



## OPERATING AND SERVICE MANUAL



## STAINLESS STEEL BRINE MAKER

# NOTICE: READING THIS MANUAL IS MANDATORY BEFORE OPERATING THIS EQUIPMENT

## Warranty Notice:

At VSI, nothing is more important to us than your complete and total satisfaction with our products and customer service. Proper setup, installation and best maintenance practices are vital to ensure longevity of your VSI equipment.

Please go through the warranty registration form and procedure for your equipment in order to register your three year Honda and one year overall product warranty. The warranty form was sent to the same email address to which you received your invoice. If you cannot find this form, please contact us at [sales@vsinnovation.com](mailto:sales@vsinnovation.com) . If the warranty is not registered, your warranty claim may be denied due to improper setup, use or install.

Our gas powered equipment is Honda tested and certified so your Honda engine comes with a three year commercial warranty backed by Honda and any Honda certified repair center. All other parts\* on your equipment are warrantied against defects through VSI for one year from the date of purchase.

\*We do not offer a warranty on pump seals as over 99% of those failures are due to improper use or running pumps dry.

This warranty is a parts and technical support only warranty, labor is not included.

Corrosion related issues including wire connections are not qualified warranty items.

We are not responsible for loss of product or productivity due to failures of any kind.

Your warranty will be void due to abuse, misuse, neglect, alteration, modification, improper handling, improper installation, improper maintenance or failure to follow the instruction and procedures in the VSI manual and warranty registration form.

Warrantied parts must be sent back to VSI within 30 days in order for us to process your warranty claim. Replacement parts will be invoiced and will not be marked as paid until the warrantied part items are returned to our manufacturing facility at 150 E Sharon St, Le Center, MN 56057.

## **Installing Your Brine Maker**

The first step will be to place your poly batch tank and stainless mixing hopper in their desired location inside of your facility. The poly batch tank goes in “back” and the stainless steel mixing tank in front so it is easily accessible to load salt. The poly tank should sit close to flush against the back of the stainless mixing tank with the stainless overflow chute aligned with the cut hole in the back poly batch tank.

Next, you will connect your back tank to your front tank with the provided 2” Kanaflex hose, as pictured below.



Next you will install your power and water lines. The two main components you will need is 220v single phase power (30amp) and a water source. If your water source is less than 40 gallons per minute, you may want to invest in a water storage tank with a float valve to most efficiently make brine.



Your water source should be plumbed into the back manifold valve. The middle valve should be connected to your additive storage and the front valve must be connected to your brine storage as pictured below.





## **Electrical Details**

As noted, the motor on this brine plant requires a 220 volt, 30 amp circuit. 10 gauge 3 wire is suggested but please follow all local code requirements.

We supply a waterproof switch/junction box as pictured below. Please note this is just a waterproof switch box, no switch is supplied.



You will need to provide a 220v switch rated to 30 amps to place inside the box.

Power from your supply will run the 2 hot wires into the box on the "line" side of the switch and the ground wire will ground to the switch.

Coming off of the "load" side of the switch will be wire that goes to the junction box on your motor as well as a ground wire from the switch to the ground terminal inside of the motor junction box.

**It is vitally important that the motor be wired in opposite rotation, per the sticker/diagram printed on the motor. This means that one hot wire will go to the black and blue motor wires and the other hot wire will go to the red and yellow motor wires. If your pump is NOT wired in opposite rotation the brine maker will not work and you will destroy your pump seal.**

Your sensorex salinity reader also runs off of 220v power, the 2 small 18 gauge wires that come from the back of the sensor can also be wired into the switch/junction box, each wire going to a hot lead. We recommend wiring them into the "line" side of the switch so the sensor remains on even when the pump is turned off.

If you prefer to run your sensorex on a separate circuit, it can also be run on 110v service, with one wire being hot and the other neutral. This device does not require a ground wire.

### **Water Details**

As noted, for most efficient operation, we suggest installing a water float tank if your in house water supply is less than 40 gallons per minute. A float tank is simply a water storage tank, from 1000-3000 gallons (less for higher flow rates, more for lower flow rates). You will run your on site water supply into the top of this tank with a float valve. We recommend the Hudson 718H float valve which can be found on Amazon and locally at ag supply stores. This valve will be placed as high in your float tank as possible, this way anytime you draw the water down below the very top, it begins refilling automatically. Below you can see a 3000 gallon water tank with a Hudson valve near the top.



This float tank would then be plumbed in via the bottom 2" valve to your brine maker manifold, so you can readily and quickly pull water into your brine maker after.

If you have sufficient water supply, over 40 gallons per minute, you can plumb your water right into the manifold. Be sure to check local regulations regarding a backflow prevention device when plumbing direct.

The image on page 4 shows where the water will be plumbed in regardless of if it is direct water or from a float tank.

### **Calibrating your Sensorex**

The first very important step for proper calibration of your Sensorex salinity reader is to “zero” the system out before adding water or brine to it. There is an in depth video on this process at the following link, if you prefer to watch a video to calibrate.

[Click here for the in depth video](#) or type the following into your web browser:

<https://youtu.be/MG3g4CSL2zM>



To zero your sensor click the cal and mode button simultaneously. A menu will pop up, press Enter to continue on. Scroll over to the third menu option “zero” and click enter. The screen should show a flashing zero and a small zero below it. Click enter to confirm the zero, as pictured below.

If the sensor has been in contact with water or brine it will not read true zero, the small number at the bottom will show a number. Simple use the zero adjustment to counteract until it reads true zero. For example, if the sensor reads 12, enter -12 to zero it out.





Now you will set your Cell constant, which is the 1st menu item in the same menu in which you did the zero. This will vary based on your salt purity and water hardness, so you will need to set it yourself after testing the brine with a floating hydrometer. A good baseline setting is 3.000. After all other setup is complete, and you begin mixing brine, you will adjust this constant up or down, up if your digital readout is reading lower than your floating tester and down if your digital readout is reading higher than your floating tester.

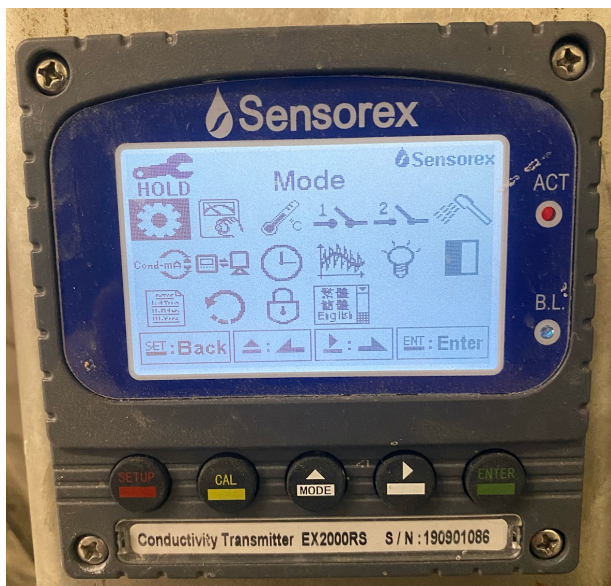
Be sure that when pulling a sample to check with your floating tester that you are pulling it from the same place as your sensor goes into the tee on your brine maker. The easiest way to do this is to use your truck fill hose to fill a bucket or pitcher. Be sure that when doing this technique to clear any previous contents out of the truck fill hose before emptying for a sample. This is only a one time step, so we want to make sure it is done right. The 3.000 baseline setting should get you within 1.5% high or low depending on your salt purity and water hardness. The cell constant adjustment screen is seen below, adjust the "C=" up or down and then hit enter until your percentage on your main screen is accurate.



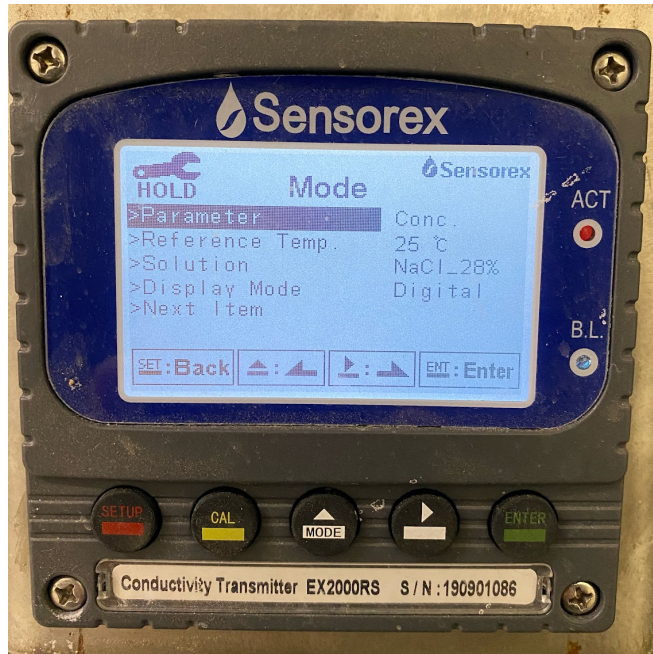
The final setting to adjust in this menu that is accessed by pressing “cal” and “mode” simultaneously is the Std. Solution which is the 2nd menu item between cell constant and zero. Select this option by pressing enter. On the solution type hit enter and select “NACL”



To get to the next menu of options, from the main screen, click the “Setup” and “Mode” buttons simultaneously and then press enter. The menu as pictured below will appear.



Click on the first option, which is “Mode”. Change your Parameter to “Conc.”, Scroll down to “Solution” and change it to NaCl 28%. The finished menu should appear as below:



From the same menu that is accessed by pressing “Setup” and “Mode” simultaneously, scroll over to “relay 1” and enter that setting, and turn the relays from “Auto” to “Off”, do the same with relay 2.

Finally, you can adjust your backlight from this menu, the standard setting is “off” where it only turns on when you press a button. You can also select “auto” or “on”. This is just up to personal preference.

### **Running Your Brine Maker**

Now that your system is set up and the sensor is mostly calibrated, it’s time to mix some brine! If you prefer to watch a video on this process to supplement the manual, check out our youtube channel.

The first batch of brine you make with your brine maker will be different from the rest. The first batch is the only one that doesn’t start with your stainless mixing hopper full of concentrated brine and with residual salt content. To begin your first batch you will add water about half full on your hopper and then fill the hopper up to the fill line with salt, this will take around 4 yards of salt (only this first batch). Anytime you are loading salt in your hopper, you want to bias your loading towards the front (away from the overflow chute) to avoid salt from running over into your back tank, as pictured below.





Always load salt slowly as adding it too quickly could cause major splashing or overflow.

Once all salt is added, you can fill the rest of the system with water, until the back batch tank is about 2-3" from the top overflow hole where the stainless chute drains into the batch tank.

You can run your pump and agitation during this time as well, in order to expedite the mixing process. (so you are mixing and filling at the same time)

Once your salinity reader reads at 23% it is time to close your agitation valve and open your brine pump out valve simultaneously in order to pump the finished batch of brine to your storage tanks. While your finished brine is pumping out, you can add your next load of salt to the mixing hopper which will overflow some extra brine from the stainless mixing hopper into your back batch tank giving you a larger finished batch each time. This is also why you will start to pump out at 23% since that extra brine that flows over is actually stronger than the rest and will bring the percentage up to 23.3%, or close enough to that desired percentage. Keep in mind, that when storing in bulk tanks, it is perfectly acceptable for your pump out batches not to be exactly 23.3%, anything within a percentage point above or below is perfectly acceptable when pumping into bulk tanks for later use.

After your first batch in which you had to add a lot of salt to fill the hopper, you will only need to add about 2300-2400 lbs of salt per load going forward, until the system is fully drained and cleaned out, at which point you would start again with the first batch process.

### **Consecutive Batches**

Now that your first batch is out of the way, the process is faster and simpler. The most efficient way to make brine is to make consecutive batches without a break until your tanks are full or to the fill level of choice. This consecutive process allows you to maneuver with one staff member and almost no “down time”. In fact, if you follow these steps you won’t even turn off your brine maker pump until you are done with your desired number of batches. The only motions will be filling salt and opening/closing valves.

Once your first batch of brine has pumped out (during which time you have added your next 2300-2400 lbs of salt for the next load) you will close the pump out valve, open the agitation valve, and open your water fill valve. Once the water is full close the water fill valve and continue agitating until your digital display reads 23% at which time you will simultaneously close the agitation valve and open the brine pump out valve. As mentioned previously, now is the time to load your next scoop of salt in preparation for the next batch. As soon as your brine is done pumping out, close the pump out valve, open the agitation valve and open the water fill valve to begin filling and mixing the next batch.

This process can be repeated as many times as you want without turning off the pump, as long as you have sufficient water and brine storage. At any time during the mixing process if it seems like the rate of mixing has substantially decreased, it may be due to a lack of salt in the top hopper. You can add salt at any time during mixing but make sure you do not overfill the capacity of your system as your back tank is likely already full at that point and adding salt will displace additional liquid.

### **Filling Your Truck**

You can fill your truck with the same pump you use to make brine. By attaching a fill hose to the camlock on the front of the brine maker and to the fill port on the sprayer, you can fill your tank. With both the agitation and the brine pump out valves turned off as well as the batch tank valve turned off, select which product you want to fill from the manifold. Typically we suggest filling brine first and then additive, then air purge (with the built in air purge feature) and disconnect your lines.

## Valve Overview

1. Truck fill valve
2. Brine pump out valve
3. Agitation valve
4. Valve to bulk brine storage tanks
5. Valve to additive storage tank
6. Valve to water source, float tank or plumbed in from building
7. Valve to brine maker batch tank



**UNLESS OTHERWISE NOTED, ALL VALVES CLOSED EXCEPT THE ONES LISTED**

**Water in to fill brine maker:** Open valves 3, 6 and 7 with pump on (this will be simultaneously filling water and mixing brine)

**Mixing brine after water level is full:** Open Valves 3 and 7 with the pump on

**Pump out finished brine to bulk brine storage tanks:** Open valves 2 and 7

**Drawing from bulk brine storage tanks to fill truck sprayer:** Open valves 1 and 4 (make certain valve 7 is closed, leaving this open is a common mistake). You will also need to make sure whatever necessary valves to allow flow into your sprayer are open.



**Drawing from bulk additive storage tanks to fill truck sprayer:** Open Valves 1 and 5 (make certain valve 7 is closed, leaving this open is a common mistake). You will also need to make sure whatever necessary valves to allow flow into your sprayer are open.



### **Top Valve**

In the photo above, the top valve is there in case you want to drain the mix tank into the batch tank. This will stay closed 99% of the time to keep debris in the mix tank from getting into the rear batch tank. This is only used when you want to clean out your brine maker, you can first drain a majority of the liquid out of the tank through this valve before flushing the remainder out of the bottom valve. Before planning for a cleanout, we suggest dissolving as much of the remaining salt in the system as possible without adding more. This may take multiple batches and they will take substantially longer to blend to 23% than normal batches.

### **Bottom Valve**

The bottom valve is your final mix tank clean out point. This is for when you want to completely drain your mixing tank for a full clean. You will likely know it is time to clean out your system when you have consistently been following the same procedure but your mix times are extended far over normal. This is likely due to buildup of

undissolvable solids in the bottom of your mix tank.

Do not flush material out of the bottom valve until you have followed the instructions in the previous “Top Valve” item regarding dissolving as much salt as possible before cleanout.

Furthermore, if there is more than 12-18” of hard buildup in the bottom of your tank, you may need to shovel some out before you can flush it out of the bottom. Be careful when shoveling out not to damage the agitation jets at the bottom of the mix tank.

### **Care and Maintenance**

Proper care and maintenance is essential to the longevity of the brine maker. There are 2 grease points on the electric motor, on top, one in front and one in back. These need to be greased every 100 hours of service. General rule of thumb is to grease them when you get the brine maker and then 3x per season.

It is vitally important that after the season of brine making is over that your system gets cleaned and flushed out. If salt brine is left in your plumbing and pump, it will destroy your pump seal which in turn can destroy your electric motor. Run clean water through the system, open all system valves and then remove the bottom drain plug on your pump and leave off until nothing is dripping out of it.

While it is not vital to clean all of the salt out of your mixing hopper, best practice is to have it clean and dry while in storage so that you do not encounter a solid layer of hardened salt that takes hours to dissolve the next season.

The see a walkthrough video that goes step by step on how to use the stainless steel brine maker, [click here](#) or copy and paste the following URL into your browser:

<https://youtu.be/D9PBTiZWfik>

### **Contact Information**

If you experience any problems with the unit, need parts, or have any other questions, please feel free to contact us and we will be more than happy to help.

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