. This connection is blocked in the closed position by a solenoid. The diameter of this "pilot" orifice is larger than the diameter of the hole in the membrane. When the solenoid is energized, the pilot orifice is opened, which causes the pressure above the membrane to drop. Because of the pressure difference on both sides of the membrane, the membrane will be lifted and the medium can flow from inlet port to outlet port. The extra pressure chamber above the membrane acts like an amplifier, so with a small solenoid still a large flow rate can be controlled. Indirect solenoid valves can be used only for one flow direction. Indirect operated solenoid valves are used in applications with a sufficient pressure differential and a high desired flow rate, such as for example irrigation systems, showers or car wash systems. Indirect valves are also known as servo controlled valves.



Schematical representation of an indirect operated solenoid valve (2/2-way, normally closed).

Walk-Through



Grinder Motor (OL1)

Circulation Pump (OL2)

Discharge Pump (OL3)

Vibrator/Water Valve (CB2)

VFD (OL4) (Variable Frequency Drive)

Power Supply (CB1)

Terminal Block 1 220 VAC (TB1)

Motor Contact Starter (CON1)

Motor Contact Starter (CON2)

Programmable Logic Controller (PLC)

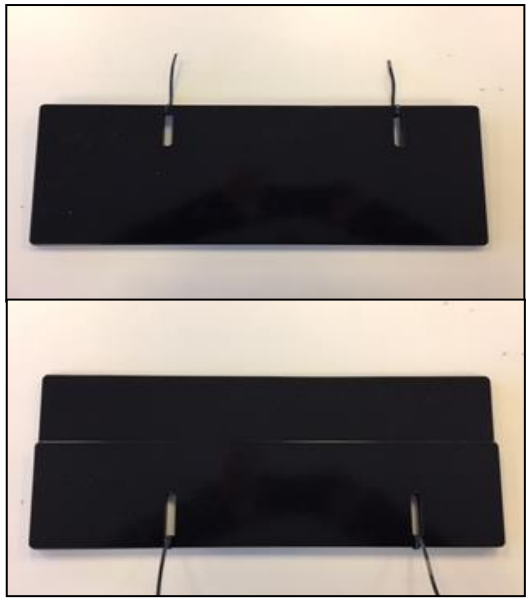
Frequency Drive (DR1) (Reads 50Hz on Startup) Reads between 20Hz-62HZ Brine Production

Terminal Block 2 (TB2)

Terminal Block 3 (TB3)

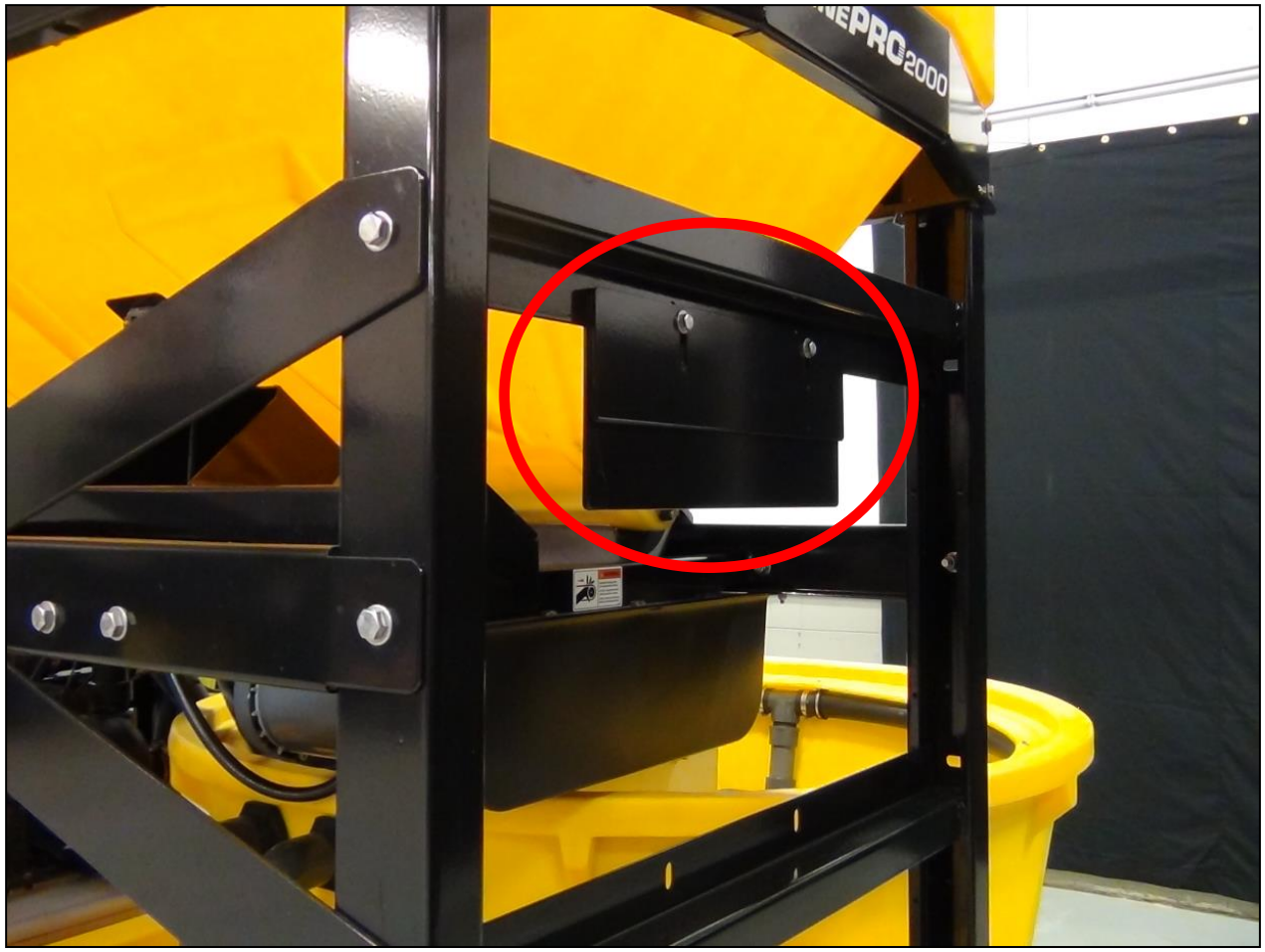
Getting Started

The Adjustable Baffle will need to be adjusted for proper flow. If your salt is very dry and free flowing, you may need to use one of the larger baffles to reduce flow. If your salt is wet or clumpy you will need to open up the baffles. Having too much flow can create auger jams and hammer mill breaker trips.



To obtain the optional baffle slides order **PN# 99982**.

Getting Started



Baffle location

Filling the Unit

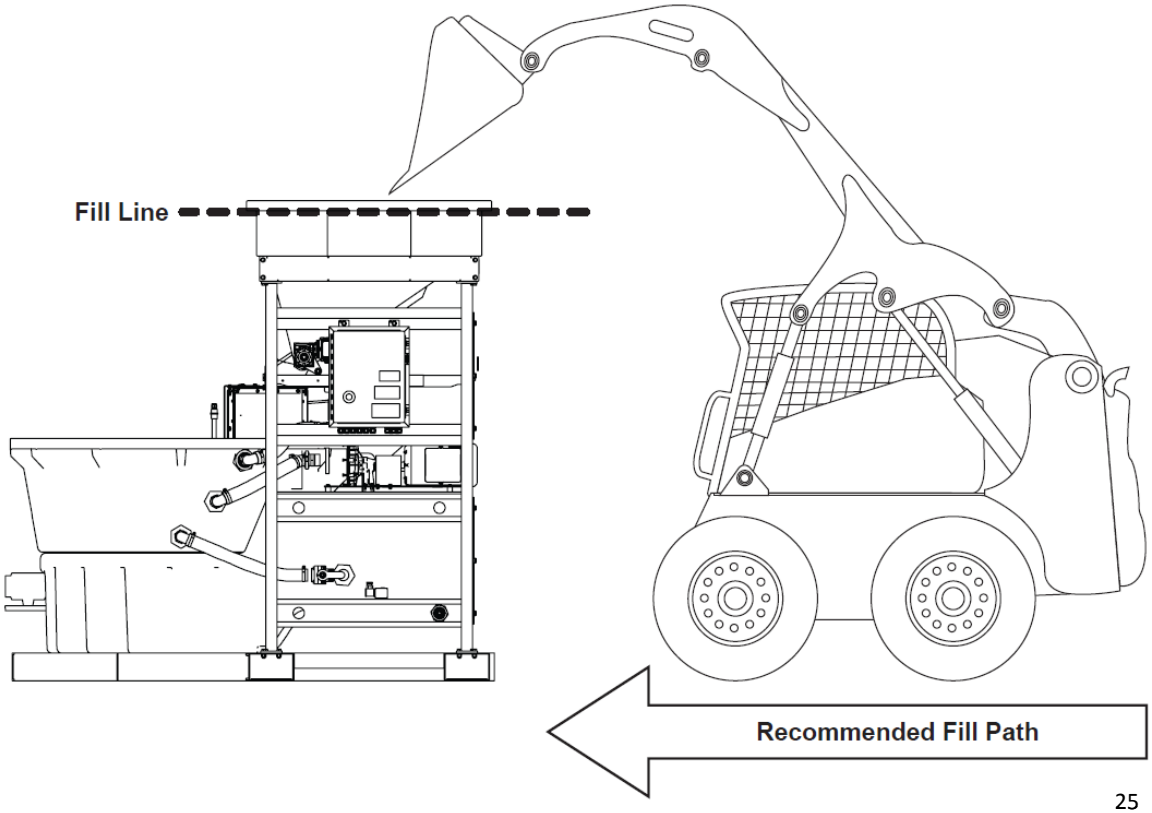
- Ensure the hopper is free of debris and/or moisture before filling.
- A skid-steer type loader is recommended for loading salt into dry hopper
- On **Initial Start Up** only fill the hopper 1/4 the way full for baffle calibration
- Do **not** exceed the fill line when adding salt (1 cubic yard max)

Be sure to use the best quality salt available.

NOTE: This brine maker is designed and programmed to mix rock salt (sodium chloride) and water *only*. It is not designed for use with magnesium chloride, calcium chloride, potassium chloride or any other solid material or additives. Do not use this equipment for purposes other than those specified in this manual.

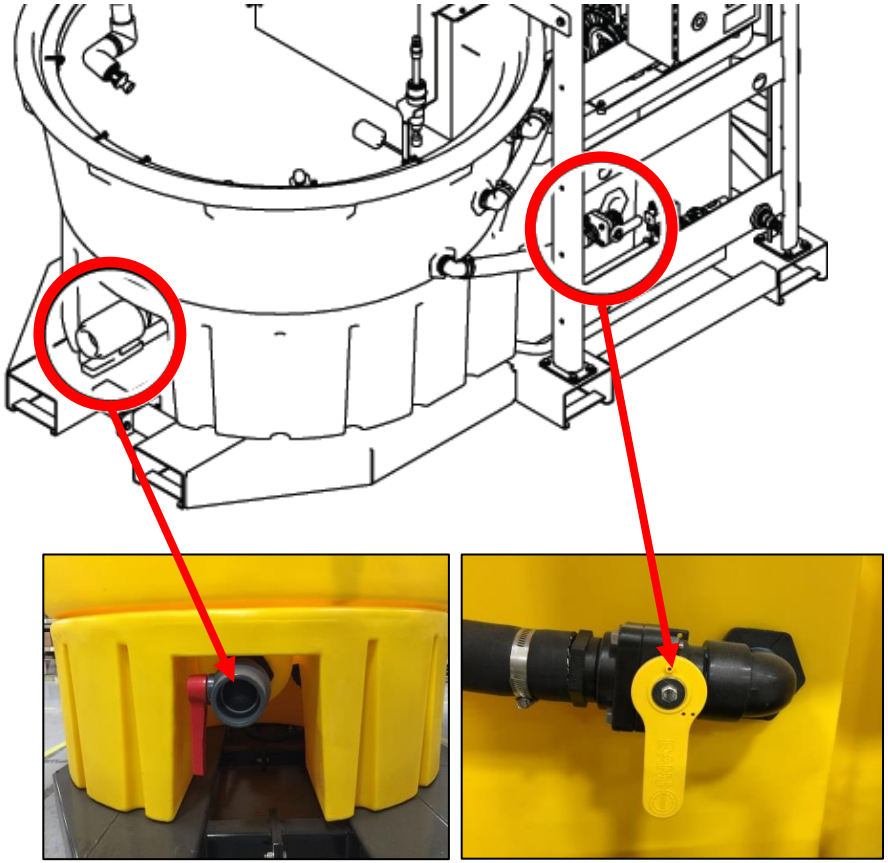
⚠ WARNING

Overloading the salt hopper could cause an accident. Do not overfill.



Getting Started

NOTE: Before making brine, ensure the mixing tank drain valve and the transfer valve are closed.



Getting Started

Hook Up Water Supply

(Requires 3-15 gal/min)

Turn the Supply Power on

Supply Power ON

Getting Started

Make sure the Emergency Stop Switch is Pulled Out

Touch Anywhere

Touch the screen anywhere to change the screen.

Select Language

Once the Language has been selected English/Espanol; the Mode Select Screen will be displayed.

Mode Select Screen

To begin, select the mode by pressing the circle with the arrow. Then press NEXT.

Mode Select Screen

In **Batch Mode**, the machine will stop when the rear storage tank is full. Batch mode will only make as much useable brine as the unit is capable of holding. Manual discharge is required.

Batch Mode

Select Batch by pressing the mode selection arrow.

Batch Mode

Pressing “Next” will take you to the batch mode control screen.

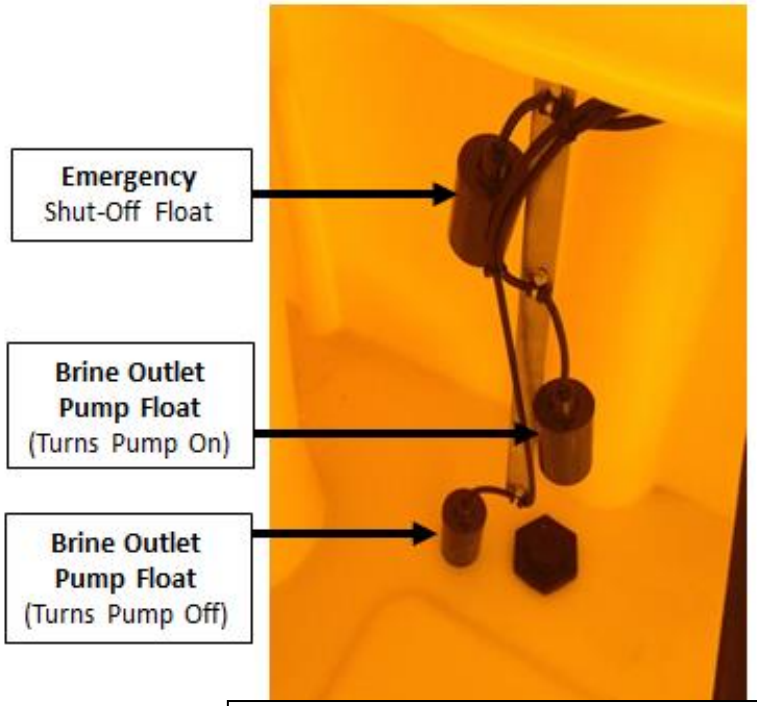
Batch Mode Control Screen

Pressing “Start” will begin brine production.

Once the onboard storage tank is full of brine, the machine will shut itself off.

Batch Mode Manual Discharge

In **Batch Mode**, "Batch Done" will appear in the message center when the storage tank is full. You will need to manually discharge the brine storage tank.



Float switch free cord length

i. Mixing tank: 3"
ii. Holding tank:
    1. Low: 2"
    2. Mid: 4"
    3. High: 1.5"

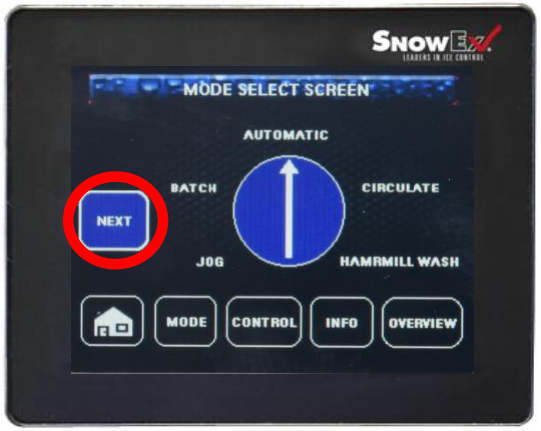
Mode Select Screen

In **Automatic Mode**, the discharge pump will turn on when the rear storage tank is full. The unit will continue to make and discharge brine to an external storage tank until the preset run limit is reached.

Automatic Mode

Select Automatic by pressing the mode selection arrow.

Automatic Mode



Pressing “Next” will take you to the automatic mode control screen.

Automatic Mode Control Screen

Press “Preset” to enter the gallons of brine desired.

Mode Select Screen

In **Automatic Mode**, you will need to set the automatic run limit. The unit measures fresh water into the brine maker. You will need to take into account your brine will require more storage space than 1000 gallons.

Set Run Limit

Press the yellow run limit window to pull up the keyboard. Enter the gallons desired and press enter.

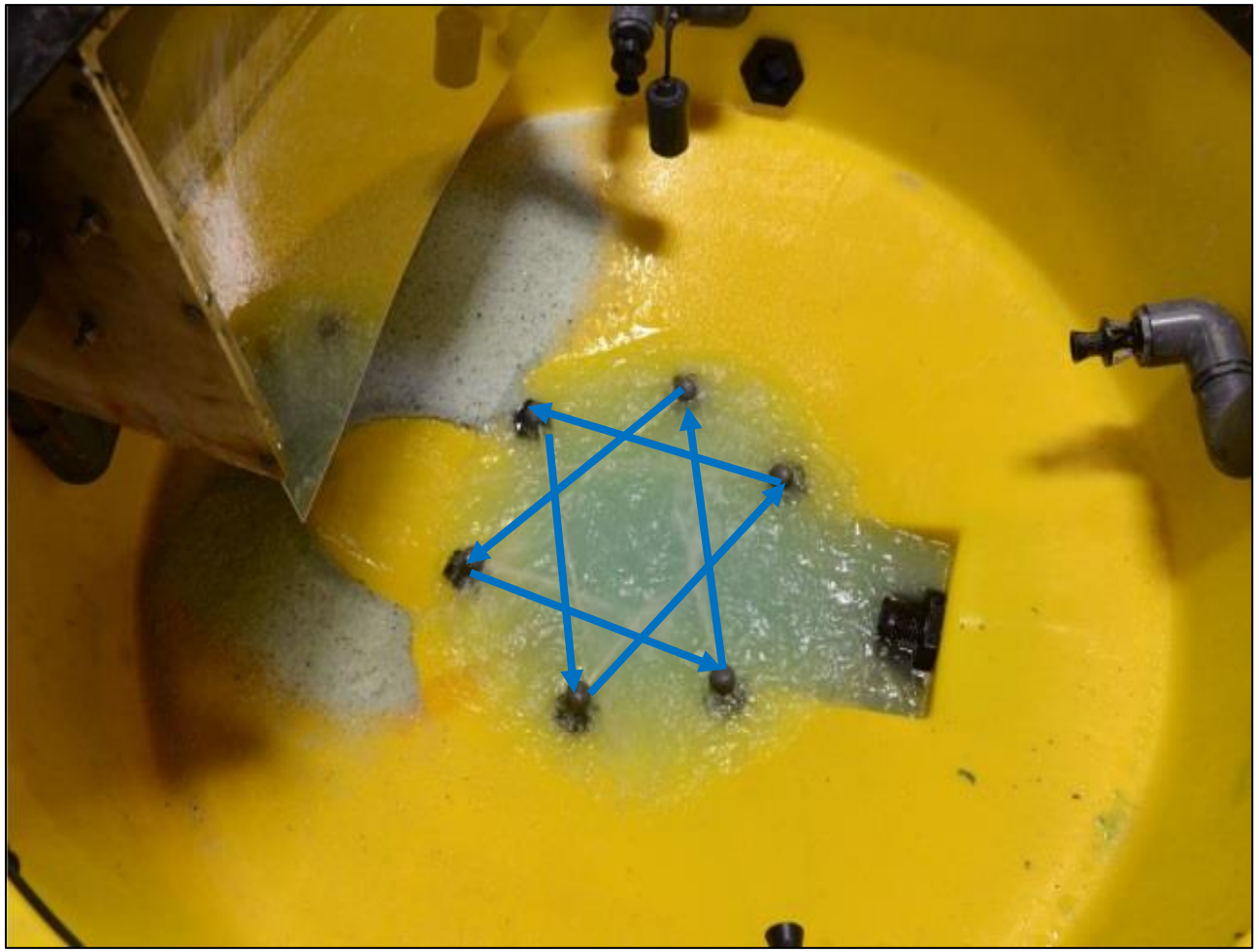
Reset Run Limit

Press reset button then the control button. Once the machine produces 1000 gallons of brine the machine will shut itself off. To make an additional 1000 gallons you will need to reset again.

Automatic Mode Control Screen

Pressing “Start” will begin brine production. Fresh water will turn on.

Getting Started



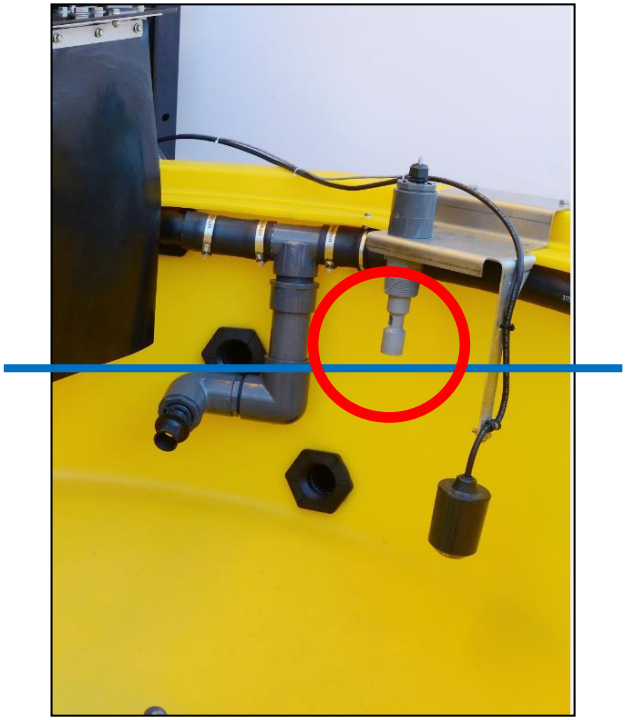
Fresh Water Nozzle Pattern

Getting Started

- Prime the pump after the water level is above the circulation inlet or if it has been sitting for a period of time. Open the reservoir cap and add 64 ounces of water. **Make sure the pump is not running.**

- Replace the reservoir cap.

Getting Started



- Once the appropriate level is reached in the mixing tank, the water level will be near the end of the salinity sensor.
- The brine maker will start to introduce salt to the mixing tank and the fresh water will turn off.
- At this time the circulation pump will start and you should see obvious circulation in the mixing tank.
- If circulation is not visible within 10 seconds of the pump coming on, the machine must be stopped and the pump primed again.
- Failure to correctly prime the pump can quickly damage the pump seals

Getting Started

- You will see salinity percent start to increase
- It can take 30 minutes or longer to reach 23.3% salinity depending on salt quality
- Be patient and do not interrupt the machine during Startup cycle
- Start measuring salinity 15 minutes after salt flow starts through the hammer mill
- You will be using an entire hopper of salt to reach this level of salinity (23.3%) and to accumulate 4-10 inches of salt build up in the bottom of the mixing tank. This is normal

Achieving Salinity

- To ensure the brine maker is producing the intended salinity, you will need to calibrate the conductivity sensor with the factor value adjustment.
- Calibration should be completed on initial startup.
- Salt quality and water quality can have an effect on the measurement of salinity.
- It is recommended to verify calibration of the BrinePro™ 2000 brine maker when any of these variables change.
- Once 23.3% salinity is reached, the fresh water will turn back on and brine will soon start to spill over into the rear storage tank.
- You will need to use the supplied refractometer to measure the salinity of the brine and calibrate the machine accordingly.

Using a Refractometer

Salt Refractometer Kit

Instructions

Refractometer

Calibration Screw Driver

Refractometer Case

Distilled Water to set the zero point

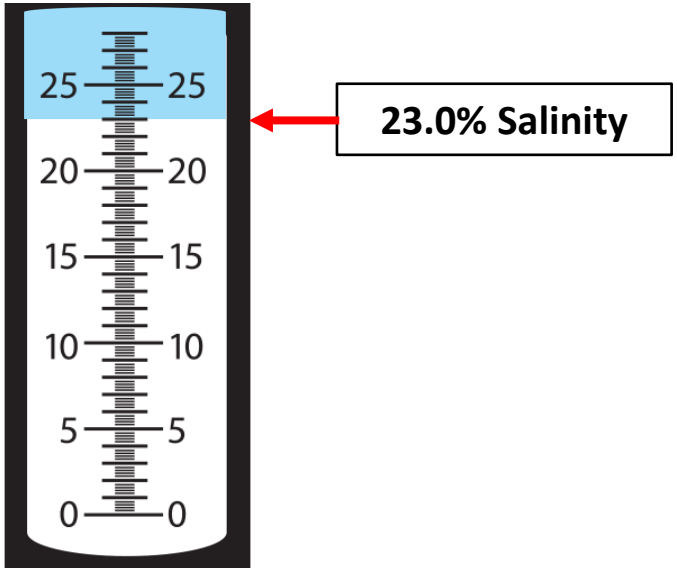
Sample Extractor

Using a Refractometer

Description

Using a Refractometer

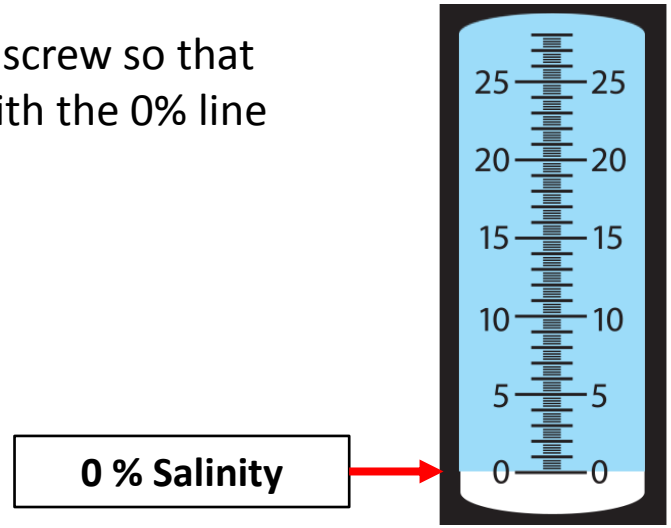
- The refractometer operates on the principle that, as the concentration or density of a solution increases, its refractive index changes proportionately.
- The refractive angle measured by your refractometer registers on the scale.
- The larger the concentration of salt in the solution the higher the reading on the scale.



Using a Refractometer

Calibrating

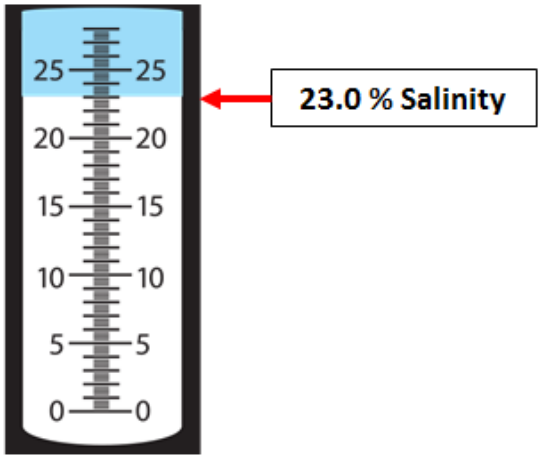
- With cover plate open, carefully clean the prism with the micro fiber cloth avoid scratching the surfaces
- Apply 3 to 4 drops of pure distilled water on to the prism platform
- Close the cover plate, ensuring the sample spreads completely across the prism.
- Aim the front end of the refractometer toward a light source and rotate the eyepiece to obtain the clearest image
- Use the supplied screwdriver to turn the calibration screw so that the dark and light boundary line coincides exactly with the 0% line on the scale
- Your refractometer is now calibrated



Using a Refractometer

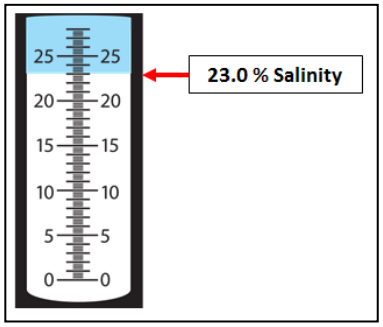
Taking a Salinity Reading

- Carefully dry the prism platform and cover plate
- Take the sample extractor and collect some brine
- Apply 3 to 4 to four drops of brine on to the prism platform and close the cover plate so the solution spreads evenly on the prism
- Aim the front end of the refractometer toward a light source and adjust eyepiece for the clearest focus of the boundary line between blue and white
- This sample tests at 23.0%
- After use, clean prisms with the micro fiber cloth, remove any surface residue, and flush the sample extractor with clean water
- You will now want to reference the flow chart in your owner's manual



Achieving Salinity Flow Chart

Test Sample



Dry Start Up
Machine Starts Adding Salt

Wait 10 min.

Measure Salinity with Refractometer

Does the Refractometer read less than 24%?

YES

Does the Machine Indicate between 23.0% & 23.6%?

YES

Is the Difference between Measured Salinity and Indicated Salinity Less than 0.4%?

YES

Wait 15 min.

Measure Salinity with Refractometer

Repeat this cycle until desired salinity is achieved. Adjust factor in smaller increments until desired accuracy is achieved. Increase the factor when the measured salinity is lower than the indicated. Decrease the factor when measured salinity is higher than the indicated.

Wait 15-20 minutes between adjustments and **never** adjust the factor by more than 10 points at a time.

NO (Is the Difference between Measured Salinity and Indicated Salinity Less than 0.4%?) → YES → Wait 15 min.

NO (Is the Difference between Measured Salinity and Indicated Salinity Less than 0.4%?) → Reduce Factor by 10 Points → Wait 10 min.

NO (Does the Machine Indicate between 23.0% & 23.6%?) → Is the Measured Salinity Less than or Greater than the Indicated Percentage?

GREATER → Reduce Factor by 10 Points → Wait 10 min.

LESS → Increase Factor by 10 Points → Wait 10 min.

Wet Start Up
Check Factor Setting → Measure Salinity with Refractometer

Factor Value Adjustment

Never change the Factor by more than 10 points at a time or the brine maker may fail to perform as intended

Press Factor

Press the factor button to enter the factor value adjustment screen

Press Factor Set Window

Press the factor set window to pull up the keyboard

Enter Factor Value

Key in the desired Factor Value and press enter. You will see the salinity percentage value change immediately

Operating the Control

(Keep screen clean for best function)

Saltmizer

Message Center

Status Lights

WTR – Water
CIR – Circulation Pump
HAM – Hammer Mill
VIB – Vibrator
AUG – Auger
DIS – Discharge Pump

Used to Display when each system is on

Auto Run Limit

Vibrator/Saltmizer Adjust

Salinity Reading

Operation Buttons

Factor Adjust

⚠ WARNING

Before operating, servicing and cleaning, locate and become familiar with the emergency stop button.

⚠ CAUTION

For emergencies press the physical Emergency Stop Button on the Control Box. Do not attempt to manually stop the unit.

Operating Modes

Automatic

Press here to change the display units

Press here to change the Run Limit

Press here to accept the Run Limit

Press here to reset the Run Limit

Volume Counter

Set to the Run Limit value and counts down as the brine is created. Shows how much brine the unit has left to create. Will automatically stop making brine once the value has reached zero. Reset each time the counter reaches zero or you will not be able to produce another 1000 gallons of brine.

Operating Modes

Automatic

Auto Control Screen

Press the "INFO" button to monitor the flow rate, auger output, input, total delivered and set the Auto Run Limit.

Operating Modes

Automatic

Auger Output
What percentage the auger is performing.

Flow Rate
How fast water is flowing into the unit from the water supply

Gallons
Changes measurements from Gallons to Liters

Input
How many gallons have been created since the last reset, increasing as brine is being created. This counter can be reset at any time by touching the “RESET” button.

Total Delivered
How many total gallons the unit has made. This value is not able to be reset.

Set Auto Limit
How many total gallons of brine the machine is set to produce.

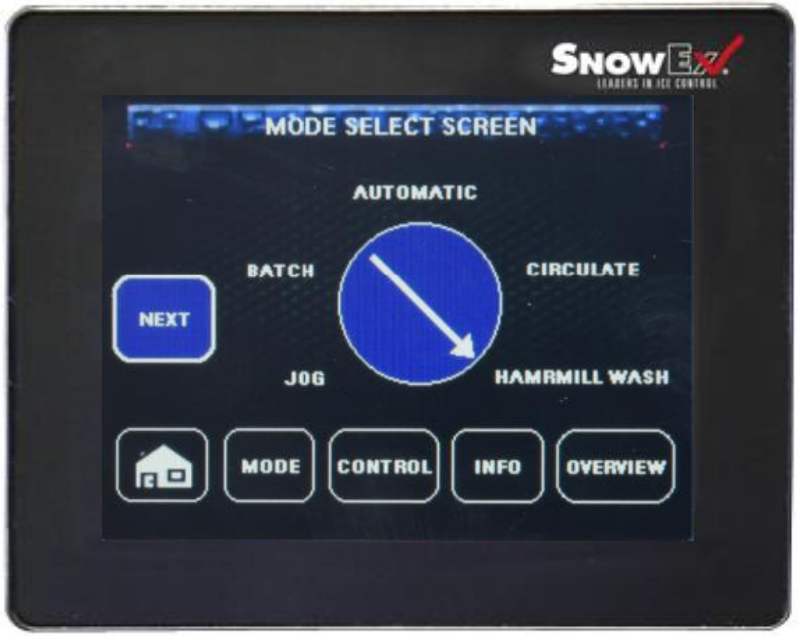
Operating Modes

Circulate

This mode creates usable brine by stopping the addition of salt and circulating the brine while adding fresh water to the mixing tank. Once the unit reaches the lowest acceptable salinity it automatically stops brine production. This uses built-up salt remaining in the mixing tank to optimize brine production so you can return to normal operation.

Operating Modes

Hammer Mill Wash



This mode allows the hammer mill to be washed out by and should be washed out before allowing the machine to sit for several days.

Operating Modes

Jog

This mode allows manual operation of the systems normally under computer control: water flow, circulation pump, hammer mill, vibrator, auger and discharge pump.

Salt Mizer

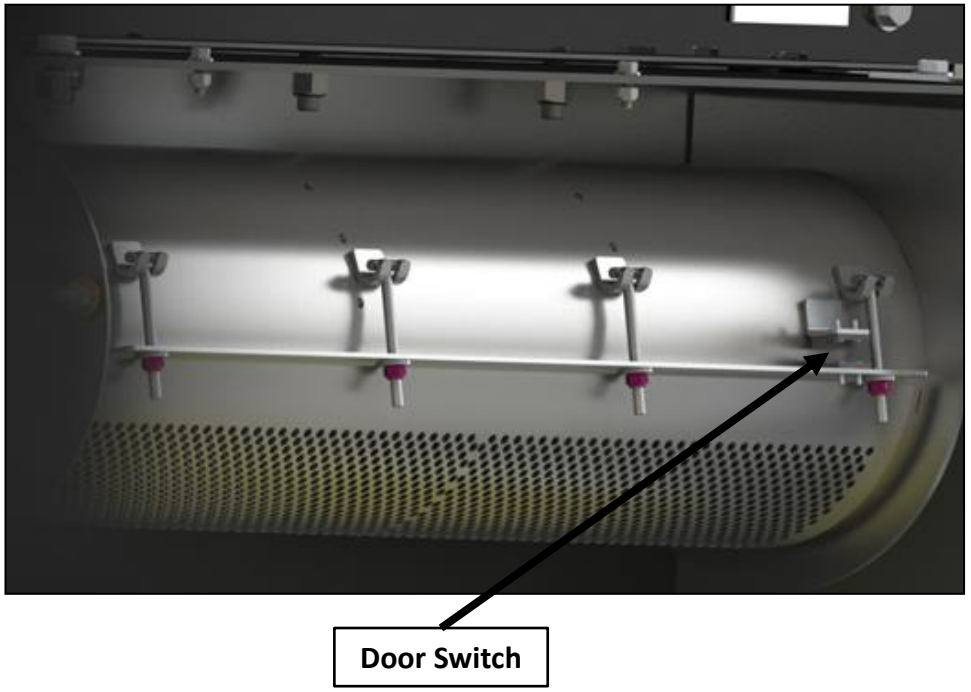
- This function operates automatically while in Automatic or Batch Mode
- It continues to produce good brine while reducing salt build-up in the mixing tank
- The unit will stop adding salt and continue circulation, adding only fresh water
- By doing this the unit is trying to use up any undissolved salt still in the mixing tank
- Once the unit cannot meet salinity or 23.3%, Normal Operation will resume automatically

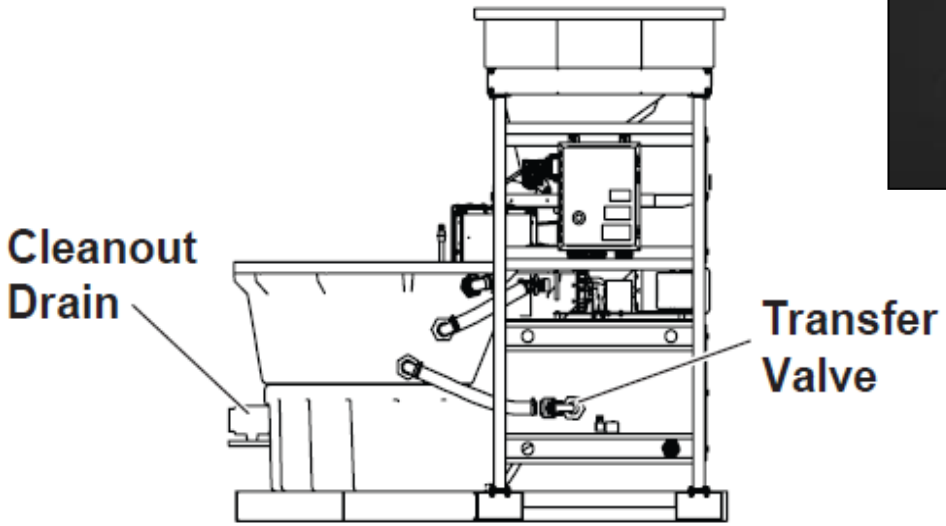
Maintenance

Clean Out

Mixing tank clean out and full system clean out

- **Run the unit until the salt hopper is empty**
- **Use circulate mode to use up the remaining salt in the mixing tank**
- **Drain the storage Tank**
- **Open Transfer Valve**
- **Shut off unit**
- **Open cleanout drain at front of mixing tank.**
- **Rinse hammer mill thoroughly**
- **Carefully remove residual solids in mixing tank**
- **Wash down with hose.**
- **Salt can build up between shafts and hammers.**

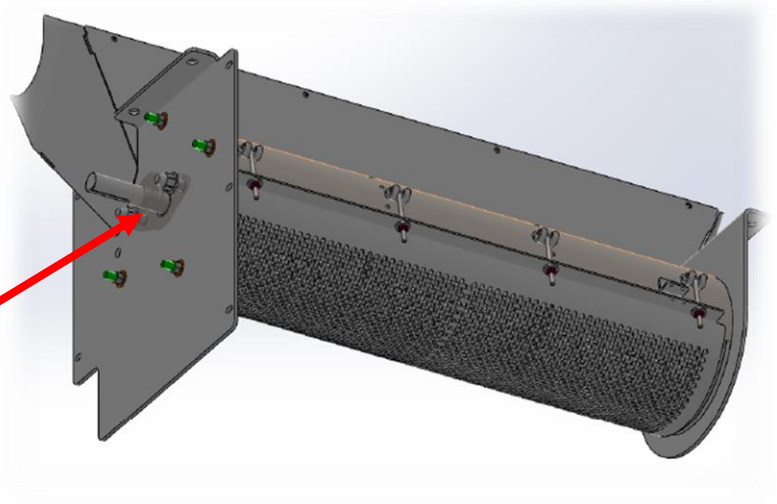




Maintenance

⚠ CAUTION

Do not open the mixing tank transfer valve while the brine tank is full. Opening while full will cause the brine tank to overflow.

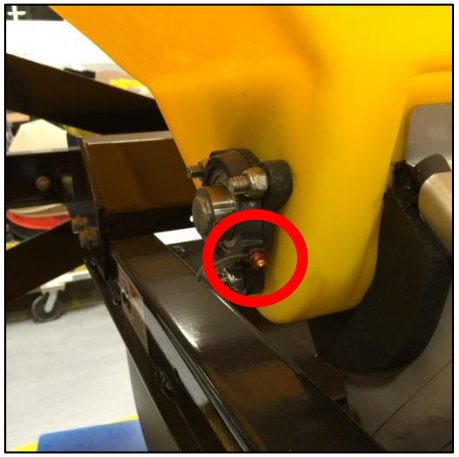


- Grease all hammer mill and salt feed auger bearings after every 10 hours of use (≈ 9,000 gallons of brine).
- Once per season, paint or oil all bare metal surfaces or as needed.
- Once per season, inspect unit for defects: broken, worn or bent parts and similar.
- Once per season, inspect all tubing, hoses and harnesses for cracks and leaks.
- Once per season, check the hammer mill belt for fraying or cracking.
- To adjust hammer mill belt tension, loosen motor mounting bolts and slide forward or backward. Tighten once adjustment is made.

Maintenance

Zerk Fitting Locations – 4 Total

Grease Every 10 Hours



Service Screens

Touch top left corner to unlock service screens. (Indicated by GREEN CIRCLE)

Press on the screen to pull up keyboard

Credentials

Disable Cap and type in name
Press Enter
Repeat for Password Field

Pressing the Lock Icon will display user name

Pressing the Home Icon will take you back to Home Screen

Machine Unlocked and System Control

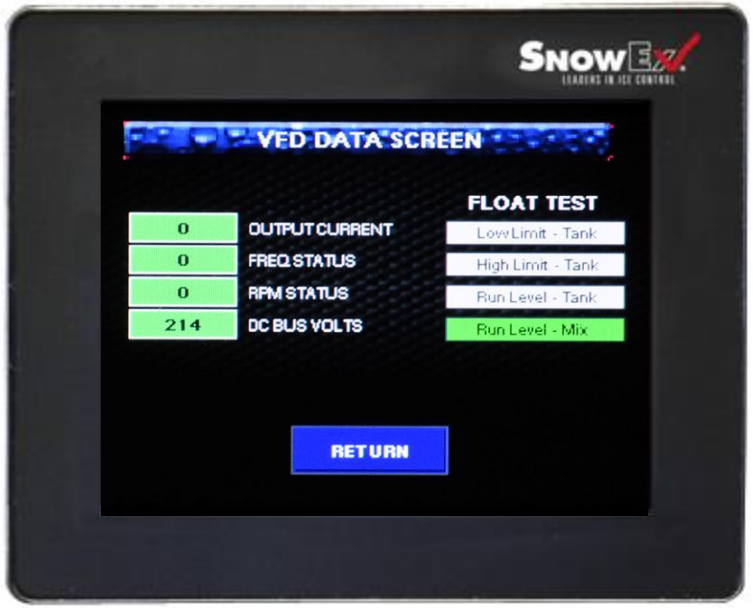
A Red Light visible in the right corner when unlocked

Select Language

Touch top left corner hidden button

VFD Data Screen / Float Test

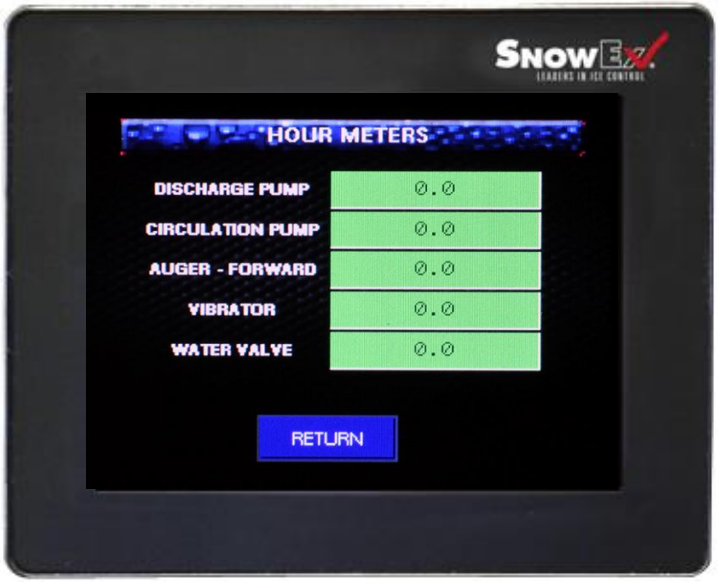
Enter this screen by selecting the VFD info button (Variable Frequency Drive)



Float Indicator lights will illuminate Green when the switch is closed.
Procedure: Raise the floats manually and watch for indicator lights to test.

Hour Meters

Enter this screen by selecting the Hour Meters button



This displays total hours for each component.

If there is a software update these values will have to be written down and reloaded to maintain the total hours.

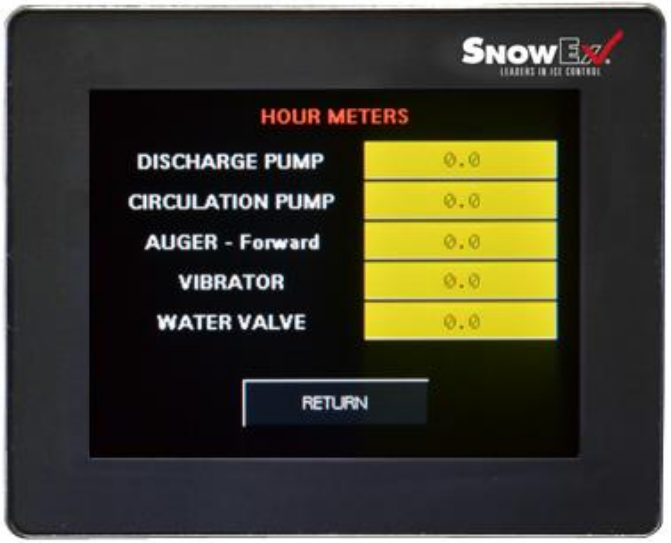
See Hour Meter Input Screen for more info.

Hour Meter Data Input

Press upper right corner of System Info screen to enter the Hour Meter/Water Total screen.

Values from the Hour Meter screen below, will need to be recorded before a software update and manually loaded here afterwards.

After inputting values, press Data Upload button



Adjust Discharge Pump Timeout

(Reference Pages 67-69 to unlock machine)

Select Timers

Press the Discharge Pump Timeout window to pull up keyboard.

Enter the desire time you would like the discharge pump to run. (Min. 8 minutes – Max 20 minutes)

BRINE PRO™ 2000 Troubleshooting

Problem	Possible Cause	Suggested Solution
Salinity becomes too low and unit shuts down	1. Hopper is empty	1. Check the hopper salt level.
	2. Salt clog in hopper	2a. Jog the vibrator to agitate salt. 2b. Manually clear the salt clog.
	3. Auger jam	3a. Jog the auger in both directions. 3b. Manually clear the auger jam.
	4. Clogged hammer mill	4a. Jog the hammer mill to clear clog. 4b. Flush the hammer mill with clear water. 4c. Service the hammer mill bearings.
	5. Circulation pump malfunction	5a. Jog the pump to verify it is working. 5b. Prime the pump.
Salinity becomes too high and unit shuts down	1. Control malfunction	1a. Jog the water valve to see if water is flowing in. 1b. Reset the control by turning the power OFF and ON again.
	2. No water flow into the tank	2a. Check hose pressure. 2b. Check hose for kinks.
Slow brine production	1. Slow water flow into mixing tank	1a. Check hose pressure. 1b. Check hose for kinks. 1c. Turn the valve on the water intake meter to increase the water flow.
	2. Control malfunction	2. Reset the control by turning the power OFF and ON again.
	3. Large amount of salt in mixing tank	3a. Run the circulate mode to reduce usable salt. 3b. Flush out the mixing tank.
Unexpected operation	1. Control malfunction	1. Reset the control by turning the power off and on again.
Inside display shows error code: SCF3	1. Auger motor electrical short	1. Open auger motor cover. Examine and adjust wires to clear motor housing and each other.
Frequent Jams	1. Wet, clumpy salt	1a. Change the vibrator ON time and the vibrator OFF time to improve salt flow. 1b. Consider installing optional salt baffle kit.
Flow rate displays 0 gal/min while water status light is on.	1. No water flow into mixing tank	1. Check to see if water source is on.
	2. Flow meter clogged or damaged	2. Call for service.

Troubleshooting

The Jog Mode is used to manually control sub-systems independently for troubleshooting and testing.

Sub-System Functions

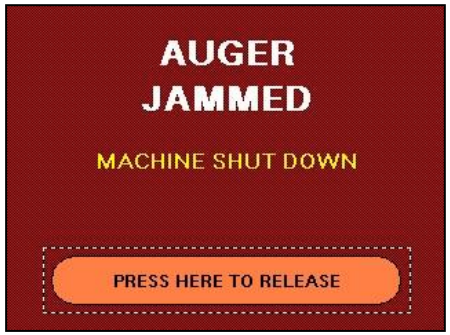
- Hammer mill
- Circulation Pump
- Discharge Pump
- Water Valve
- Vibrator
- Auger

⚠ WARNING

Always shut off and lock out the power source before servicing.

Troubleshooting

Pop Up Messages

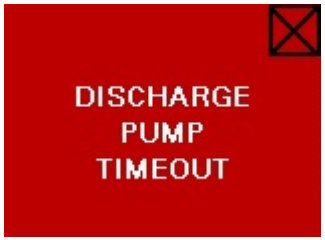


Try Jogging the auger to clear the jam. Check to see if breaker is tripped inside the control panel (OL4). If problem persists clear out the area around the auger.

Check to see if breaker is tripped inside control panel (OL2). Check/Flush circulation pump. Check Love Joys between the circulation pump and motor to ensure they are in alignment.

Troubleshooting

Pop Up Messages



Check to see if breaker inside control panel is tripped (OL3). Check pump for air bubble. See if check valve is operating correctly. Adjust discharge pump timeout setting.

Troubleshooting

Pop Up Messages

Try jogging the hammer mill to clear the jam. Check to see if breaker is tripped inside the control panel (OL1). Open hammer mill door and rinse out the hammer mill with a garden hose. Adjust baffles to reduce salt flow.

Check to see if hammer mill door is closed all the way. The hammer mill door safety switch needs to be gapped at 5/8” or less. Check switch and wires for physical signs of damage.

Troubleshooting

Pop Up Messages

Water supply is too high.
3-15 gal./min. is required. Reduce water flow. Check flow meter to make sure it is functioning properly.

Water supply is too low.
3-15 gal./min. is required. Increase water flow. Check flow meter to make sure it is functioning properly.

Troubleshooting

Pop Up Messages

Salinity is too high. Check to ensure the conductivity sensor is clean. Take a refractometer reading and reference the flow chart in your owner's manual or reference page 51 in this manual.

Salinity is too low. Check to ensure the conductivity sensor is clean. Take a refractometer reading and reference the flow chart in your owner's manual or reference page 51 in this manual.

Troubleshooting

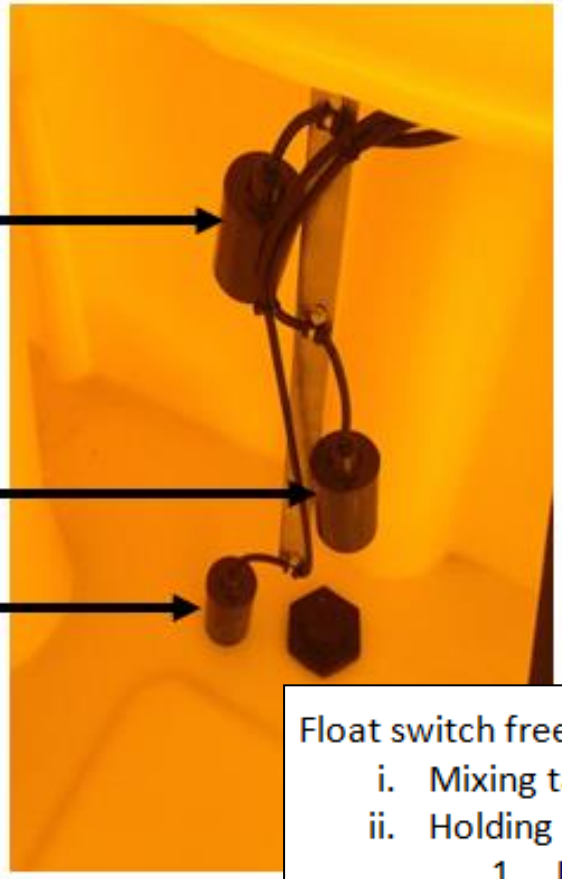
(Reference page 70 in this manual to test float switches)

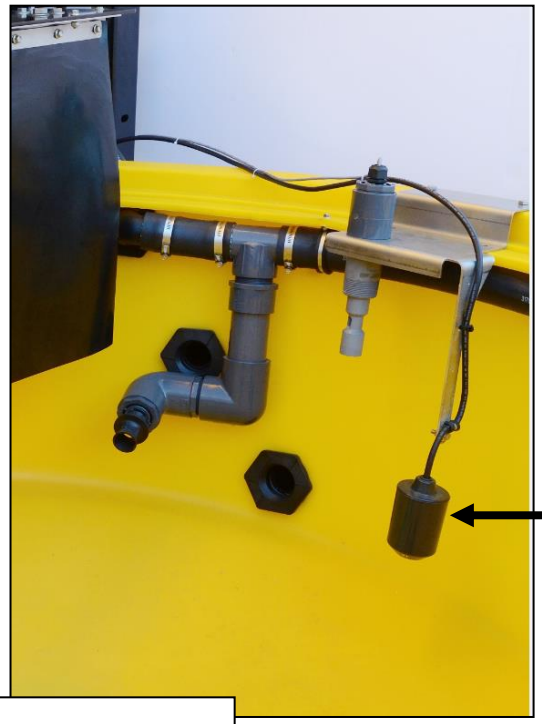
Pop Up Messages

EMERGENCY FLOAT HIGH ALARM

MIDDLE FLOAT SWITCH FAILURE

LOW FLOAT SWITCH FAILURE





MIX FLOAT SWITCH FAILURE

Float switch free cord length

i. Mixing tank: 3”
ii. Holding tank:
    1. Low: 2”
    2. Mid: 4”
    3. High: 1.5”

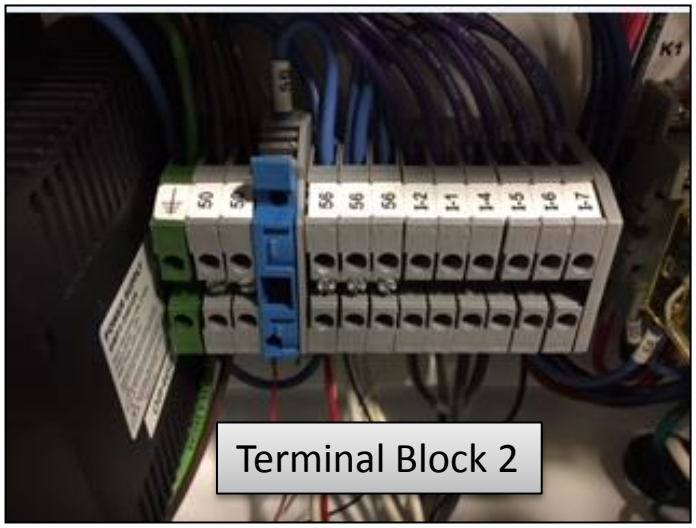
Troubleshooting

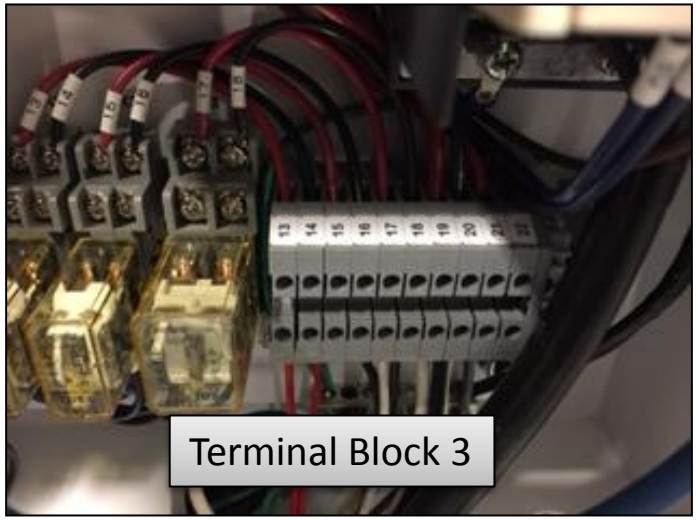
Pop Up Messages

Bearings must be grease every 10 hours or damage may occur.

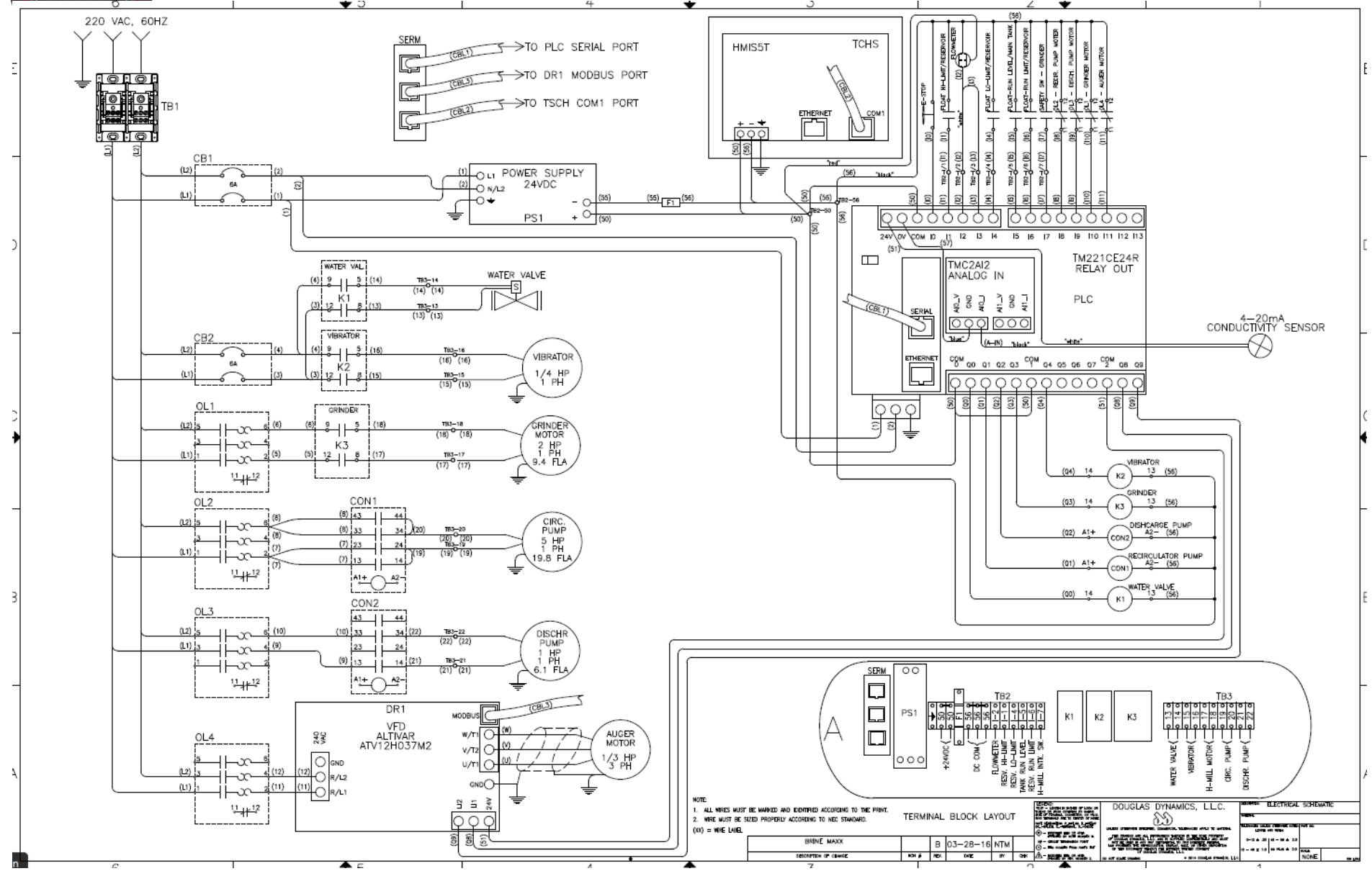
Terminal Block Reference

Conductivity Sensor AOI_I- Black /24V- White
Flow Sensor 50-Red / i2- White / 56- Black
Low Limit Tank 56- White / i4- Black
Run Level Tank 56- White / i6- Black
Hammer Mill 17- White / 18- Black
Auger Motor Direct to VFD
Hammer Mill Safety Switch 56- Red / i7- Black
Run Level Mix 56- White/ i5- Black
High Limit Tank 56- White/ i1- Black
Discharge Pump 21 White/ 22- Black
Vibrator 15- White / 16 Black
Water Valve 13- Red / 14- Red
Circulation Pump 19- White / 20- Black

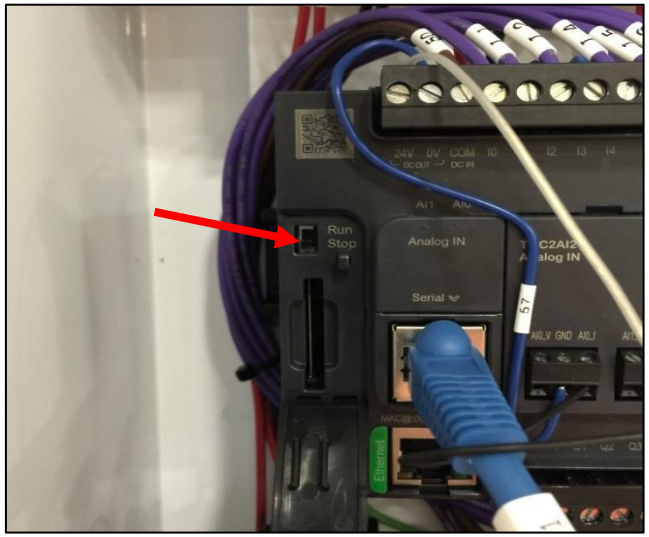




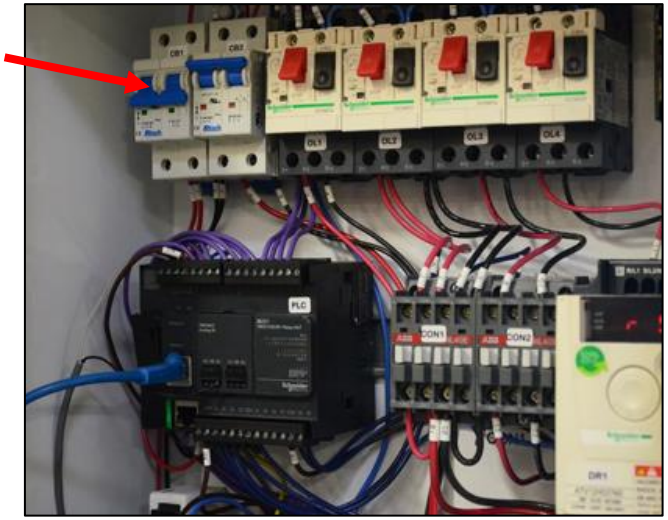
BRINE PRO™ 2000 Wiring Diagram



Resetting the PLC



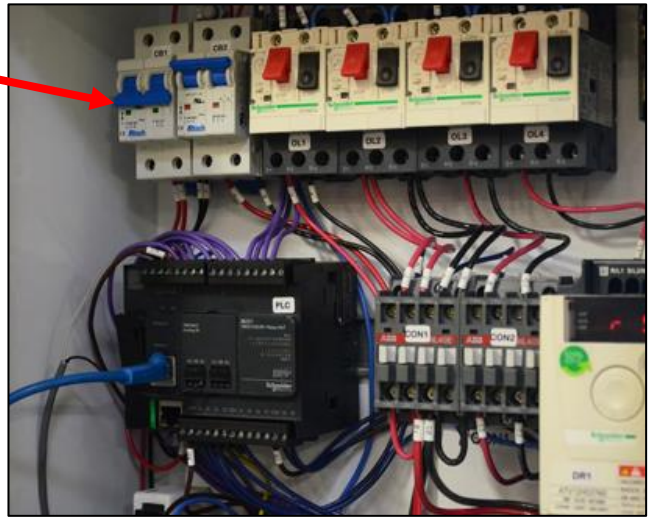
1. Power on unit and record gallons, hours, etc.
2. Move selector switch above SD card to Stop
3. Wait 30 seconds
4. Move selector switch back to Run



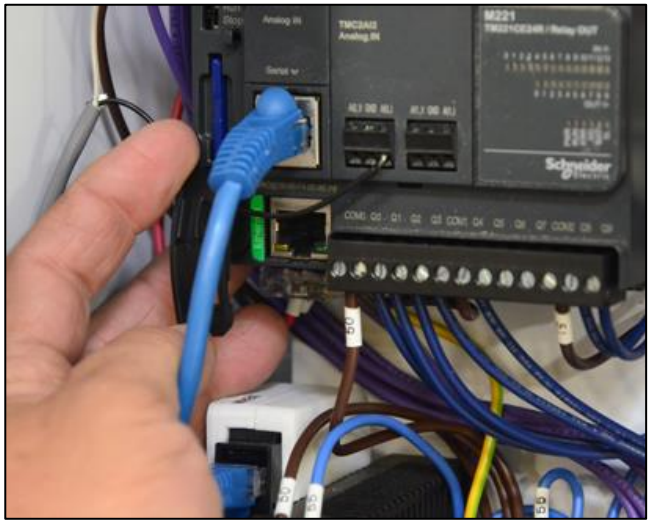
5. Push CB1 Breaker Down to the Off position
6. Wait 30 seconds
7. Push CB1 Breaker Up to the On position

PLC Reset is Complete

PLC Software Upgrade

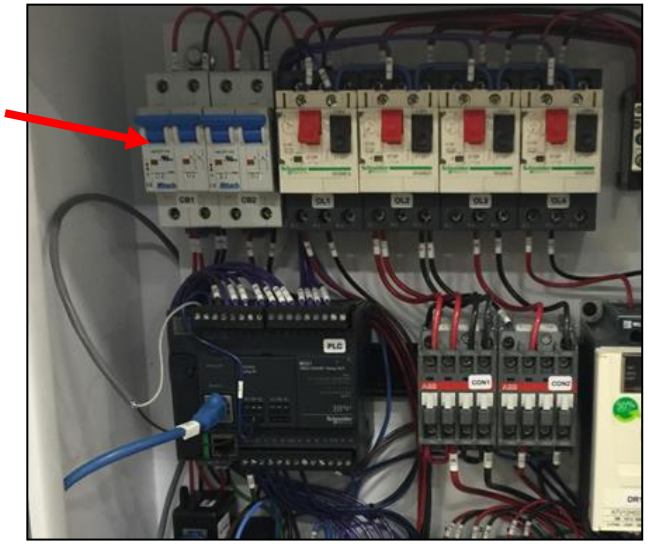


1. Power on unit. Push CB1 Breaker down to the off position

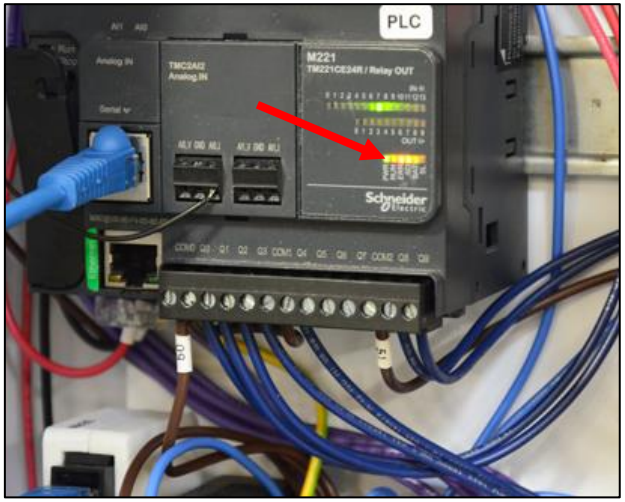


2. Insert SD Card into slot as shown

PLC Software Upgrade



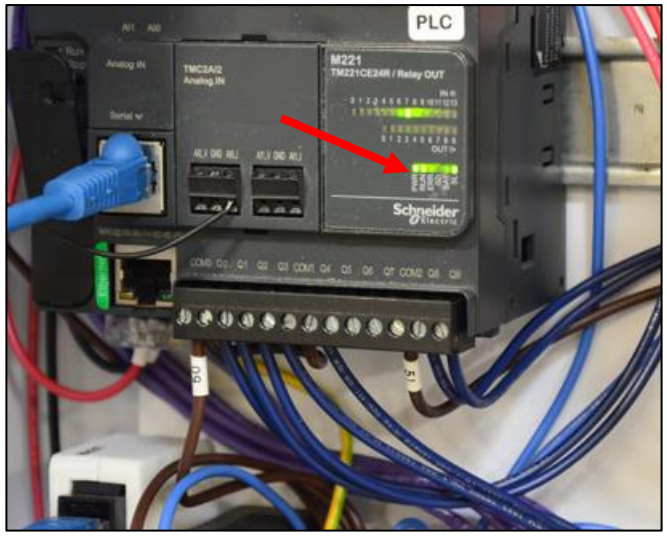
3. Push CB1 Breaker up to the on position



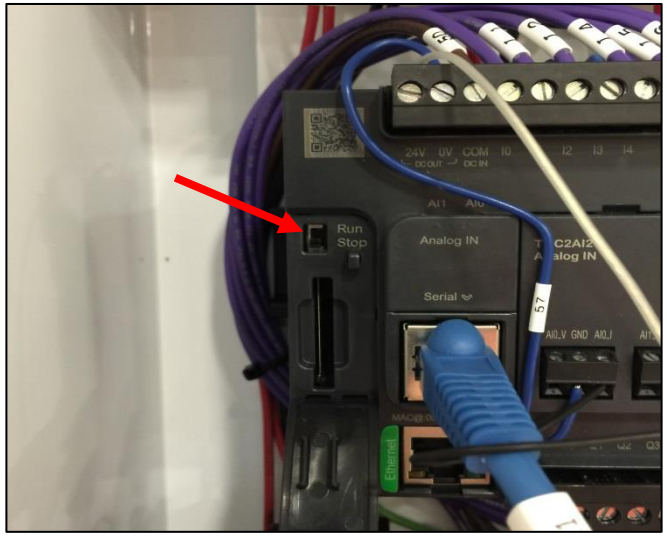
4. Watch for green SD to go out.

Be patient when this process begins.
It could take a few minutes.

PLC Software Upgrade



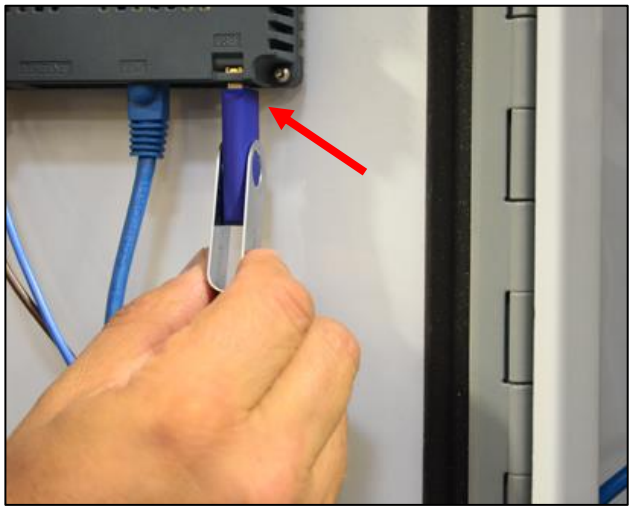
5. Wait for lights to turn Green



6. Move selector switch above SD card to Stop
7. Wait 5 seconds
8. Move selector switch back to Run

PLC Upgrade is Complete

HMI Software Upgrade

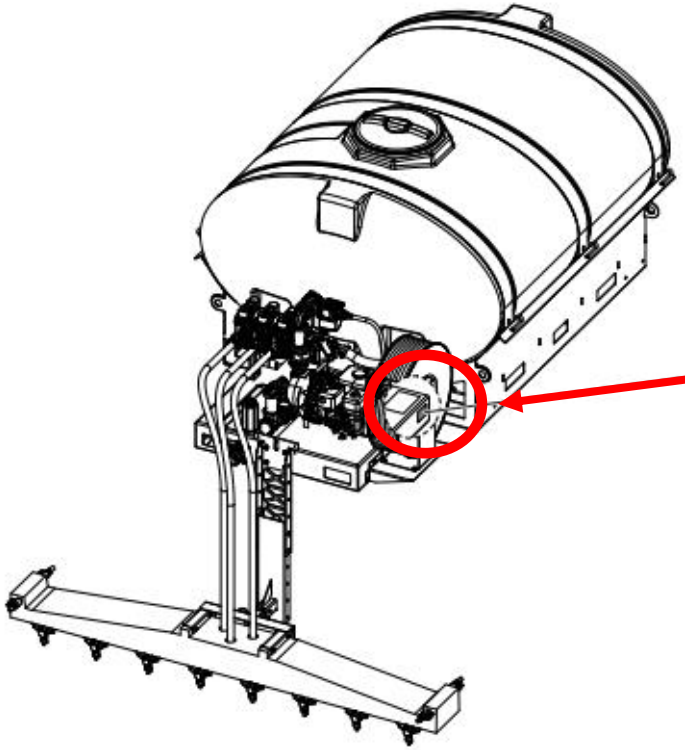


1. Turn the Power on & record gallons, Hours, etc.
2. Insert the Flash Drive
3. Press Yes on the Screen
4. Press Restart on the Screen
5. Remove Flash Drive Immediately

LiquiMAXX™

SPRAYER SYSTEM

Serial Number Label



Code	Definition
YY	2-Digit Year
MM	2-Digit Month
DD	2-Digit Day
LL	2-Digit Location Code
XXXX	4-Digit Sequential Number
ZZZZZZ	Model #

Liqui Maxx™ Specifications

Liqui Maxx™ Sprayer System					
Tank Model		**TSA-300**	**TSA-500**	**TSA-750**	**TSA-1250**
Capacity (Gallons)		300	500	750	1250
Tank and Pump Dimensions (in)	**Length**	101	112	118	119
	Width	53	59	75	85
	Height	24	48	55	73
Empty Unit Weight (lbs)		334	510	695	916
Full Unit Weight (lbs)		3500	5600	8200	13500
Suggested Gross Vehicle Weight Rating (GVWR) (lbs)		8,500–10,000	14,000–16,000	16,000–19,500	19,500–26,000
Minimum Required Vehicle Class		Class 2B	Class 4	Class 5	Class 6

F250/2500

F450/4500

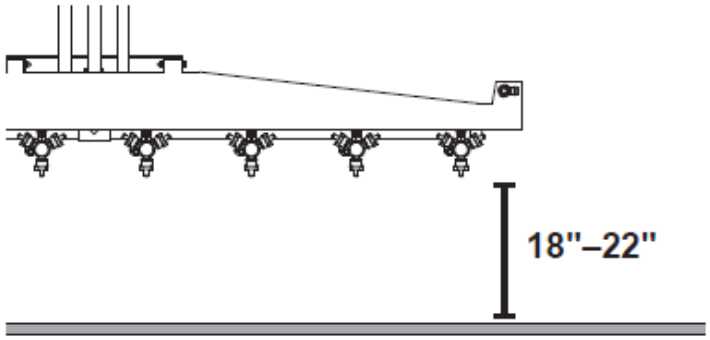
F550/5500

F650/6500

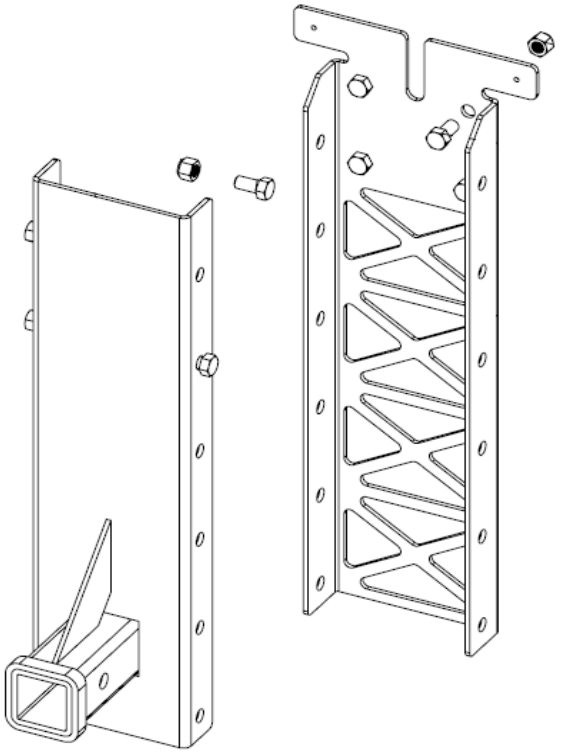
Boom Options

Standard 2” Receiver Mount

Consider using the optional BRM-175 Adjustable Boom Receiver Mount if the tips of the nozzles lie outside this zone when using your stock receiver hitch.



Adjustable Boom Receiver Mount BRM-175 Accessory only



Liqui Maxx™ Accessories

Hose Reel Kit
PN HRK-200

Adds spot spraying capabilities to the unit. Bolts directly to the sprayer frame and includes spray wand with 100-foot hose.

Universal Mount Kit
PN UMK-200

This kit includes ratchet straps, brackets and hardware for mounting a sprayer in a truck bed. Six brackets and Four Straps

Standard Sprayer Control

- Complete and safe control of both spraying pressure and valve shut-down from the operators seat

Deluxe Controller

The left wing, right wing and center boom nozzles can be managed independently with the 3-zone control. This helps to apply liquid exactly where it's needed without wasting material.

GPS ground speed sensors automatically adjust the flow according to the vehicle speed, reducing the chance of operator error.

IMPORTANT

Deluxe Controller kit does not include the speed sensor. This is an accessory ONLY.

Deluxe Controller Accessories

Speed Sensor
PN 10777

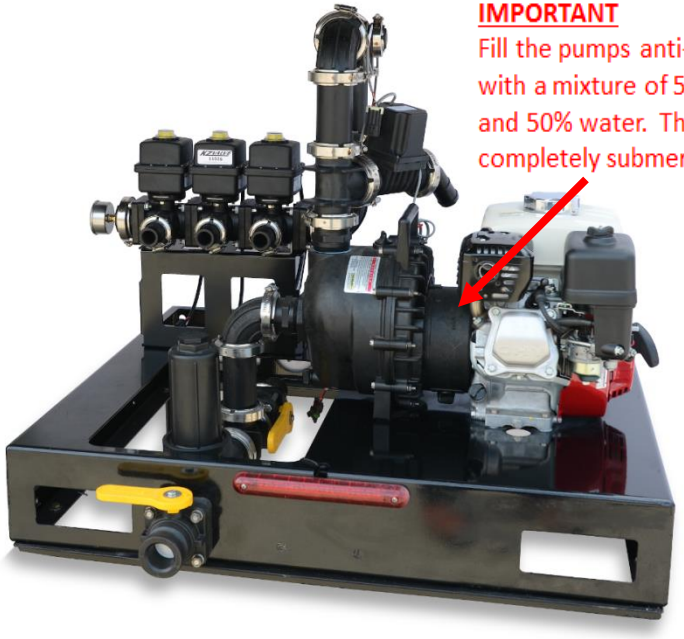
Blast/Run/Hold
Remote Switch Box
PN 17560

Pump Specifications

Wet-sealed centrifugal pump

5.5-horsepower HONDA® engine

210 gallons per minute



IMPORTANT
Fill the pumps anti-freeze reservoir with a mixture of 50% Ethylene-Glycol and 50% water. The seal should be completely submerged.

Dry-sealed centrifugal pump

5.5-horsepower HONDA® engine

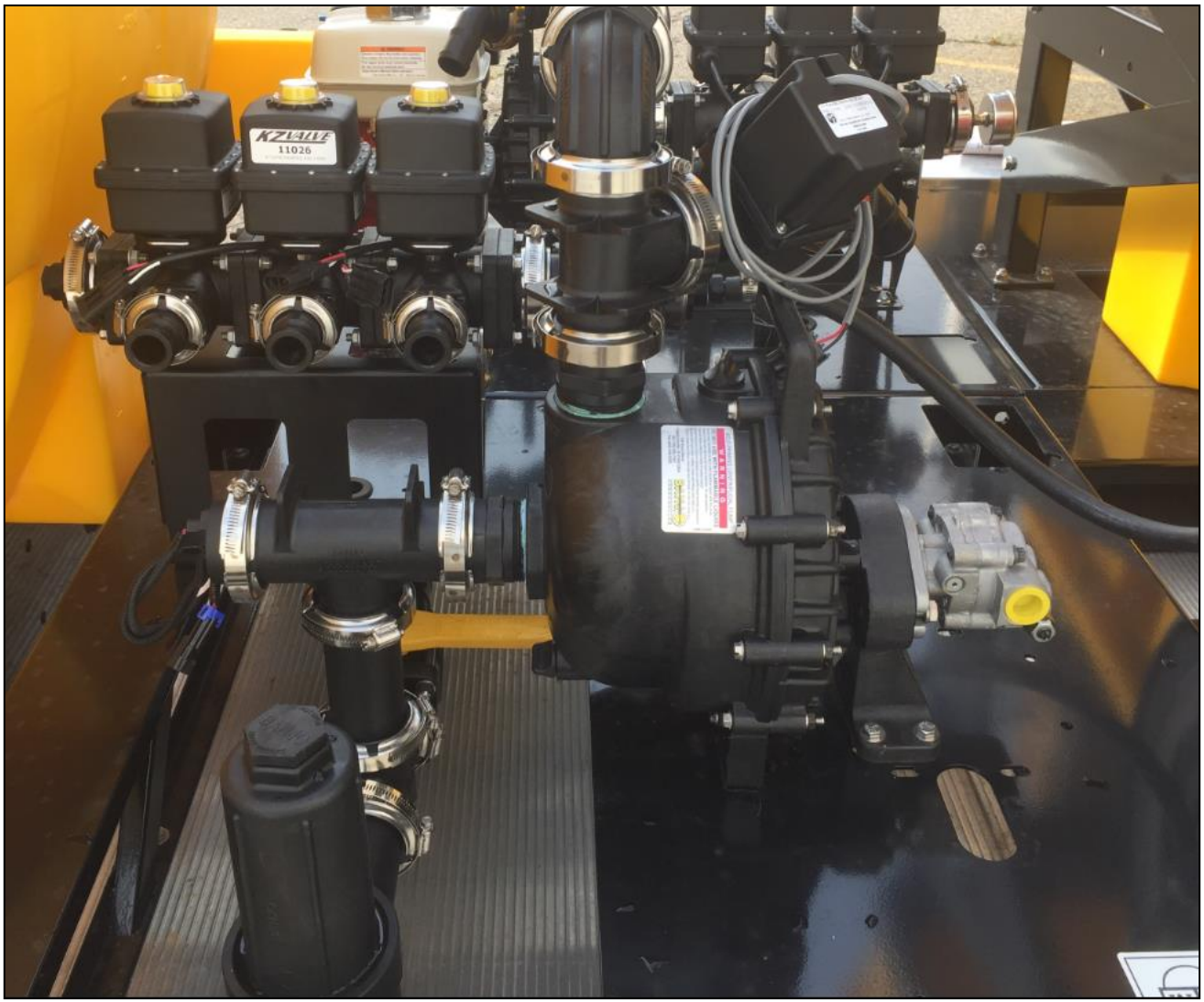
210 gallons per minute

What's New?

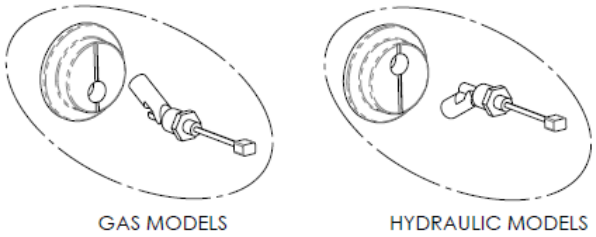

LiquiMAXX
BY SNOWEX
LEADERS IN ICE CONTROL
FLOW CAL
VOLUME (1) (2) (3)
AREA (1) (2) (3)
WIDTH CAL
MIN FLOW
VOLUME / MINUTE
DISTANCE (1) (2) (3)
SPEED CAL
ADJUST RATE
TANK LEVEL
MODE (ALARM RESET)
MODE SELECT
TARGET RATE
RATE
SPEED (1) (2) (3)
TEST SPEED
AUTO MAN
BLAST
RESET
PUMP
ON
OFF
HOLD
RUN
CHOKE
START
CHOKE +
CHOKE -

What's New?

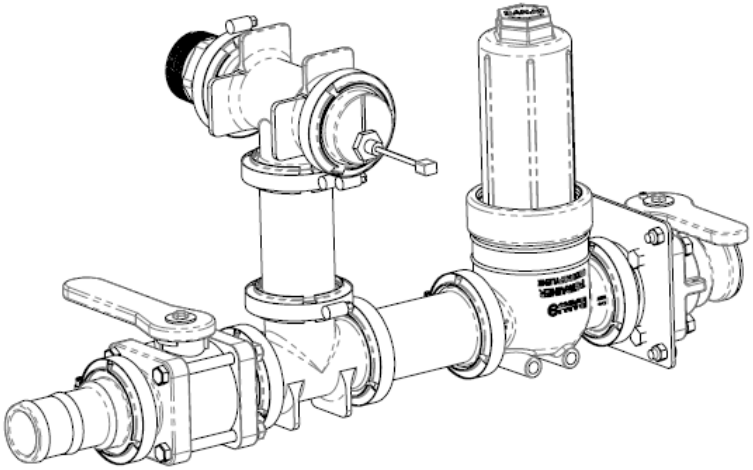
What's New?



What's New?

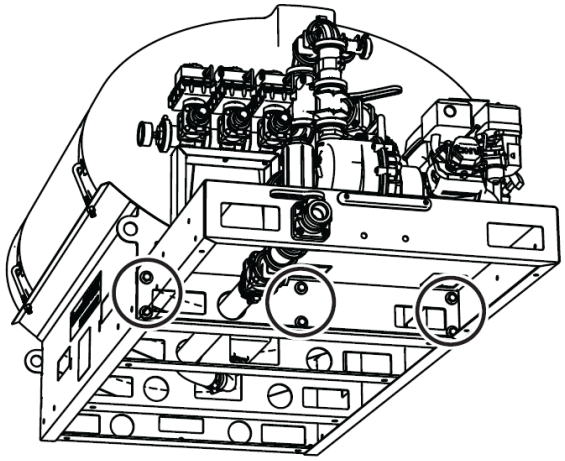


DETAIL A: FLOAT SWITCH INSTALLATION

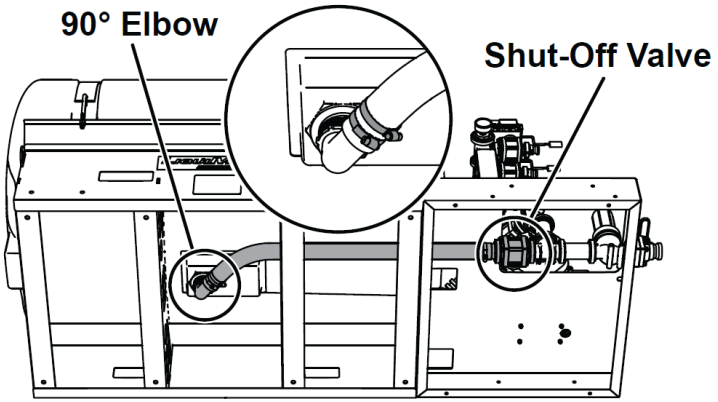


Set-Up Instructions

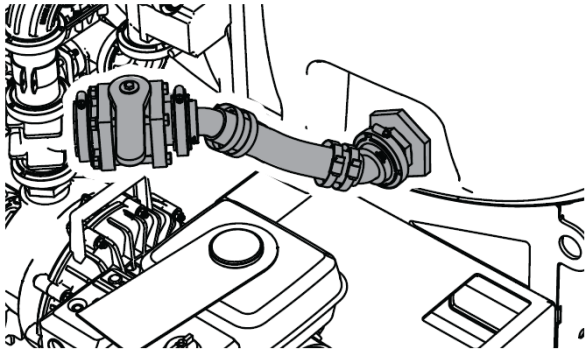
1 Bolt the pump and tank platforms together (6 places).



2 Connect the hose underneath the unit. Securely fasten the 90˚ elbow connection to the tank bulkhead fitting underneath the unit.
(Dip the hose in hot water or carefully use a heat gun for 20-40 seconds)



3 Connect the return valve to the 2" bulkhead connection on the pump side of the brine tank. Securely fasten the 45˚ connections to the tank bulkhead fitting and the return valve.

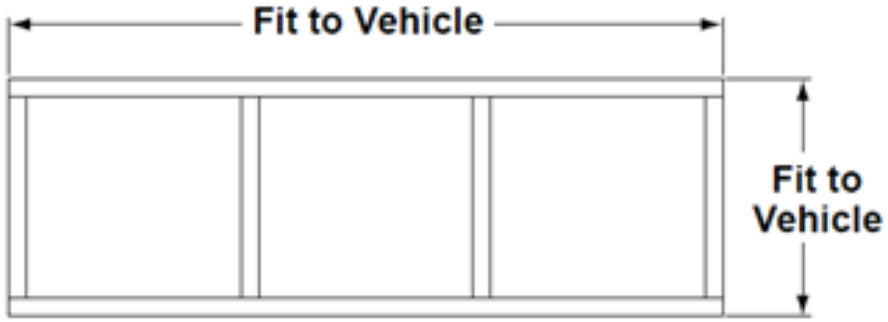


NOTE: To prevent leaks, use a thread sealing compound on all threaded connections. Do not use Teflon® tape, as fragments will clog the spray nozzles. Clamped connections may require periodic retightening

Set-Up Instructions

4 Lift the main tank and pump assembly using the fork lift pockets. Center the tank and pumping system from driver to passenger side on top of the truck bed and lower into position.

5 Measure the distance between front of the truck bed and the tank base. Make a spacer to fill between the tank base and the front of the truck bed.

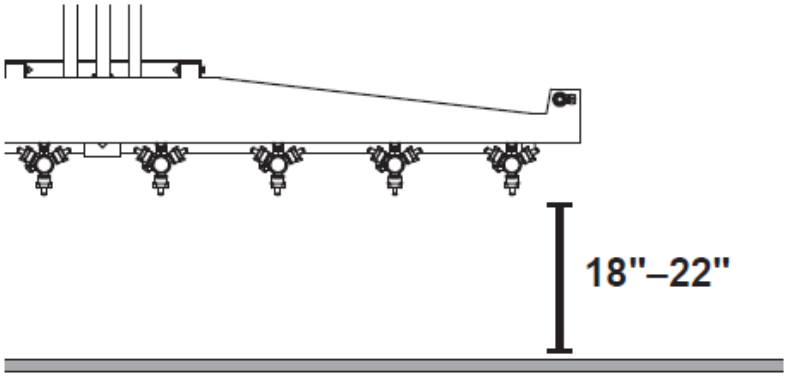


Set-Up Instructions

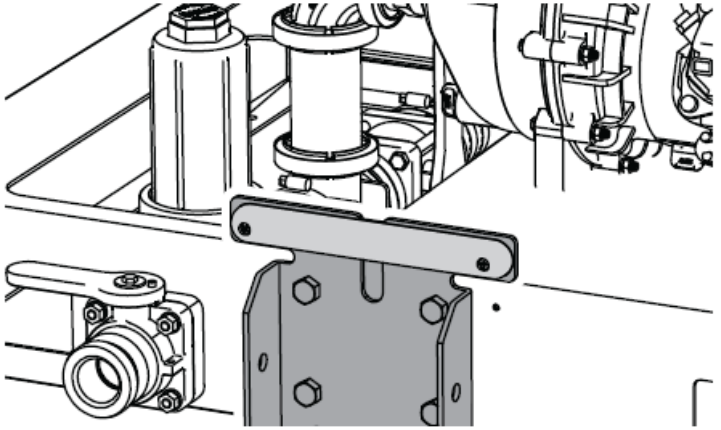
⚠ CAUTION

Ensure nozzles have minimum 18 inches ground clearance. Low boom heights can cause accidental breakage from curbs, uneven surfaces and other obstacles. Adjustment may require optional BRM-175 Adjustable Boom Mount.

6 **Install the boom so the nozzles measure 18"-22" from ground to nozzle tip. Consider using the optional BRM-175 Adjustable Boom Receiver Mount if the tips of the nozzles lie outside this zone when using your stock receiver hitch.**

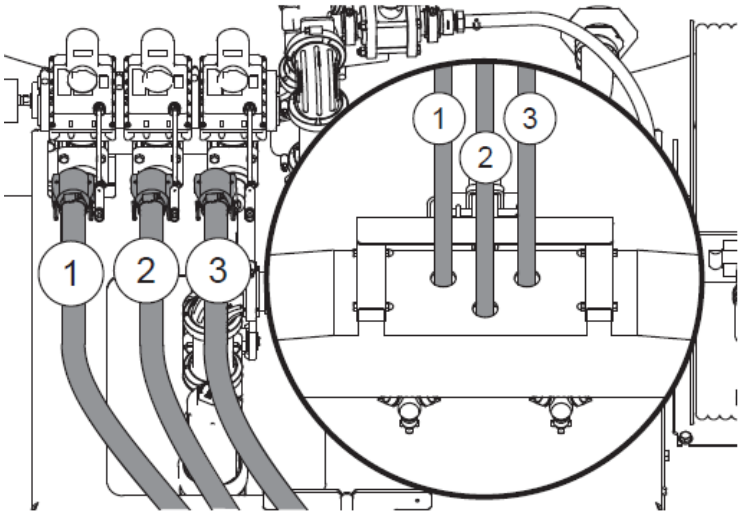


7 **To install the BRM-175 Adjustable Boom Receiver Mount, unfasten the rear brake light, install the kit, and re-install the light on the top rear face of the BRM bracket.**

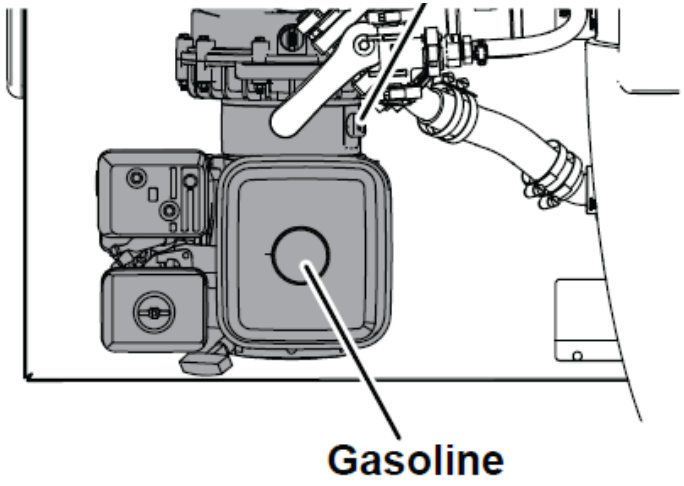


Set-Up Instructions

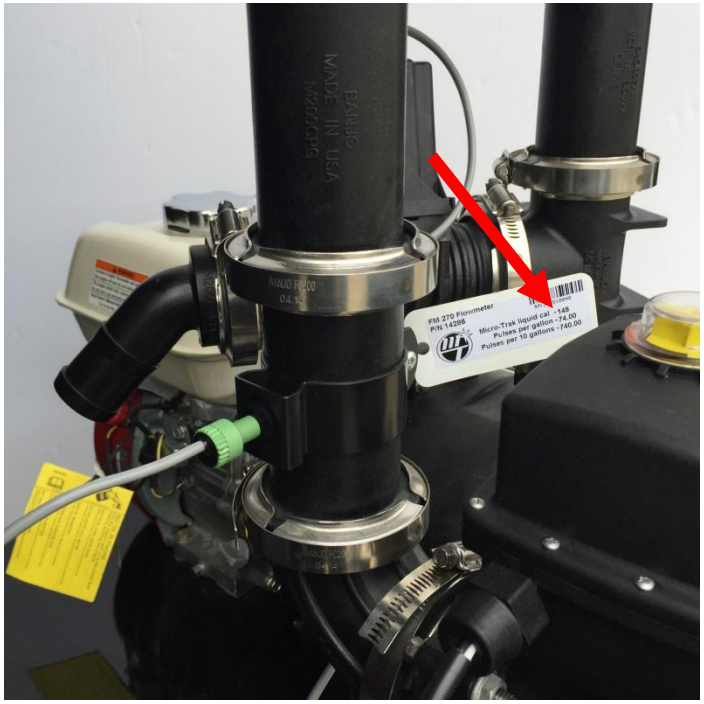
8 Connect the boom to the pump. Clamp the quick disconnect attachments on the boom hoses to the manifold valves on the pumping unit. Route the hoses to the installed boom with adequate slack and cut the hoses to fit. Clamp the hose tightly to the boom to prevent leaks.



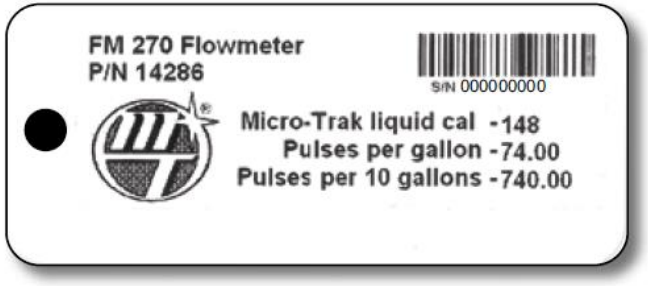
9 Fill the pump's anti-freeze reservoir with a mixture of 50% Ethylene and 50% Water. Check mixture every 8 hours of operation and when the gasoline tank is filled. The reservoir should be at least 75% full, with the seal completely submerged.



Calibrate the Flowmeter



Enter the liquid cal number (148) printed on the flowmeter tag into the LiquiMaxx Control to calibrate the flow.



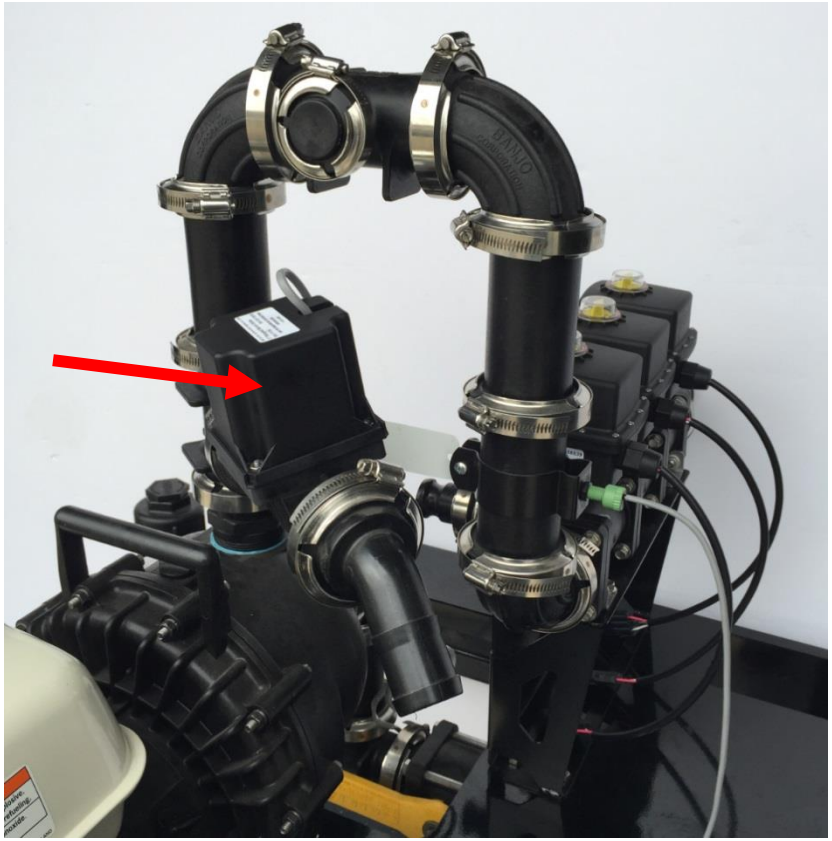
1. Turn the boom sections off or put the system in HOLD
2. Hold the BLAST key for 1 second. The CAL icon and red light will be visible and calibration values can be viewed and edited
3. Calibration positions are identified by WHITE labeling on each side of the rotary selector.
4. Edit calibration values by using the “+” and “-” buttons on the front panel. Hold BLAST key for 1 second to save changes and exit calibration mode.

Mounting and Plumbing Servo Valve

What is a Servo Valve?

An electrically operated valve that controls the flow rate of fluid.

The servo valve installs in the main unrestricted spray line, between the flowmeter and the lane shut-off valves. It is not recommended to install the the servo valve closer than 12” to the flowmeter. The servo valve has a flow direction decal on it. Make sure that the actual flow direction matches the decal on the servo valve.

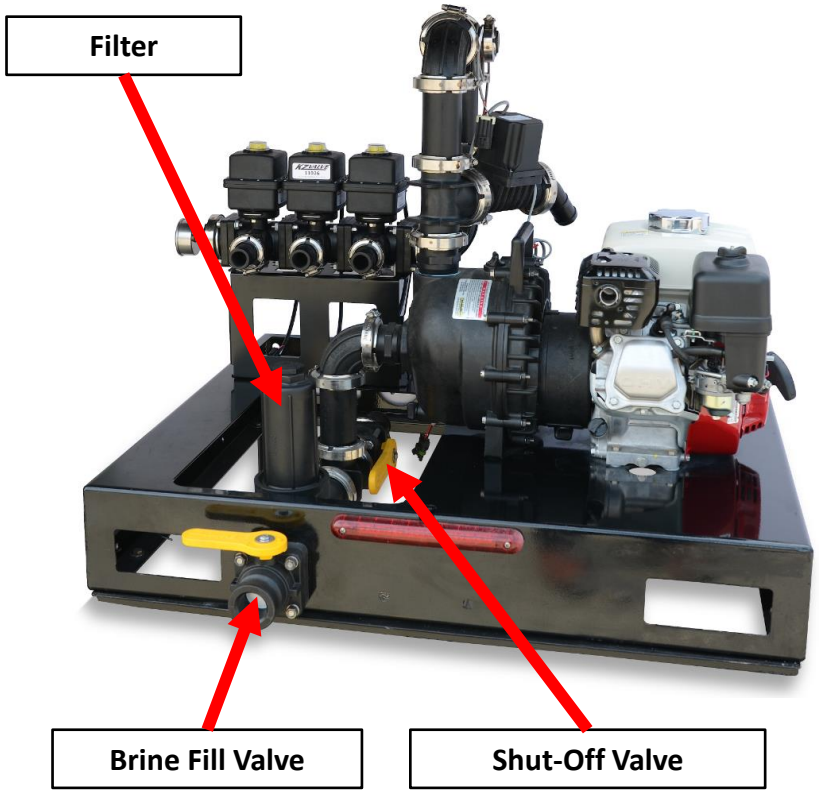


The servo valve connects directly to the main harness 3-pin W/P cable lead. If more length is required, use a 3-pin W/P extension cable of the appropriate length.

Filling the Tank and Pump

Filling With an External Pump:

1. Connect fill hose to the brine fill valve.
   Note: Opening the valves first will cause standing brine in the tank to flow out.
2. Once hose is hooked up, open the brine fill and shut-off valves.
3. Once the valves are open, begin pumping brine from the holding tank using the external pump.
4. Fill to the desired level.
5. Close the brine fill valve. The shut-off valve must be open for spraying.



Control Operation

VOLUME (1) (2) (3): Displays total gallons (liters))of liquid applied. May be reset. SEE NOTE

VOLUME/MINUTE: Displays total gallons (liters) of liquid applied per minute.

TANK LEVEL: Displays gallons (liters) of liquid remaining. If a FILL TANK SIZE has been set to a value in Calibration, pressing the "+" will make the Tank value jump to FILL TANK SIZE value. The value can be decreased but not increased above the FILL size. If the FILL TANK SIZE is set to Zero, Tank level can be adjusted to any value from 0 to 65,535 using the "+" **or** "-" (RESET) keys.

RATE: Displays application rate.

WARNING LIGHT: Indicates over or under application of plus or minus 10% from the Target Rate or if the tank is low or minimum flow active. Also lit when in CAL. and Unlocked.

Control Operation

AREA (1) (2) (3): Keeps a running count of the total area worked. May be reset. SEE NOTE

DISTANCE (1) (2) (3): Displays distance traveled. May be reset. SEE NOTE

MODE: Displays selected mode. User selects between Lane, Ag, Dust and Turf Modes of operation. Allows Audible Alarm to be RESET by Pressing the RESET button.

SPEED (1) (2) (3): Displays ground speed in miles per hour (kilometers per hour) or Average & Highest velocity. May be reset. SEE NOTE

Control Operation

VOLUME (1) (2) (3): Displays total gallons (liters))of liquid applied. May be reset. SEE NOTE

AREA (1) (2) (3): Keeps a running count of the total area worked. May be reset. SEE NOTE

DISTANCE (1) (2) (3): Displays distance traveled. May be reset. SEE NOTE

SPEED (1) (2) (3): Displays ground speed in miles per hour (kilometers per hour) or Average & Highest velocity. May be reset. SEE NOTE

NOTE: VOLUME, AREA, DISTANCE & SPEED counters work in sets. If the VOLUME counter 1 is reset, it also resets AREA counter 1, DISTANCE counter 1 and Average & Highest Speed counter 1. This will be the same for resetting any counters in the set.

Control Operation

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	Off
Fill Tank Size	Off
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(Off)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-Off	Off
Minimum Alarm Speed	0 MPH
Manual Control Enable	On
Alarm Enable	On
Default Calibration Values	English
Mode	Acres
Speed Cal	.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 width	96.0
Section 2 width	96.0
Section 3 width	96.0

AUTO – Long distances (ex. Parking lots)

MAN – Short distances (ex. driveways)

Auto Operation

1. **Set the rotary switch to RATE to see the actual application rate per acre.**

2. **Application rate can be adjusted by using the Up (+) and Down (-) arrow buttons on the control.**

   Factory Defaults:
   - Target Application Rate: 30
   - Rate Increment: +/- 5
   - Units: Gallons/Acre

3. **BLAST function is intended for spot applications requiring higher application rates.**

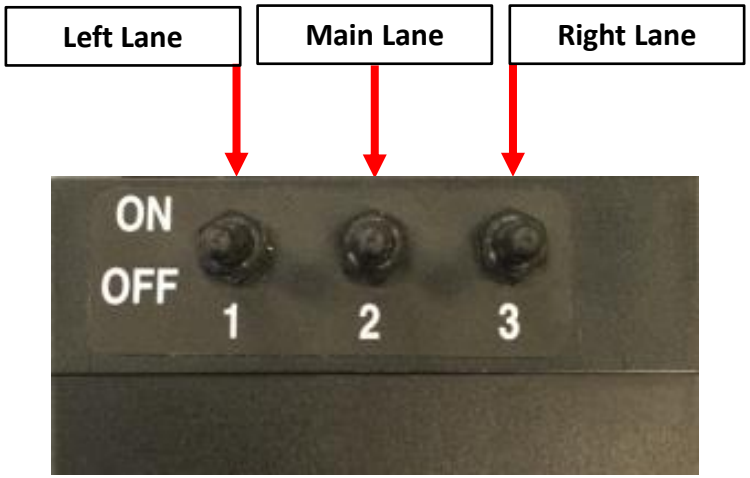
   Factory Defaults:
   - Blast Target Rate: 35
   - Blast Duration: 5 seconds
   - Units: Gallons/Acre

Manual Operation

1. Set the rotary switch to VOLUME/MINUTE.

2. Application rate can be adjusted by using the Up (+) and Down (-) arrow buttons on the control.

3. Use the RUN/HOLD button and the boom switches to control the boom.



Default Calibration Settings

1. **<u>CONTROL MUST BE UNLOCKED</u>.**
   Put the system in HOLD, hold the BLAST key for 1 second. The CAL icon will be visible and the red light

Default Basic Calibration Settings

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Basic Calibration

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Basic Calibration

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Basic Calibration

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Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
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Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
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Section 3 Width	96.0

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Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
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Minimum Alarm Speed	0 MPH
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Fill Tank Size	OFF
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Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
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Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
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Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
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Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
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Target Rate	30.0
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Section 2 Width	96.0
Section 3 Width	96.0

Basic Calibration

Factory Settings — Deluxe Control	
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Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
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Flow Cal	148
Min Flow	0.0
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Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Basic Calibration

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Entering Special Calibration

1. **CONTROL MUST BE UNLOCKED.**
   Put the system in HOLD, turn the control OFF, press and hold the BLAST button while turning the control back ON. The system will display SPEC for 2 seconds to show the control is in the Special Calibration mode. Release the BLAST button.

2. **The desired Special Calibration Parameter(s) can then be accessed with the rotary switch. Example:**
   - **BLAST TARGET RATE**
   - **BLAST DURATION**

3. **EXIT & SAVE: Press and hold the BLAST button for 1 second. The console will save any changes and revert to normal operation.**

4. **EXIT WITHOUT SAVING: turn the control power OFF without pressing BLAST.**

If the Console is unlocked, the Warning LED will also turn on and any of the "Special" CALIBRATE values can be adjusted.

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Flow Cal - Page 1 (CAL 1)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Flow Cal - Page 2 (CAL 2)

Entering Special Calibration Values

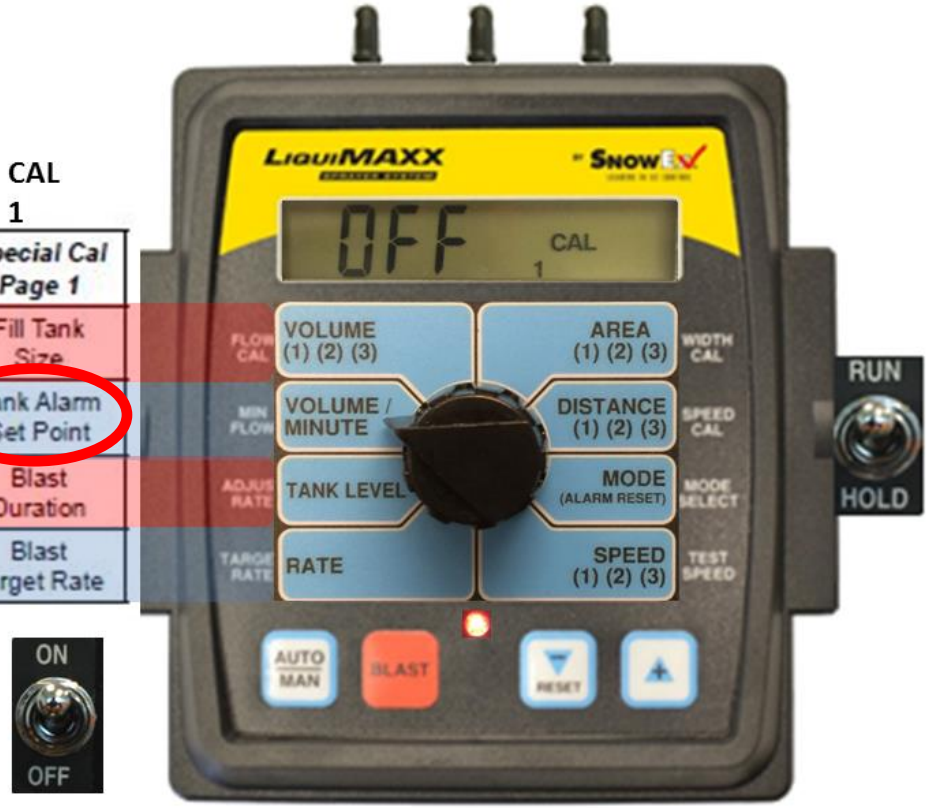
CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Flow Cal - Page 3 (CAL 3)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate



Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Min Flow - Page 1 (CAL 1)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Min Flow - Page 2 (CAL 2)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Min Flow - Page 3 (CAL 3)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Adjust Rate - Page 1 (CAL 1)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Adjust Rate - Page 2 (CAL 2)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Adjust Rate - Page 3 (CAL 3)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Target Rate - Page 1 (CAL 1)

Entering Special Calibration Values

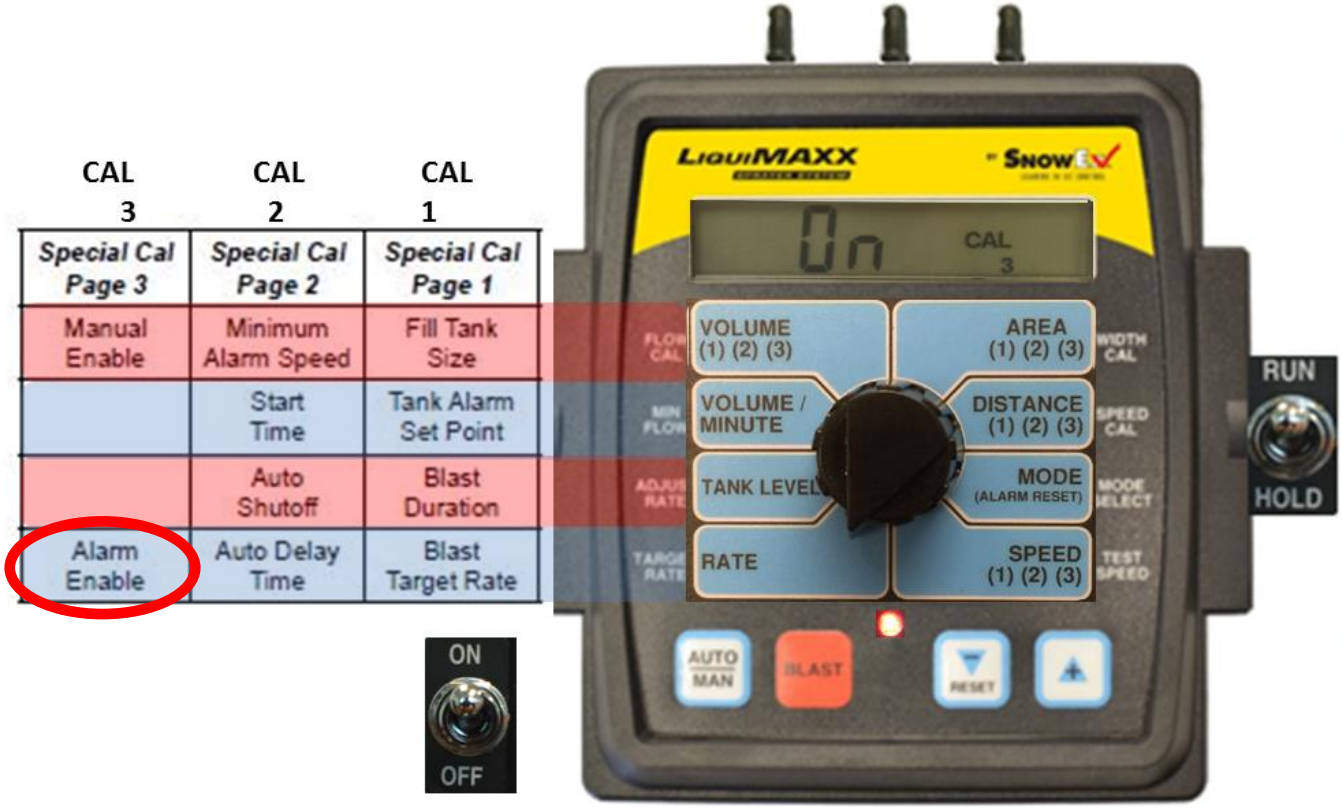
CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Target Rate - Page 2 (CAL 2)

Entering Special Calibration Values

CAL 3	CAL 2	CAL 1
Special Cal Page 3	*Special Cal Page 2*	*Special Cal Page 1*
Manual Enable	Minimum Alarm Speed	Fill Tank Size
	Start Time	Tank Alarm Set Point
	Auto Shutoff	Blast Duration
Alarm Enable	Auto Delay Time	Blast Target Rate



Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

Target Rate - Page 3 (CAL 3)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Test Speed - Page 1 (CAL 1)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Test Speed - Page 2 (CAL 2)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Test Speed - Page 3 (CAL 3)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Mode Select - Page 1 (CAL 1)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Mode Select - Page 2 (CAL 2)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Mode Select - Page 3 (CAL 3)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Speed Cal - Page 1 (CAL 1)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Speed Cal - Page 2 (CAL 2)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Speed Cal - Page 3 (CAL 3)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Width Cal - Page 1 (CAL 1)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Width Cal - Page 2 (CAL 2)

Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Width Cal - Page 3 (CAL 3)

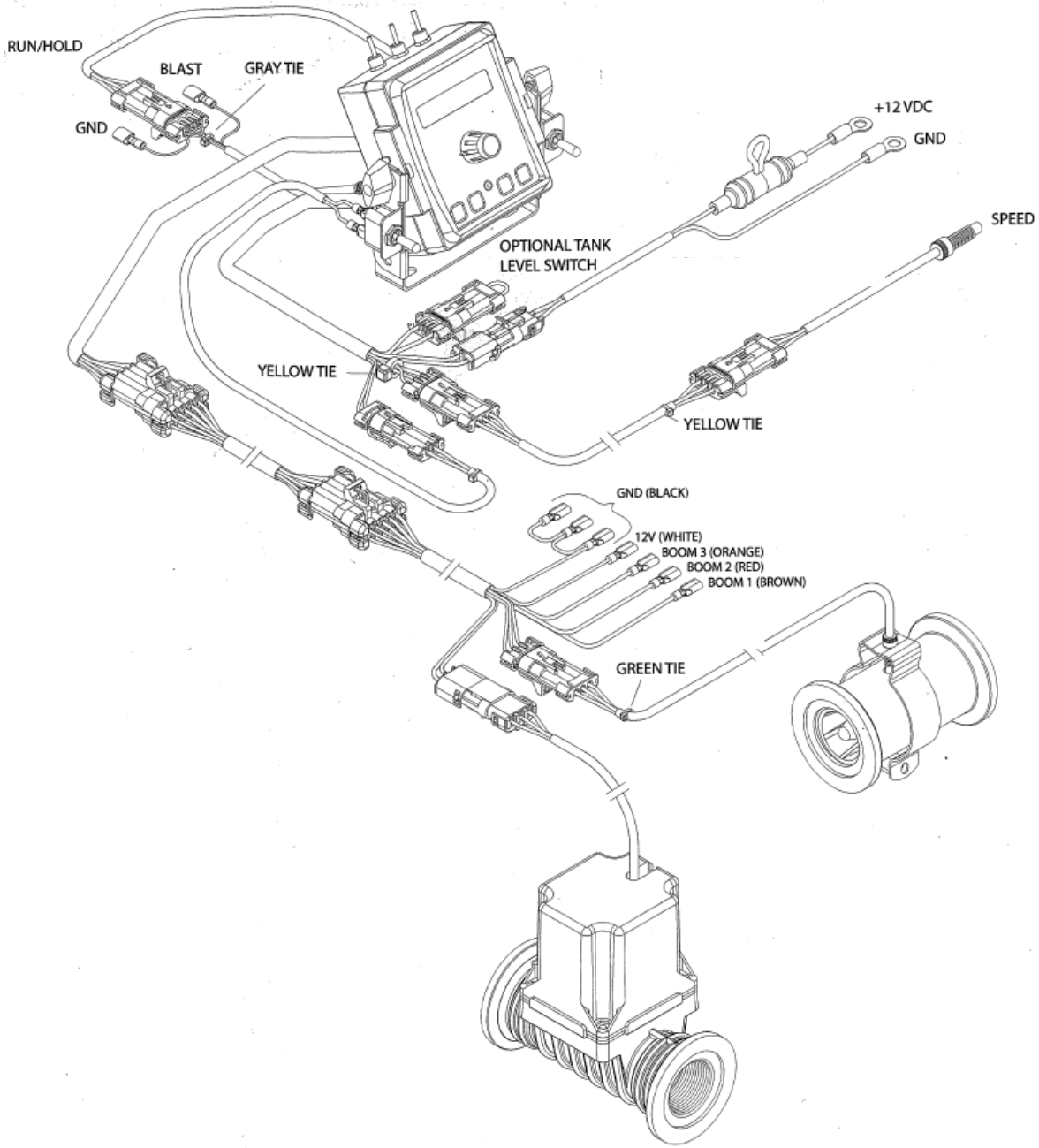
Entering Special Calibration Values

Factory Settings — Deluxe Control	
	ENGLISH
Tank Set Point	OFF
Fill Tank Size	OFF
Control Speed	-1
Vehicle Number	1
Blast Target Rate	35
Blast Duration	5
Start Time	0(OFF)
Auto Delay Time	1 sec
Valve Polarity	Bypass
Auto Shut-off	ON
Minimum Alarm Speed	0 MPH
Manual Control Enable	ON
Alarm Enable	ON
Default Calibration Values	English
Mode	Acres
Speed Cal	0.189
Flow Cal	148
Min Flow	0.0
Target Rate	30.0
Adjust Rate	5.0
Section 1 Width	96.0
Section 2 Width	96.0
Section 3 Width	96.0

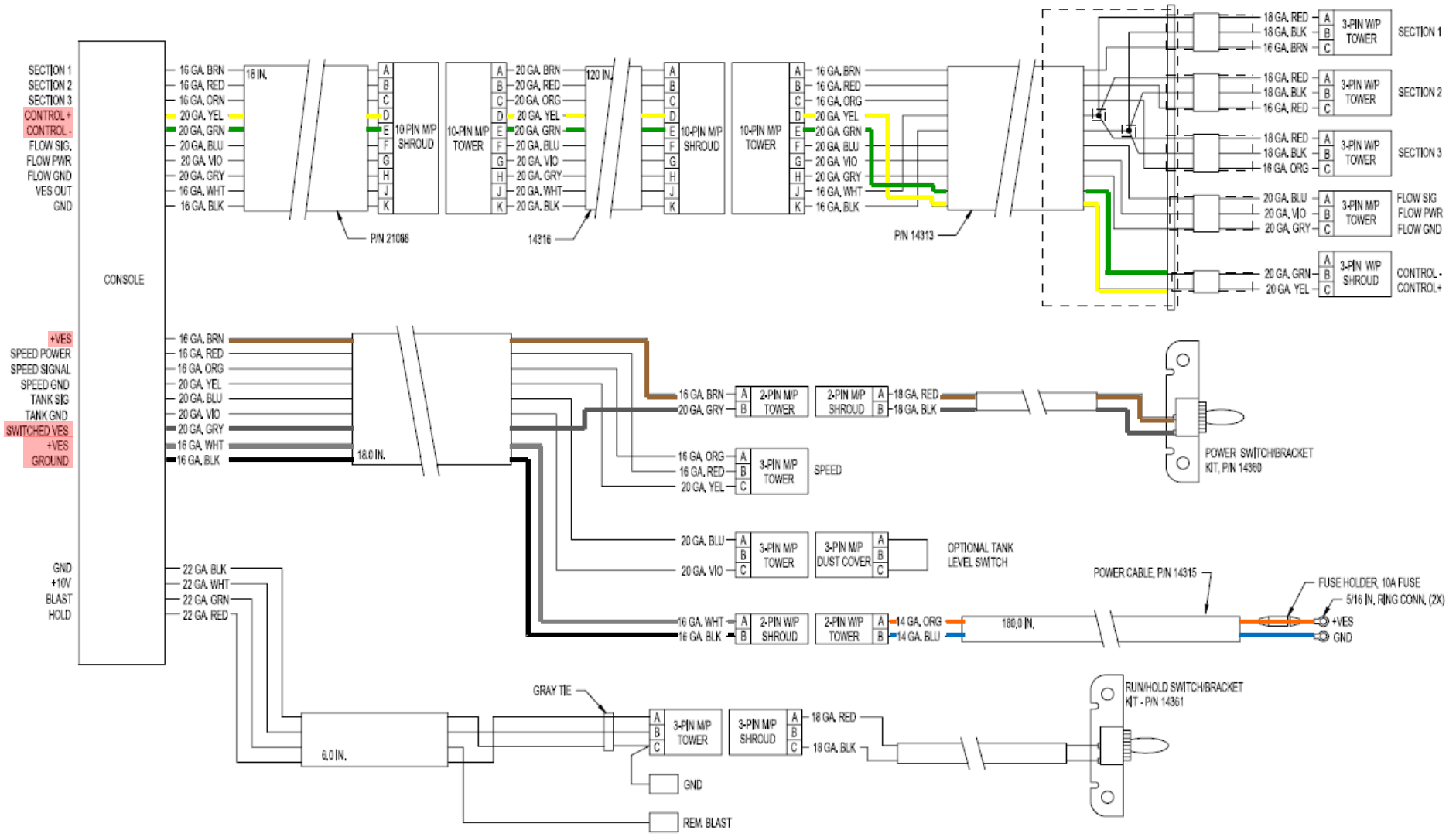
CAL 1	CAL 2	CAL 3
Special Cal Page 1	*Special Cal Page 2*	*Special Cal Page 3*
Units (Eng/Metric)	Set Year	
Vehicle Number	Set Month	
Valve Polarity	Set Date	
Valve Speed	Set Time	

Press and hold Blast to Save and Exit Special Calibration

System Diagram



Deluxe Controller Wiring Diagram



Deluxe Controller Messages/Warnings

A	Average Speed (for selected Data Set) is being displayed for 2 seconds.
bAd CAL	Indicates memory fault. Cycling power will not clear the bad CAL message, it can only cleared by entering Calibration or "Special Calibration modes, checking and/or changing settings and exiting to save settings.
bLASt	BLAST is active (Blast key was pressed).
CLEAr	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.
ESTOP	Emergency Stop caused by missing Flow Signal. Appears after "No Flow" error. Check flowmeter. Verify there is liquid flow and the tank is not empty.
Error	Trying to select Metric Units in Turf Mode or Turf Mode in Metric Units.
FILL	Rotary switch in any position, **FILL** will flash if tank level is equal to or less than Tank Set Point or Float Switch detects empty Tank. Fill TANK. If using TANK counter and Tank Alarm Set Point reset TANK counter by setting the rotary switch at the TANK position and pressing the "+" button for one second. Check to make sure TANK ALARM SET POINT is properly calibrated.
H	Highest Speed (for selected Data Set) is being displayed for 2 seconds.
L.P.r	In Lane Mode when a Boom is selected for Width Cal a letter will display for 1 second that identifies the selected Boom. After 1 second the displayed BOOM letters clear and the Boom Width is displayed.
Lo P	Low Power. Check all power and ground connections.
no boom	Will flash in display if rotary switch is in Width position, system is in Cal mode and no booms are turned on. Make sure system is in run and a boom switch is turned on, also check Run/Hold switch or sensor and connections.
no FLo	Will flash in display if rotary switch is in RATE position and should have flow (In Run, some booms on, speed greater than 0) but no flow is detected. Check flowmeter and flow harness connections per Troubleshooting section.
no SPEEd	Will flash in display if rotary switch is in RATE position and there is no Speed signal regardless of all other conditions. Check speed sensor and connections per Troubleshooting section.
99999	Counters (DISTANCE or AREA or VOLUME) have reached their maximum. RESET (see page 25) to clear counters and resume counting.
SPEC	"Special" Calibration mode is active. Appears when entering Special Calibration mode (hold AUTO/MAN and CAL buttons while turning console on).
————	An unused SPECIAL CALIBRATE or LIVE CALIBRATE position.
	Warn LED flashes when the Rate error is over 10% or Volume/Minute is below the Minimum, or Tank is less than Tank Set Point. It is on steady when in CAL mode or SPECIAL CAL mode or Test Speed if console is unlocked.
 Audible Alarm	Alarm will sound if Alarm Enable is ON and either the Tank Level is below minimum or the Optional Tank Level Switch is active, or if Application Rate error rate is greater than 10% and the console is in Auto with adequate ground speed.

Liqui Maxx™ Troubleshooting

Problem	Possible Cause	Suggested Solution
Brine pumps in slowly or not at all	1. Valve(s) are in closed position.	1. Rotate handle to open the valve.
	2. Brine filter is clogged.	2. Remove and clean the brine filter.
No power to cab control (Ignition and control switches ON; no illumination of control indicator lights)	1. Control connector plug is loose	1. Check plug connection at cab control.
	2. Switched accessory connection is poor.	2. Check accessory connection.
	3. Faulty battery.	3. Check for low battery.
	4. Vehicle control harness is damaged.	4. Replace or repair damaged wires or harness as required.
Control malfunction	1. Refer to the troubleshooting section of the control's operating manual.	1. Refer to the troubleshooting section of the control's operating manual.
Brine spray is inconsistent or no spraying occurs	1. Nozzles have become clogged.	1. Remove and clean the affected nozzles.
	2. Control connection is loose.	2. Check harness connections.
	3. Brine tank empty.	3. Check brine tank level.
Unit is leaking	1. Hose connections are loose.	1. Retighten all hose connections; add thread sealing compound.

Liqui Maxx™ Maintenance

Periodic Maintenance

- Wash unit after each use to prevent material build-up and corrosion.
- Use dielectric grease on all electrical connections to prevent corrosion.
- Paint and oil any bare metal surfaces.
- Inspect all hoses, harness and worn or bent parts.
- Clean brine filter as needed.

End of Season and Storage

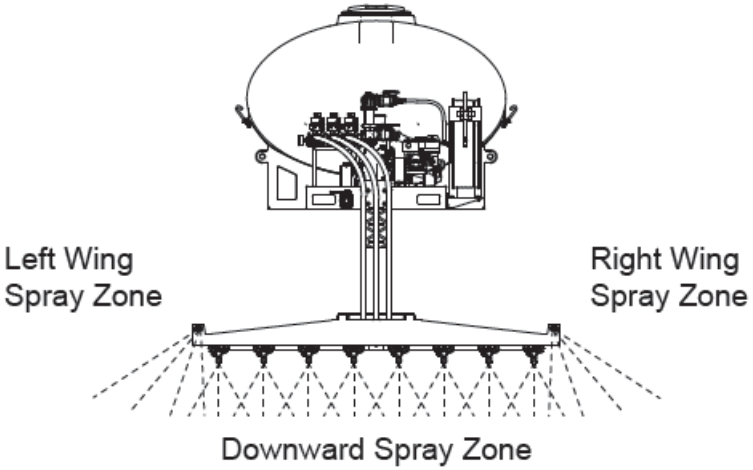
- Flush out tank, pumping system and boom to remove salt build up and prevent corrosion.

Nozzle Maintenance

- Remove nozzles and clean as necessary

Standard Nozzle Selection

SPRAY BOOM OPERATION



Wing Nozzle
(Come in Left/Right Pairs)

Downward Spray Nozzle Selection
PBA-300

Select the nozzles to use by referring to the application rates charts. Rotate the selection wheels so that the desired nozzle faces downward.

Nozzle Alignment

For consistent brine application, make sure the holes in the nozzles are aligned with the boom.

Boom Nozzle Application Rates

Suggested Nozzle Configuration

Desired Speed (mph)	Center Nozzles	Boom Nozzles	Gallons Per Acre	Gallons Per Lane Mile
5–7	Brown	Red	25–40	35–60
8–11	White	White		
12–20	Green	Red & White		

Application Rate Table

Desired Application Rate*	Gallons Per Acre	Gallons Per Lane Mile
50	22	32
60	26	38
70	31	44
80	35	51
90	39	57

* lb of NaCl Active Ingredient Per Acre @ 23.3% Solution

Nozzle Selection

Suggested Operating Range 30–40 psi

Boom Nozzle†	Width (ft)	gal/min @30psi‡	Total gal/min‡	gal/min @40psi‡	Total gal/min‡
Brown *(std)*	8	0.38	3.0	0.42	3.4
Gray *(acc)*	8	0.45	3.6	0.50	4.0
White *(std)*	8	0.61	4.9	0.67	5.4
Lt Blue *(acc)*	8	0.76	6.1	0.84	6.7
Lt Green *(std)*	8	1.04	8.3	1.26	10.1
Black *(acc)*	8	1.47	11.8	1.68	13.4

Side Nozzle†	Width (ft)	gal/min @30psi‡	Total gal/min‡	gal/min @40psi‡	Total gal/min‡
Red *(std)*	8	0.37	3.0	0.42	3.4
White *(std)*	8	0.72	5.8	0.84	6.7

† Application calculations assume boom set @ 18" from ground
‡ Application calculations adjusted with a factor of specific gravity for brine solution of 1.189

Boom Nozzle Application Rates

Recommended Application Rate = 30 gallons/acre
Recommended PSI = 30 psi
Recommended Ground Speed = 15 mph

Gallons Per Acre

Boom Nozzle	Width (ft.)	PSI	Nozzle Cap. – 18"	GPM	Speed - MPH 4	6	8	10	12	14	16	18	20
Light Blue	8	20	0.65	5	80	54	40	32	27	23	20	18	16
		30	0.90	7	111	74	56	45	37	32	28	25	22
		40	1.00	8	124	83	62	50	41	35	31	28	25
Light Green	8	20	0.99	8	123	82	61	49	41	35	31	27	25
		30	1.24	10	153	102	77	61	51	44	38	34	31
		40	1.50	12	186	124	93	74	62	53	46	41	37
Black	8	20	1.41	11	174	116	87	70	58	50	44	39	35
		30	1.75	14	217	144	108	87	72	62	54	48	43
		40	2.00	16	248	165	124	99	83	71	62	55	50

Boomless Nozzle Application Rates

Side Nozzle	Width (ft.)	PSI	Nozzle Cap. – 18"	GPM	Gallons Per Acre MPH 4	6	8	10	12	14	16	18	20
Red	6	20	2.87	6	59	39	30	24	20	17	15	13	12
	7				51	34	25	20	17	14	13	11	10
	8				44	30	22	18	15	13	11	10	9
	6	30	3.53	7	73	49	36	29	24	21	18	16	15
	7				62	42	31	25	21	18	16	14	12
	8				55	36	27	22	18	16	14	12	11
	6	40	4.00	8	83	55	41	33	28	24	21	18	17
	7				71	47	35	28	24	20	18	16	14
	8				62	41	31	25	21	18	15	14	12
White	6	20	5.60	11	116	77	58	46	39	33	29	26	23
	7				99	66	50	40	33	28	25	22	20
	8				87	58	43	35	29	25	22	19	17
	6	30	6.83	14	141	94	70	56	47	40	35	31	28
	7				121	80	60	48	40	34	30	27	24
	8				106	70	53	42	35	30	26	23	21
	6	40	8.00	16	165	110	83	66	55	47	41	37	33
	7				141	94	71	57	47	40	35	31	28
	8				124	83	62	50	41	35	31	28	25

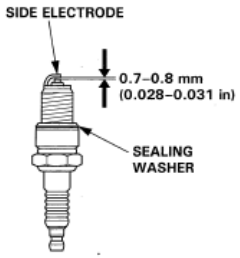
Engine Specifications

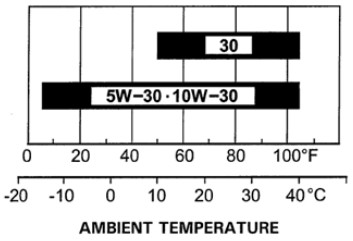
Honda GX 160

Engine Type	Air-cooled 4-stroke OHV
Bore x Stroke	68 X 45 mm
Displacement	163 cm3
Net Power Output*	4.8 HP (3.6 kW) @ 3,600 rpm
Net Torque	7.6 lb-ft (10.3 Nm) @ 2,500 rpm
PTO Shaft Rotation	Counterclockwise (from PTO shaft side)
Compression Ratio	9.0 : 1
Lamp/Charge coil options	25W, 50W / 1A, 3A, 7A
Carburetor	Butterfly
Ignition System	Transistorized magneto
Starting System	Recoil Starter
Lubrication System	Splash
Governor System	Centrifugal Mechanical
Air cleaner	Dual Element
Oil Capacity	0.61 US qt. (0.58 L)
Fuel Tank Capacity	3.3 U.S. qts (3.1 liters)
Fuel	Unleaded 86 octane or higher
Dry Weight	33 lbs. (15.1 kg)

MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (3) Perform at every indicated month or operating hour interval, whichever comes first. / ITEM		Each Use	First Month or 20 Hrs	Every 3 Months or 50 Hrs	Every 6 Months or 100 Hrs	Every Year or 300 Hrs	Refer to Page
Engine oil	Check level	o					9
	Change		o		o		9
Reduction case oil (applicable types)	Check level	o					9–10
	Change		o		o		10
Air cleaner	Check	o					10
	Clean			o (1)	o *(1)		11–12
	Replace					o **	
Sediment cup	Clean				o		12
Spark plug	Check-adjust				o		12
	Replace					o	
Spark arrester (applicable types)	Clean				o (4)		13
Idle speed	Check-adjust					o (2)	13
Valve clearance	Check-adjust					o (2)	Shop manual
Combustion chamber	Clean	After every 500 Hrs. (2)					Shop manual
Fuel tank & filter	Clean				o (2)		Shop manual
Fuel tube	Check	Every 2 years (Replace if necessary) (2)					Shop manual





SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

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