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Rev. 1.7

# PLC-3000SS-HYD HYDRAULIC BRINE MAKER

WITH AUTOMATIC SALINITY AND  
PLC CONTROL

**INSTALLATION  
START-UP  
MAINTENANCE  
MANUAL**



**PENGWYN**

2550 W. FIFTH AVENUE  
COLUMBUS, OH 43204

# PENGWYN

2550 WEST FIFTH AVE.  
COLUMBUS, OHIO  
43204

## PHONE

614-488-2861  
800-233-7568

## FAX

614-488-0019

[WWW.PENGWYN.COM](http://WWW.PENGWYN.COM)

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## ***LIMITED WARRANTY***

PENGWYN warrants Hydraulic Automatic Brine Maker to be free of defects in material and workmanship, under normal use and service for a period of one (1) year from date of shipment. PENGWYN's obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by PENGWYN, any part or parts thereof which are returned within thirty (30) days of the date when failure occurs or defect is noted, with transportation charges prepaid, and which upon examination appears to PENGWYN's satisfaction to have been defective. **Such free repair or replacement does not include transportation charges, or the cost of installing the new part or any other expense incident thereto. Pengwyn will not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products, nor will PENGWYN be liable for special, incidental or consequential damages.**

Ordinary wear and tear, and damage from abuse, misuse, neglect or alteration are not covered by this warranty. PENGWYN assumes no liability for expenses incurred or repairs made outside PENGWYN's factory except by written consent. PENGWYN's warranty also does not cover the requirement of calibration. All calibration is to be performed by the end user after receiving training and with the use of the technical manual. This warranty is null and void if instructions and operating procedures are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with PENGWYN products, are covered directly by the warranty of the manufacturer supplying them. However, PENGWYN will assist in obtaining adjustment on such equipment or parts when necessary.

**THIS WARRANTY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND OF ANY OTHER OBLIGATION OR LIABILITY OF PENGWYN.**

### **PRODUCT IMPROVEMENT LIABILITY DISCLAIMER**

PENGWYN reserves the right to make any changes in or improvements on its products without incurring any liability or obligation whatever and without being required to make any corresponding changes or improvements in products previously manufactured or sold.

***Field plumbing and wiring is the responsibility of the customer and should be done in accordance with PENGWYN's circuit requirements and applicable building codes.***

# Hydraulic System Benefits

***The PENGWYN Hydraulic Brine System incorporates ten (10+) years of experience in brine making machinery. The hydraulic powered brine maker has some major advantages over the electric powered models.***

- The only high voltage electric power to the brine maker is located at the hydraulic power unit which is remote from the operator's push button station.
- The push button station is operated with 24 volt DC current which is inherently safe for the operator eliminating troublesome GFI circuits.
- The variable speed hydraulic pumps allow infinitely variable flow adjustment via hydraulic flow controls. This eliminates troublesome globe valves in the brine lines which plug up, leak and put non-productive back pressure on the brine system.
- The system includes hydraulic power and control for the cleanout dumping cylinders eliminating the need for dump truck hydraulic jumper hose disconnects which rust.
- The system includes as standard a 150 GPM hydraulic driven truck fill station. PENGWYN can supply a wired remote control box if desired.
- Almost all pipe thread connections are eliminated. Those who have had experience with salt brine and pipe threads are familiar with how brine will creep around these connections and present a perpetual housekeeping problem due to leakage.
- The hydraulic brine pumps have silicon carbide seals with four (4) times the expected life of ceramic seals. In the event of a pump problem the pumps are easy to remove for maintenance.

**NOTE:**      **The Salt Institute states:**

**The most rapidly growing winter maintenance practice in North America is anti-icing - which is based upon applying saturated brine to the highway.**

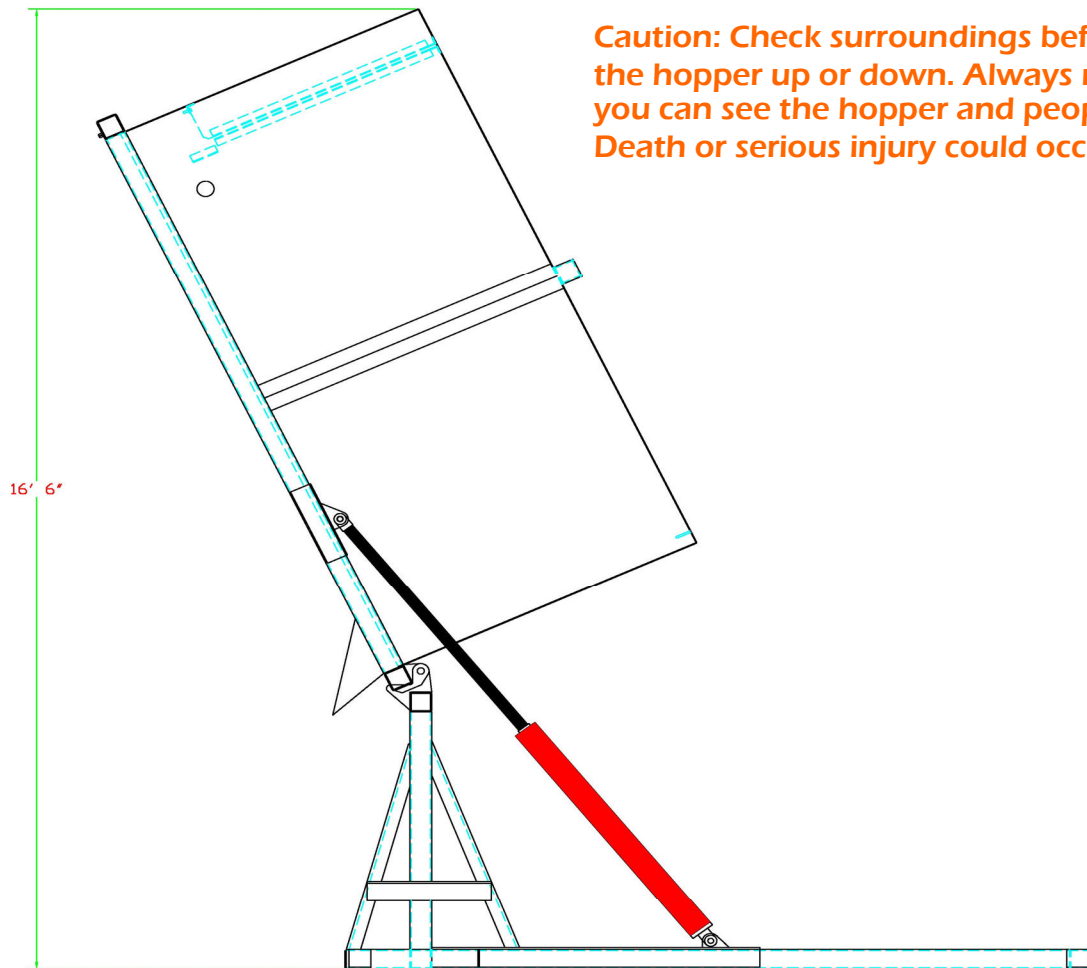
# Brine Site Utilities and Layout

**The main factors to decide upon for the brine site are:**

- Providing for a minimum of 50 amps of 3ph 208v, 60hz electrical service for an electric motor inductive load with sufficient wire gauge. Follow Electrical code and standards by contacting your local Electrician.
- Inside heated space for the tap water supply and the hydraulic power unit.
- A 1-1/2" tap water supply line with back-flow preventer and a **maximum pressure of 60 PSI.**
- An (8") thick concrete pad sufficient in area to support the brine maker, the control sump and the storage tank (s).
- Access to the brine maker Hopper on two sides. A long side for loading salt, and a short side for clean out to a front-end loader.
- Overhead clearance of 16'6" for hopper cleanout.
- Location for the control adjacent to the Hopper and in line of sight for dumping and truck loading. If this is not possible, a remote switch box can be supplied.
- Location of salt supply.
- Location on a building for the low salinity flood light.

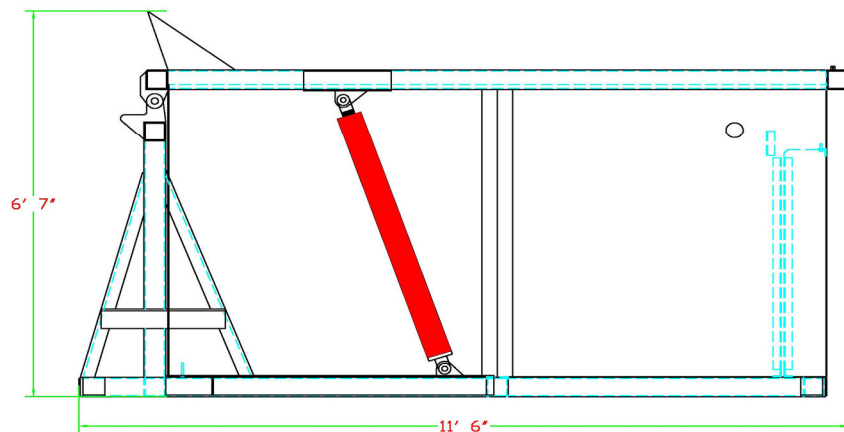
# Dump Clearance

Figure 1



**Caution:** Check surroundings before running the hopper up or down. Always make sure you can see the hopper and people around it. Death or serious injury could occur.

**Note:** Make sure that you disconnect all brine hoses before running the hopper up and down.



## Make A Layout Diagram of Your Brine Site

*Note: All brine sites are different. The following steps are general in nature and will be adjusted to suit the site's specific requirements.*

- **Design the concrete pad. The concrete must be at least 8" thick under the salt hopper. A pad 14FT by 24FT is adequate for most installations with one 6000 gallon storage tank.**
- **Locate the salt hopper towards one corner of the pad so that salt can be loaded from one side and clean out can be accomplished at the end opposite the brine plumbing.**
- **Determine the location of the control console so the operator can visually and safely control the dumping. Also, the control panel should be handy for operating the switch for turning on the truck loading pump (See page 9).**
- **Locate the storage tank and the bottom port plumbing to keep the suction plumbing as short as practical.**
- **Locate the hydraulic power unit and tap water supply as close as possible to the inside wall adjacent the out side brine equipment.**
- **Determine where to locate the penetrations for plumbing to go from inside to outside.**

## Tap Water Plumbing

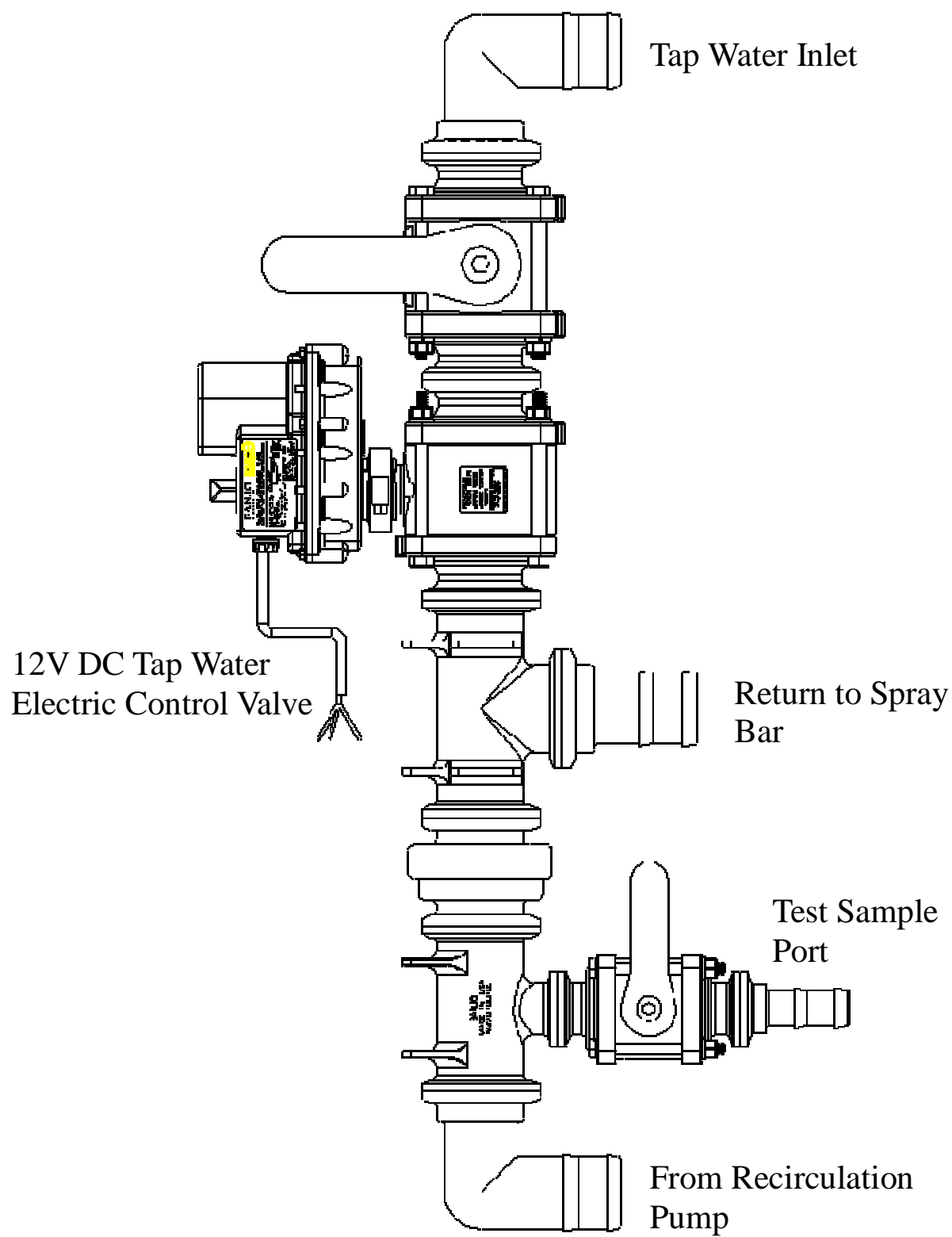


Figure 3

# Sample Layout Diagram

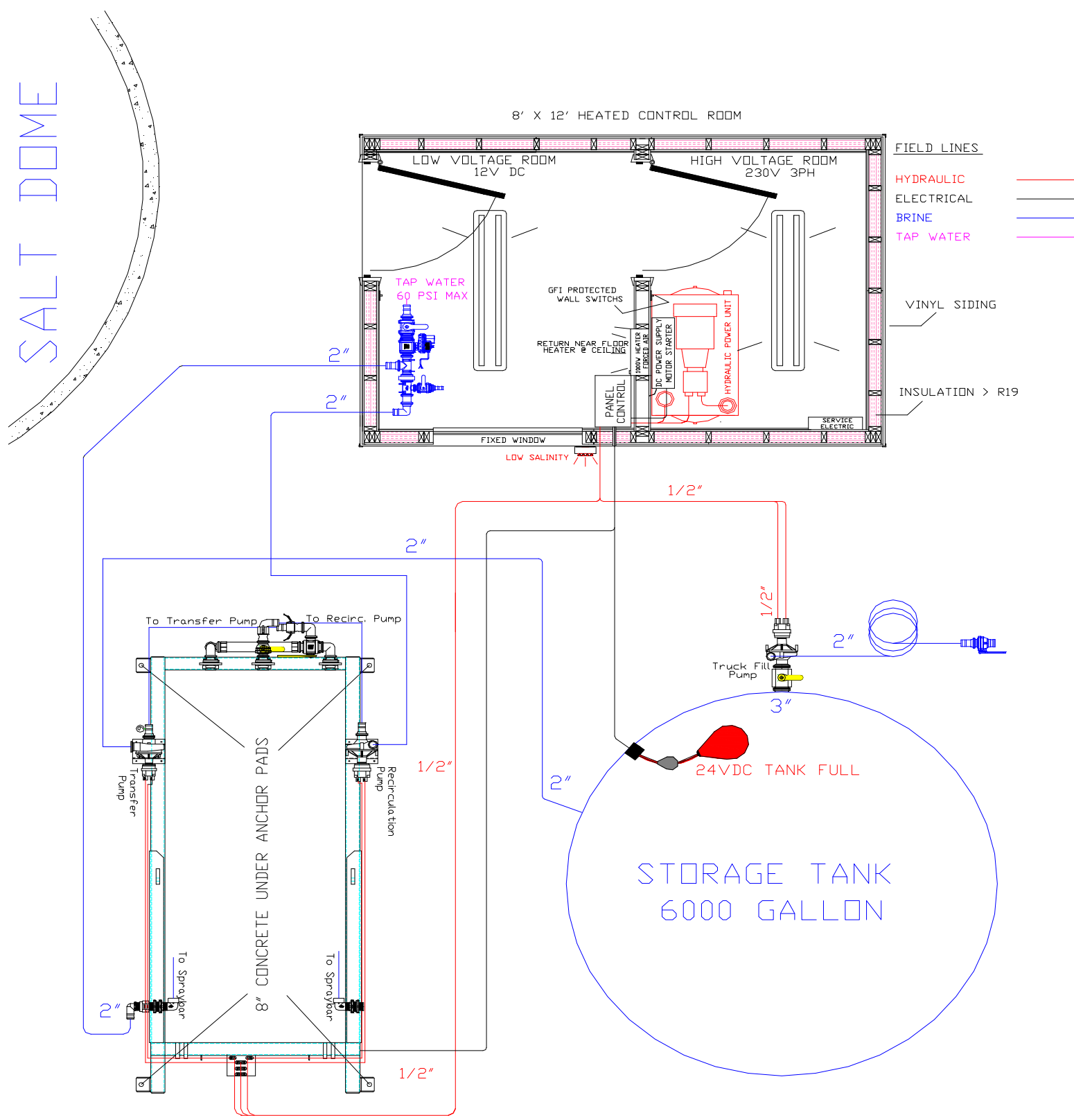


Figure 2

# Installation Requirements

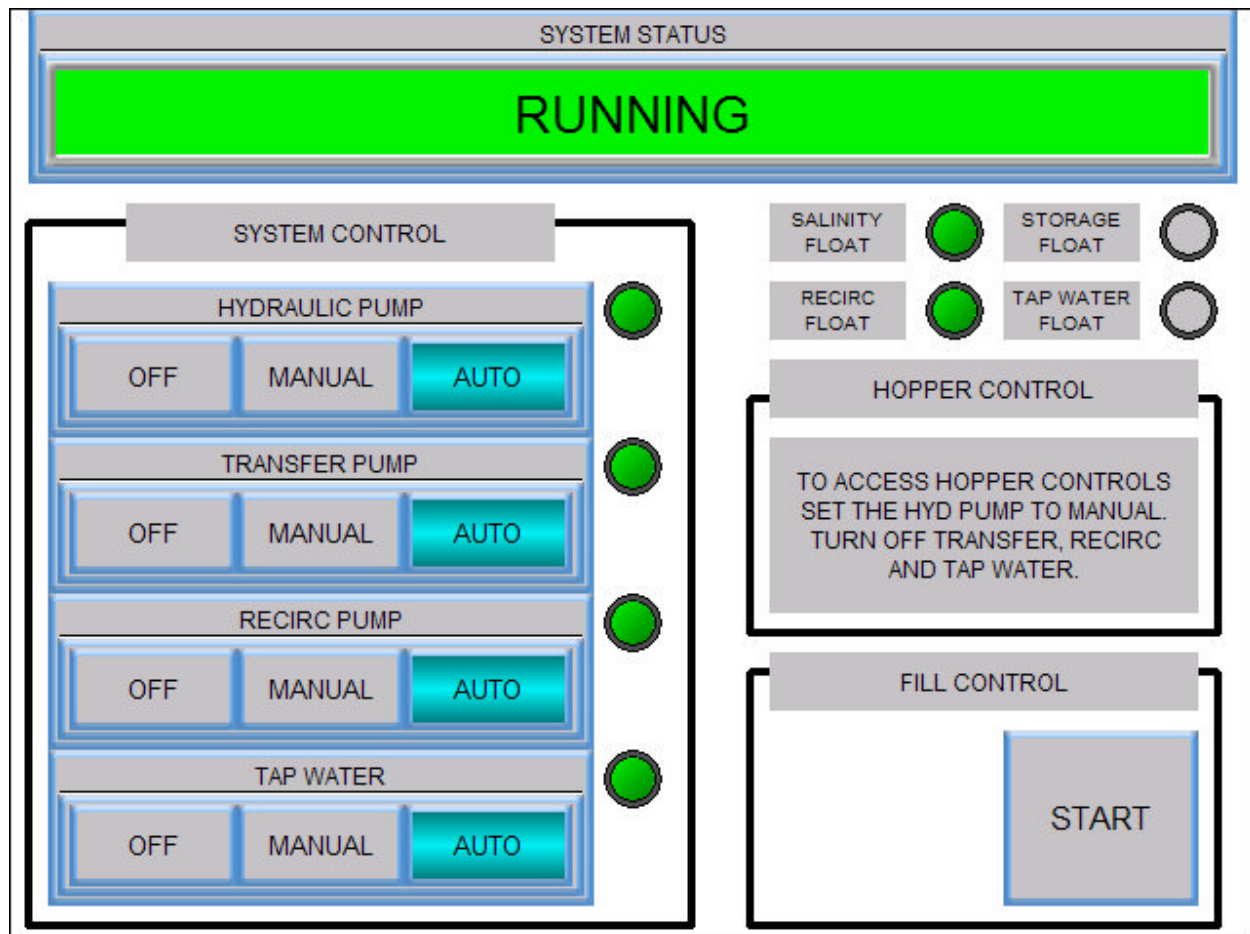
- The hopper could weigh from 10,000 lbs to 15,000 lbs when it is being dumped, therefore, the lifting frame must be well anchored for safety. The anchor bolts should be either the J bolt style put in when the concrete is poured or epoxy style. The Anchor Holes on the Hopper are 1.25" in diameter.
- The storage tank system shut-down float switch must be properly installed to prevent back flow. The float wire bulkhead and strain relief should be installed as high as possible in the storage tank. The float weight should be adjusted to about 6" from the float.
- **The Storage Float and the Transfer line must be connected to the same tank. If they are not connected to the same tank, the Transfer pump may overflow the tank without the float.**
- The 2" bulkhead for the storage tank transfer pump inlet should be located as high on the tank as possible. All tank volume above the bulkhead is not useable since to fill above this point would back flow upon transfer pump when shut down.
- The storage tank shut down float must be adjusted to shut off the transfer pump before the brine level reaches the transfer pump inlet.
- Locate the low salinity light where it can be seen by yard personnel while performing their normal duties.
- All carbon steel framework and fittings located in the brine hopper area will eventually corrode, therefore, it is recommended that proper plastic, stainless steel and brass materials be used.
- The centrifugal pumps will not self prime and therefore must be mounted **as low as possible** so that their suction ports are flooded.
- The tap water supply pressure should not exceed 60 PSI.

# Electrical System Description

## The electrical system has the following features:

- The system is PLC controlled allowing great flexibility in timing and logic in controlling the automatic brine maker.
- All electrical power to the operators control console and the hydraulic valves is inherently safe 24 or 12 V-DC.
- When the storage tank is full and there is no other function required of the hydraulic system and the motor switch is in Automatic, the electric motor on the hydraulic power unit will shut down after a period of time. This will allow sufficient time to circulate brine in the lines to prevent freezing. Also, this saves electrical power.
- If remote operation is required a 24V-DC wired remote pendant can be supplied for either remote Dump or remote Truck Fill or even both.

## Sump Control Panel Layout



# Sump Control Panel Descriptions

**Caution:** Running any pump in manual will ignore any float conditions for that pump. This could lead to freezing in the lines if proper use is not executed. If tap water valve is in manual, tap water could enter the lines and potentially freeze. Keeping Eutectic brine inside the lines is necessary to help prevent line freeze-up.

## **Power:**

Power to the control panel is supplied from the Hydraulic Power Unit's Starter Panel.

**To power up the Control Box:** Plug in the battery on the side of the Power Unit. Then, turn the disconnect handle to the on position.

**To power down the Control Box:** Turn off the power.

## **Hydraulic Pump:**

**Auto:** The hydraulic power unit will start and stop depending on the requirements of the sump control.

**Man:** The hydraulic power unit will remain on until either the Auto or Off button is selected. A green light will appear indicating Manual Mode is enabled.

## **Transfer Pump:**

**Auto:** Transfer of brine from the salt hopper to the storage tank is controlled by the salinity float and the storage tank float. Brine will only be transferred when the salinity float is high (*indicating proper salinity*) and the storage tank float being low (*indicating available room for more brine solution*). Transfer will cease when one of these two conditions is not met.

**Man:** Transfer of brine from the salt hopper to the storage tank will not be based on positioning of float. Typically it is used to pump down remaining solution in the salt hopper in preparation for clean out. Care must be taken to ensure that the storage tank is not over filled. A green light will appear indicating Manual Mode is enabled.

## **Recirc Pump:**

**Auto:** Recirculation of brine solution is enabled by the recirculation float. The brine solution will be re-circulated through the hopper pipes when the float is high to achieve the desired level of concentration. When the storage tank becomes full, the recirculation will shut down after a time delay to ensure that all of the brine plumbing contains saturated brine.

**Man:** Recirculation in manual mode is not based upon float position. Recirculation of brine solution will continue as long as the switch remains in this position. Care must be taken to ensure that the pump does not run dry when operating in this mode. A green light will appear indicating Manual Mode is enabled.

# Sump Control Panel Descriptions

(Continued)

## Tap Water:

- Auto:* Tap water is added to the system based upon the position of the tap water float. When the float is down, tap water will automatically be added to the system until the level that operates the float is reached, turning the tap water off.
- Man:* Tap water is continuously added to the system in the Manual ON position. Care must be taken when selecting tap water in this mode as there is the potential for over filling, spillage and freeze up. A green light will appear indicating Manual Mode is ON.

## Salinity/Storage/Recirc/Tap Water Floats:

- Green Light:* Floats are at or above normal level.
- No Light:* Floats are below normal level.

## Hopper Control:

In order to access the Hopper Controls, the Hydraulic Pump must be in Manual mode and the Transfer and Recirc.. Pumps and Tap Water Valve must all be turned Off. Once these conditions are satisfied, you must hold the appropriate function on the PLC Screen (up or down) for three seconds before either action will begin.

- Up:* Raises the salt hopper for cleaning out accumulated non-dissolvable particles that are a characteristic of road salt. Care must be taken to ensure that any brine plumbing that can be damaged by raising the salt hopper is disconnected.
- Down:* Lowers the salt hopper after clean-out is finished. Keep a clear distance anytime the salt hopper is being raised or lowered to prevent personal injury.

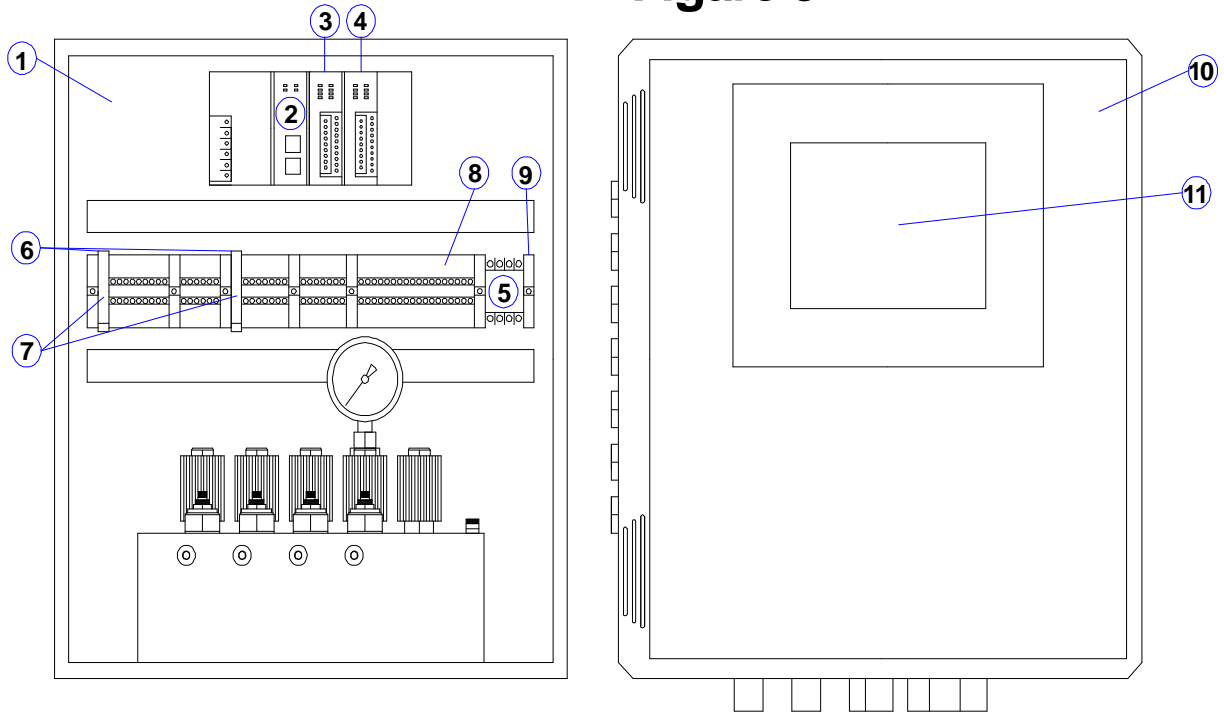
## Fill Control:

Transfers brine from storage tanks to the truck mounted unit. Filling of equipment should be monitored at all times to prevent over-filling and spillage.

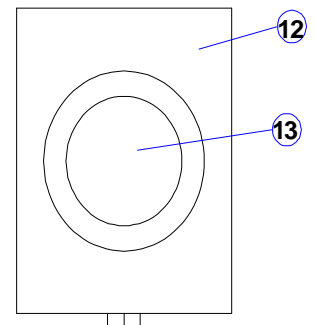
- Start:* The pump will turn on and "Fill Pump Running" will be displayed.
- Stop:* Pump will turn off.

# Sump Control Box Layout

**Figure 5**



Control Panel Bill of Materials			
	Part #	Description	Qty.
1	HW-MP2016A	ENCLOSURE BACKPANEL	1
2	D2-240	PLC CPU	1
3	D2-16ND3	16PT DC INPUT CARD	1
4	F2-08TRS	8PT RELAY OUTPUT CARD	1
5	MK2P-S	OMRON DPDT 12V RELAY	1
6	DN-F10	FUSE HOLDERS	2
7	MCL-5	5A FUSE	2
8	DN-T12	TERMINAL BLOCKS	48
9	DN-EB35	END BRACKETS FOR TB	7
10	HW-201610CHQR	ENCLOSURE	1
11	EA7-T8C	MICRO GRAPHIX SCREEN	1
12	HW-J80604CHSC	LOW SALINITY ENCLOSURE	1
13	7500	4" LED STOP/TAIL LIGHT	1
x	D4-1000CBL	PLC TO SCREEN CABLE	1



# Sump Control Box Bottom & Side View

Figure 6

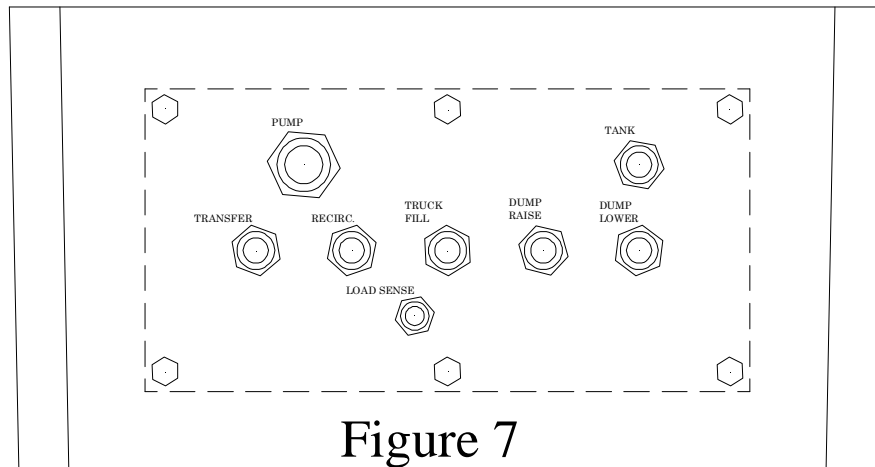
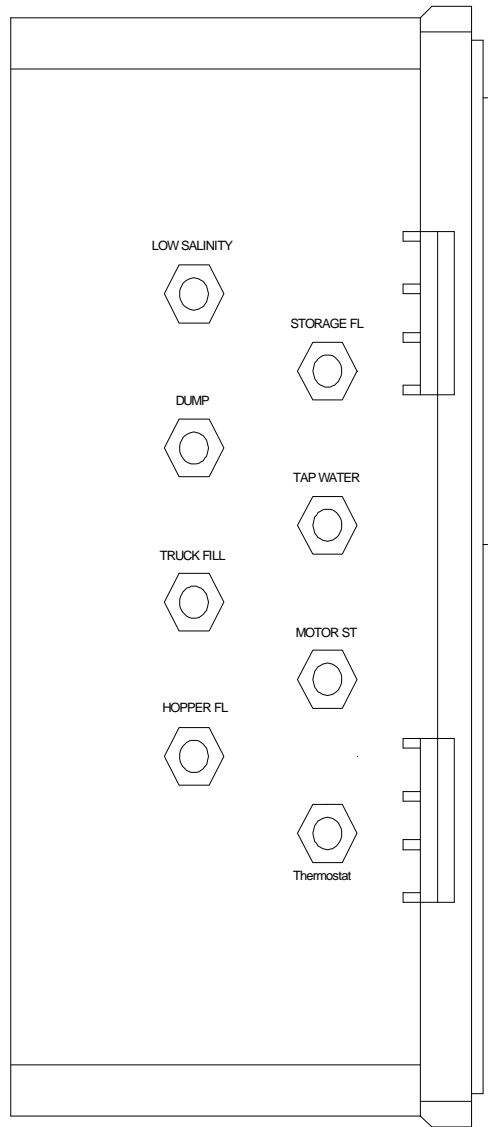
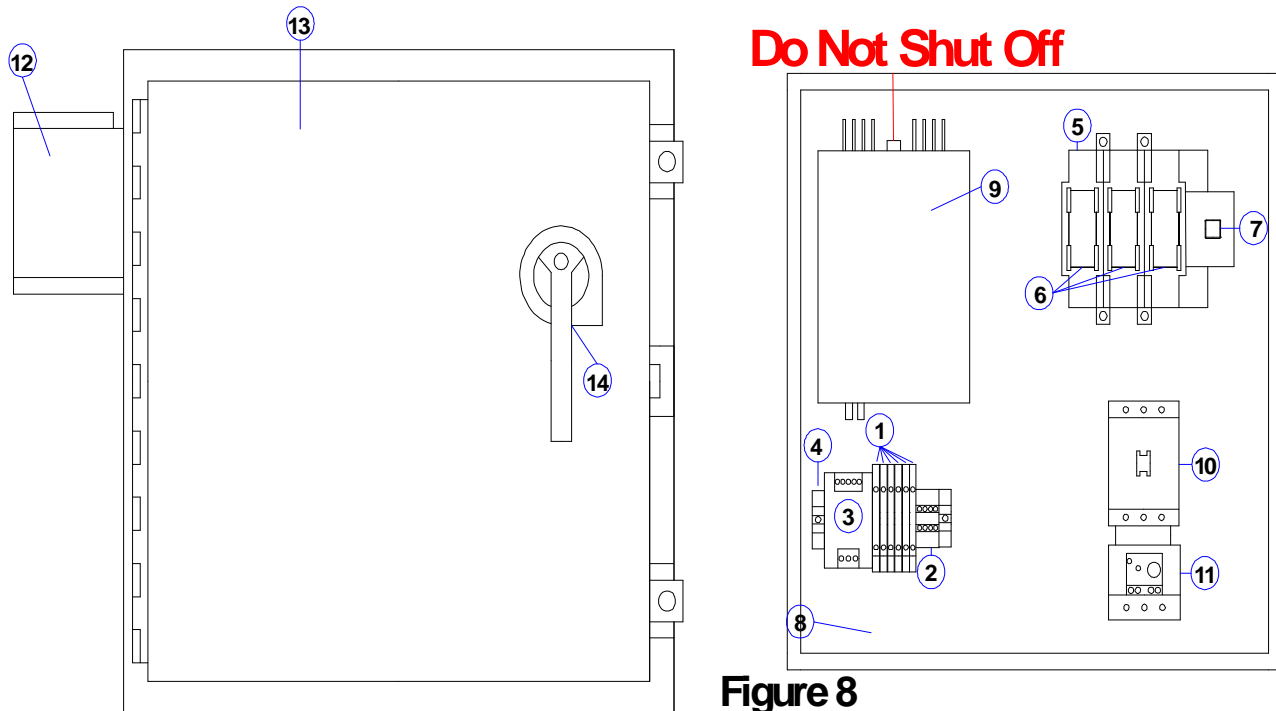


Figure 7

# Motor Starter Box

The PLC-3000SS-HYD pumps are hydraulically powered. The Power Unit includes:

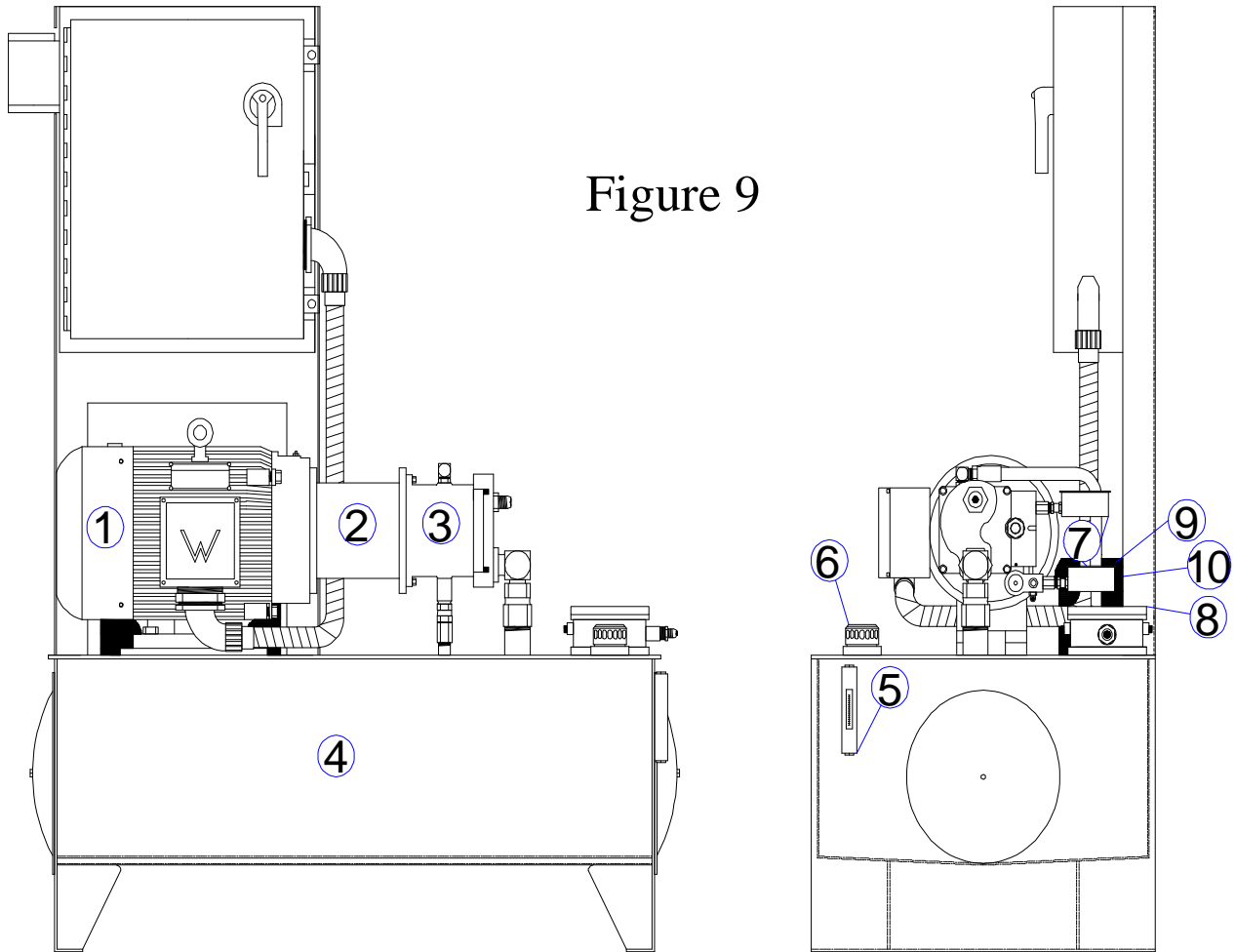
- Hydraulic reservoir for oil storage
- In tank hydraulic filter
- 15HP electric motor for driving the hydraulic pump
- Motor starter
- 12VDC Power Supply
- 24VDC Power Supply
- AC Power Transformer



**Figure 8**

Hydraulic Power Unit Bill of Materials			
	Part #	Description	Qty.
1	DN-F6	Fuse Holders	6
2	DN-T12	Terminal Blocks	4
3	PSP24-060S	24 VDC Power Supply	1
4	DN-EB35	End Brackets For TB	2
5	FBJ60	Disconnect 60A	1
6	JDL60	60A Service Fuse	3
7	SG200-10	Disconnect Shaft	1
8	NP2420	Back Panel For Enclosure	1
9	136581	13.8 VDC Power Supply	1
10	SC-E3G-24VDC	Motor Contactor	1
11	TK-E3-6800	Overload Relay	1
12	1H722	Control Transformer	1
13	N12242008	Motor Start Enclosure	1
14	HGPRL	Disconnect Handle	1

# Hydraulic Power Unit

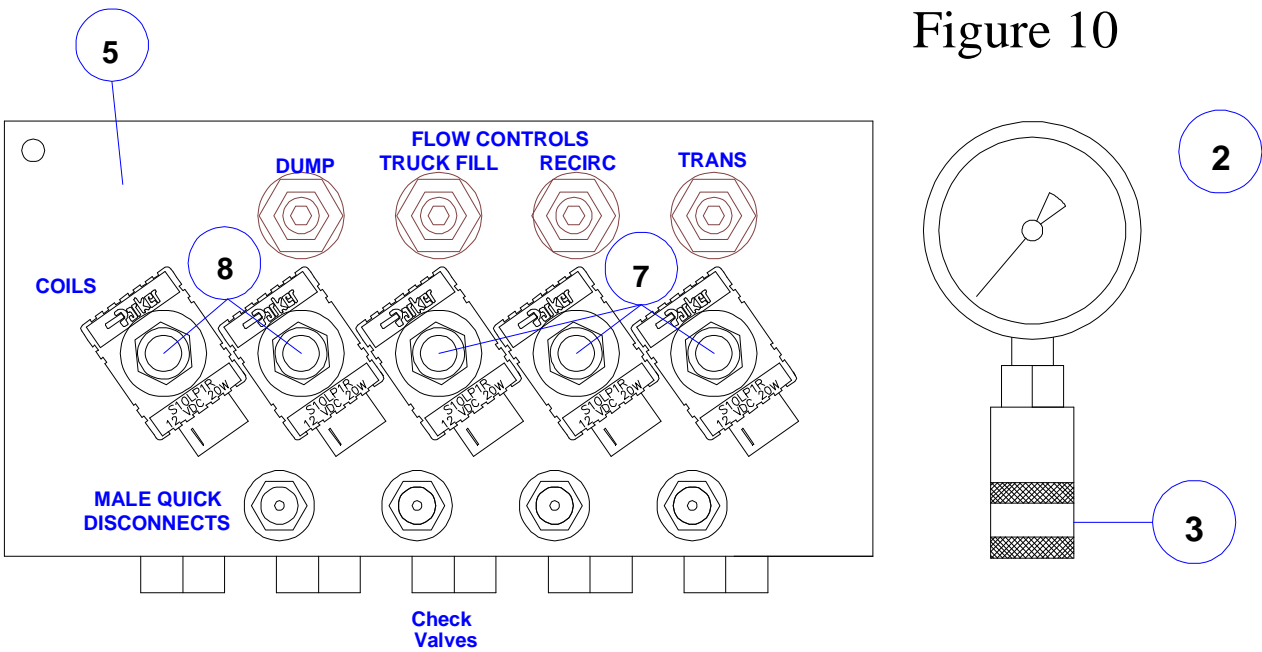


Hydraulic Power Unit Bill of Materials			
	Part #	Description	Qty.
1	WWE15-18-254TC	15 HP Motor	1
2	254399	Pump/Motor Adapter	1
3	80002965	Pump	1
4	10060	Hydraulic Reservoir 60 Gallon	1
5	SG-101	Sight Glass	1
6	FB-101	Filter Breather	1
7	PG-4000	4000 PSI Gauge	2
8	TF-101	Tank Filter	1
9	12 V Battery	Battery Backup	1
10	Battery Box	Backup Battery Box	1

# Hydraulic Manifold

Flow Control Valves turn clockwise approximately one turn from off. Then adjust as needed.  
**Caution: When adjusting flows, be sure to stay under the AC motors maximum Amperage. Any questions, please contact Pengwyn.**

Figure 10



Hydraulic Manifold Bill of Materials			
	Part #	Description	Qty.
1	CVH-103P	CHECK VALVE	5
2	PG-4000	PENGWYN GAUGE 4000 PSI	1
3	FIR14VNPT	1/4 FEMALE QCD	1
4	MIR14VNPT	1/4 MALE QCD	4
5	ABM MANIFOLD	B/M MANIFOLD DRILLED 4X6X12	1
6	RC-S10L	COIL	5
7	DSL101C	2-WAY SIZE 10 NC	3
8	DS103A	3-WAY SIZE 10	2
9	NVH101S	SIZE 10 CARTRIDGE FLOW CONTROL	4

## Battery Box

System includes a 12 VDC Automotive Battery. This is for the emergency closing of the 12 VDC Tap Water Ball Valves. This power will immediately close the tap water supply in the event of loss of AC power. The Emergency Battery's charge is maintained by the 13.8 VDC power supply located in the Motor Control Panel. This power supply must remain on during the Brine Production Season to prevent flooding or freeze-up.

# Thermostat

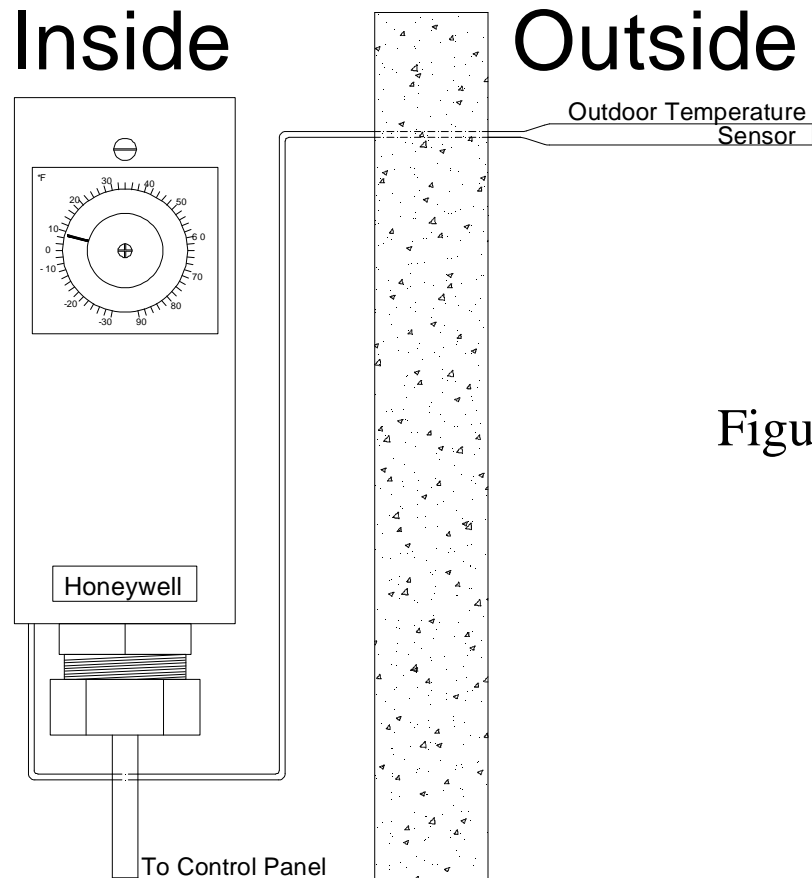


Figure 11

- The Thermostat is used to continuously cycle the Recirc pump when the outside temperature reaches a certain sub freezing temperature .
- The Thermostat is set by the user, and will run eutectic brine through the Recirc lines to prevent freezing.
- When the Thermostat is active, the PLC will keep the Hydraulic motor running and the Recirc Pump running. The production of Brine is not affected.
- In order to stop this feature, simply unplug Thermostat from the Control Panel. Keep in mind that doing so could cause freeze-up.
- It is important to check the salinity in the lines during colder temperatures to ensure the lines will not freeze up.
- Any other questions, please contact Pengwyn.

## Cautions

- The tap water supply should not exceed 60 PSI.
- Check surroundings before running the hopper up or down. Always make sure you can see the hopper and people around it.
- Make sure that you disconnect all brine hoses before running the hopper up and down.
- The Storage Float and the Transfer line must be connected to the same tank. If they are not connected to the same tank, the Transfer pump may overflow the tank without the float.
- The centrifugal pumps will not self prime and therefore must be mounted as low as possible so that their suction ports are flooded. Failure to properly flood the Suction ports will result in damage to the pump.
- Running any pump in manual will ignore any float conditions for that pump. This could lead to freezing in the lines if proper use is not executed. If tap water valve is in manual, tap water could enter the lines and potentially freeze. Keeping Eutectic brine inside the lines is necessary to help prevent line freeze-up.

## Cautions (Continued)

- When adjusting flow controls, be careful not to exceed the maximum amperage of the AC motor. Any questions please contact Pengwyn.
- Do not Unplug battery box. If external power is lost, the battery box is needed to shut the Water Tap Valve and stop the Water Supply.
- Always keep proper Hydraulic Oil levels in the tank to prevent any damage to the system.
- It is important to check the salinity in the lines during colder temperatures to ensure the lines will not freeze up.
- Caution: Wetted salt left to dry in air will re-crystallize forming a solid cake of rigid salt; therefore, once the brine is pumped off, the solids must be immediately dumped before they re-crystallize into a solid block.
- When saturates salt brine cools, some dihydrate crystals will form. These will easily pass through the centrifugal pumps and hose barb type nozzles. These crystals, however, could plug fine spray nozzles.

# Initial Start-Up

- Connect all plumbing according to Figure 15 on page 27.
- Turn the main water supply ON.
- Check for tap water leaks.
- Turn on the electrical service panel.
- Check the hydraulic fluid level in the hydraulic reservoir. **PENGWYN does not supply the oil, so the pump could be damaged if it is run dry.**
- Turn on the Motor Starter box.
- Jog the motor to check for rotation. Rotation is indicated by Yellow arrow. (Rewire if necessary) If there are any questions about reversing the rotation of the motor, contact PENGWYN.
- The hydraulic flow controls are calibrated at Pengwyn before delivery for optimal use without exceeding the motor amperage. If any flows need to be adjusted, contact Pengwyn.
- Disconnect the brine hoses from the Hopper.
- At the **Control Panel**, press the **Manual** button under Hydraulic Pump.
- Dump the empty hopper by fully extending the cylinders several times to fill them with hydraulic fluid and purge them of air. This process may take a few minutes.
- Reconnect the hoses to the Hopper and turn on the 2" transfer pump suction line ball valves. Close the By-pass ball valve.
- Refill the Hydraulic Power Unit to the full mark.

**NOTE:** All the brine maker centrifugal pumps are NOT self priming. They must not be run dry or the shaft seals will be damaged. All suction ports must be flooded with liquid before starting.

# Initial Start-Up

(Continued)

- Press the **Auto** button under **Tap Water** and **Recirculation**. The **Recirculation** pump will automatically turn on and off as the liquid level rises until the fluid level in the Hopper reaches the **Baffle plate** which in turn will allow the level in the sump to permanently cover the safety float in the bottom of the sump.
- As the **Hopper** fills with 15 to 18 inches of water as a buffer, load the **Hopper** with salt to within 18 inches of the top of the Hopper.
- Continue to fill the **Hopper** with water until the water reaches the top of the **Hopper** baffle plate.
- During the filling process check the brine concentration at the sample port with the Salometer. At some point, Salometer readings of 86% to 100% should occur. Fill the Saloat (3 gallon plastic jug) with a desired concentration of brine. Refer to the Salinity Chart on page 26 to select a certain salinity. Be sure to get all the air out of the Saloat or it will not sink when it should.
- Salinity tests can be made with the ball valve at the tap water plumbing, displayed on Figure 3 on page 10.
- Press all **Auto** buttons.
- The brine maker is now in full production.
- When the Saloat sinks, indicating the brine concentration is below the desired salinity in the jug, the Salinity Float light will turn off.

# Cleanout and Maintenance

The rule of thumb according to The Salt Institute is that road salt contains about 5% insoluble material, thus for every 20 scoops of salt into the brine maker there will remain in the maker one scoop of debris which will need to be cleaned out. A ton of salt will make a thousand gallons of eutectic concentration brine at 88.3% of saturation or 23.3% salt in solution by weight (see the salt vs. water phase chart).

It is recommended that the brine maker be allowed to dissolve out most of the granular salt occasionally to check the amount of debris that remains in the bottom of the hopper. The residue can be roughly measured by probing the bottom of the hopper with a pole similar to a broom stick. When there is 12 inches or more of residue in the hopper it should be cleaned. The remaining brine in the hopper probably will still have a concentration well above 80%. Even at 80% the freezing point is below 0°F. Since the previous brine production is usually in the 90% to 95% range it will not create a problem to add this brine to that in the storage tank.

**Caution: Wetted salt left to dry in air will re-crystallize forming a solid cake of rigid salt; therefore, once the brine is pumped off, the solids must be immediately dumped before they re-crystallize into a solid block.**

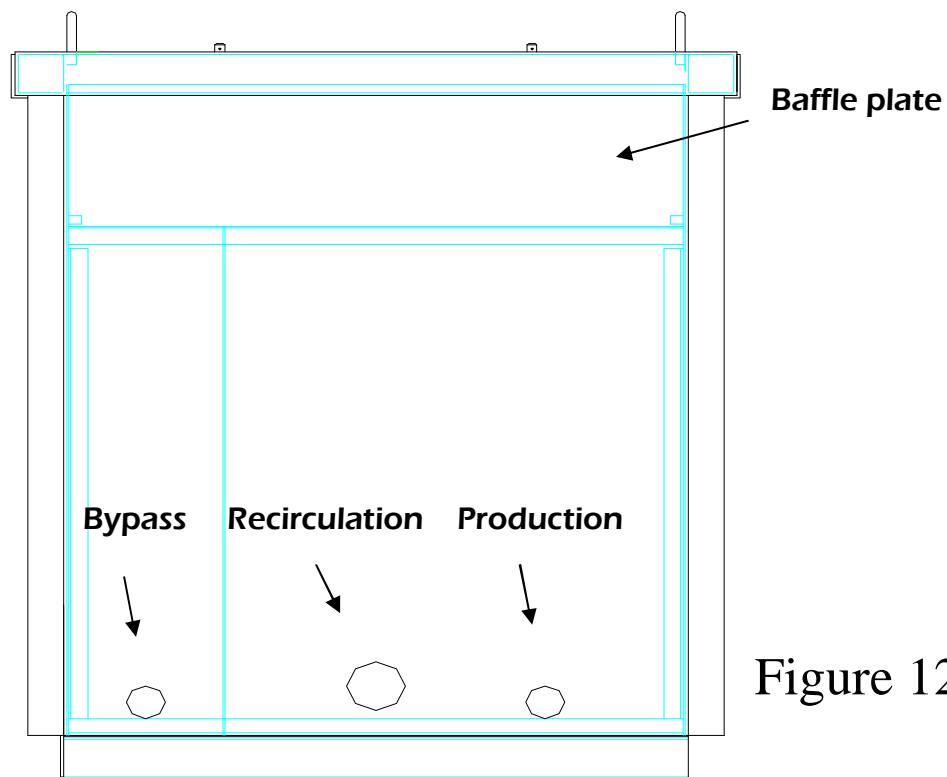


Figure 12

## The clean out procedure is as follows:

- Open the Bypass Ball Valve to the Empty Position.
- Turn the Hydraulic Pump switch to Manual.
- Turn on the transfer pump switch to the manual mode.
- Empty hopper.
- Immediately begin the dumping process before the remaining salt can re-crystallize by operating the dump switch to up.
- Dump the residue into the awaiting front end loader. Scoop out as necessary.
- Lower the hopper with the dump switch.
- Remove the slanted cover above the baffle, remove the screen and clean the screen and discharge baffle chamber as necessary.
- When everything has been cleaned and/or replaced, return to production.

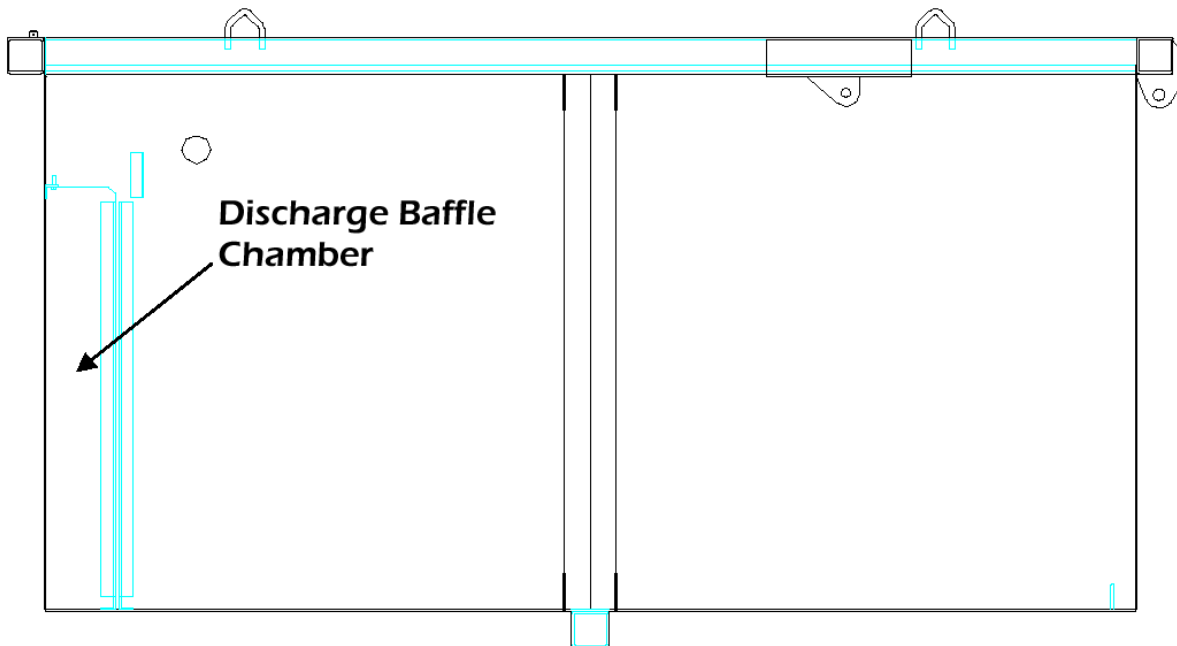


Figure 13

# Hydraulic Circuit Diagram

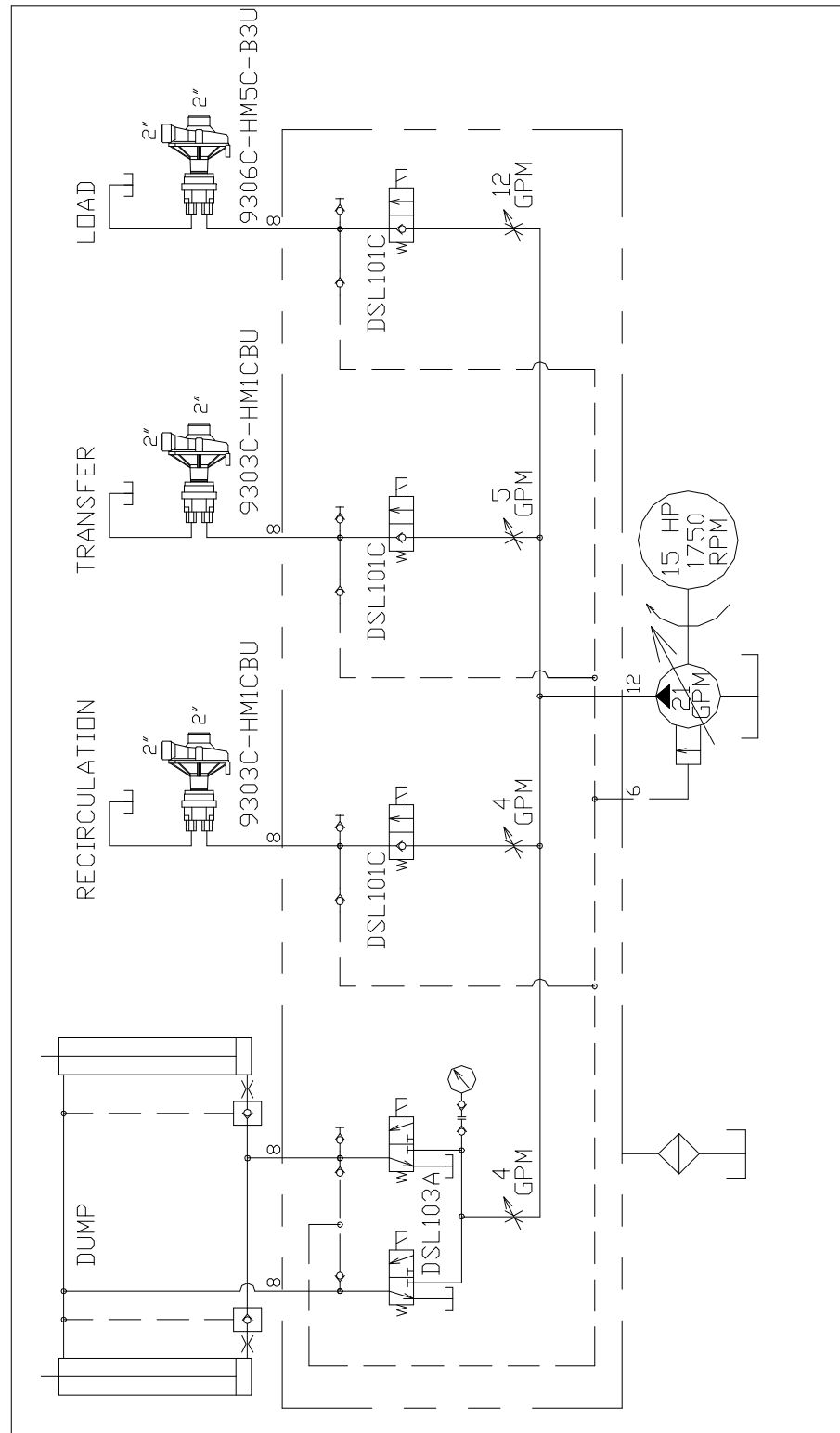


Figure 14



# NaCl/H<sub>2</sub>O PHASE CHART

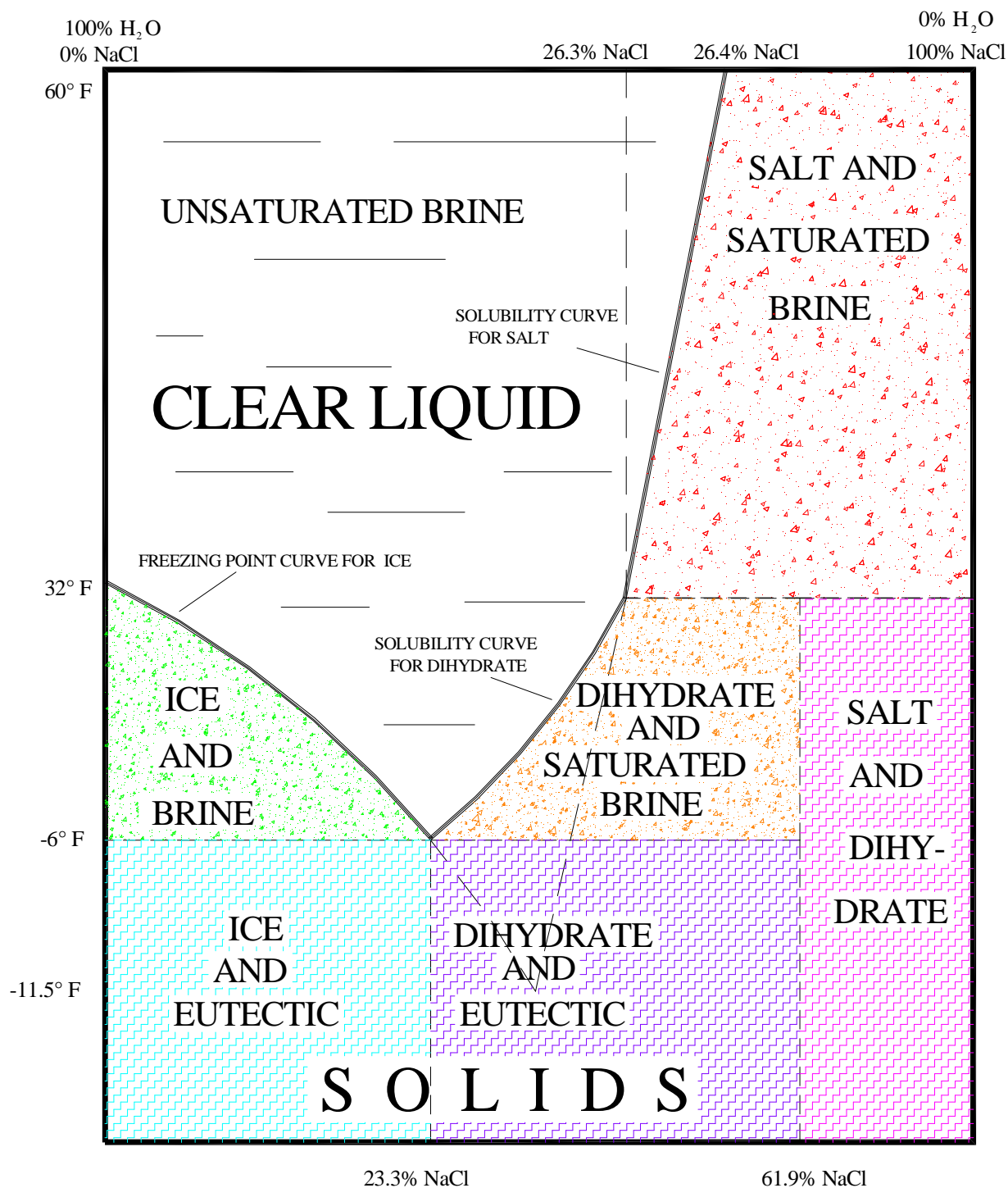


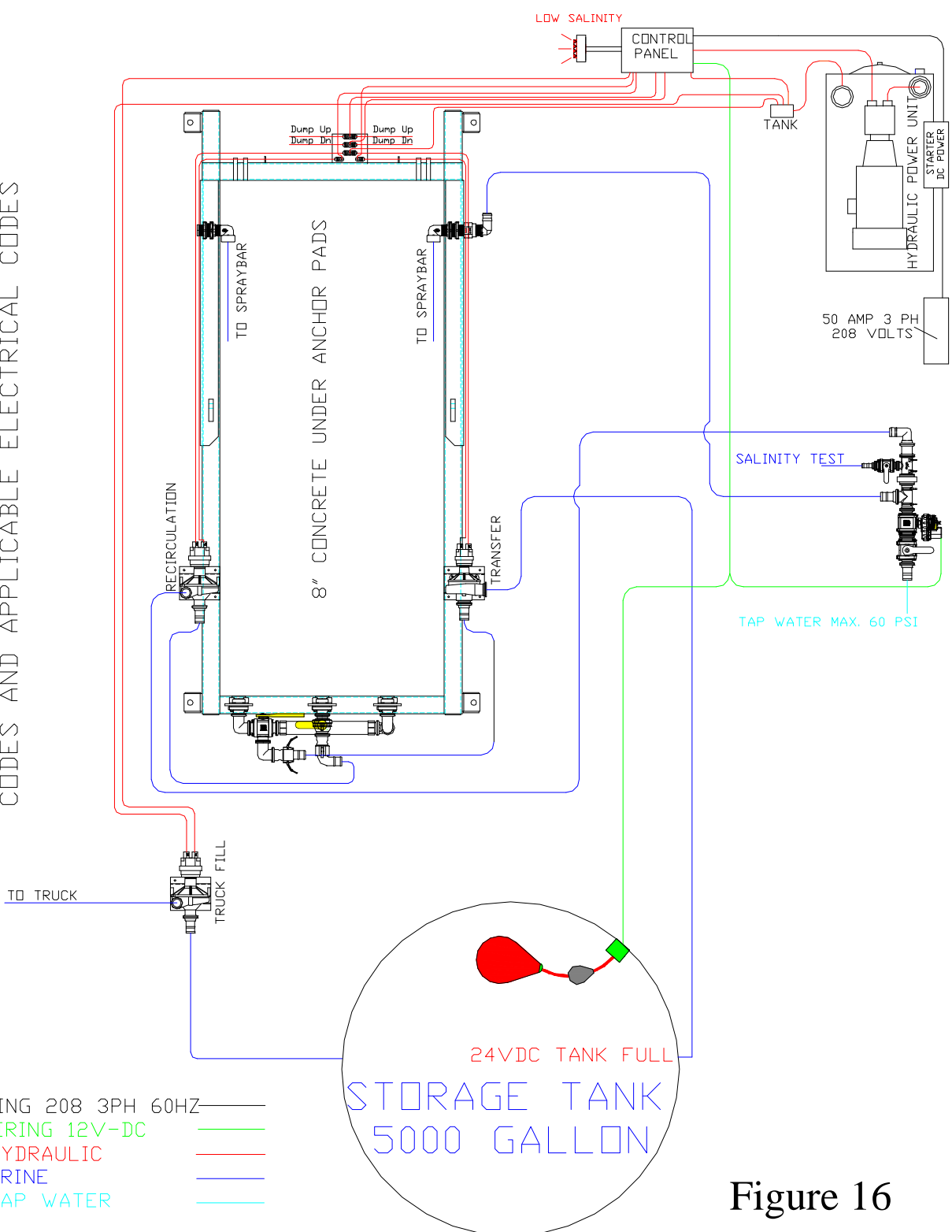
Figure 15

SALOMETER DE- GREES	SPECIFIC GRAV- ITY	BAUME DE- GREES	PERCENT SO- DIUM CHLORIDE BY WEIGHT	POUNDS PER GALLON OF BRINE (NaCl)	POUNDS PER GALLON OF BRINE (WATER)	FREEZING POINT DEGREES FAHR- ENHEIT
0	1.000	0.0	0.000	0.000	8.328	+32.0
2	1.004	0.6	0.528	0.044	8.318	+31.5
4	1.007	1.1	1.056	0.089	8.297	+31.1
6	1.011	1.6	1.584	0.133	8.287	+30.5
8	1.015	2.1	2.112	0.178	8.275	+30.0
10	1.019	2.7	2.640	0.224	8.262	+29.3
12	1.023	3.3	3.167	0.270	8.250	+28.8
14	1.026	3.7	3.695	0.316	8.229	+28.2
16	1.030	4.2	4.223	0.362	8.216	+27.6
18	1.034	4.8	4.751	0.409	8.202	+27.0
20	1.038	5.3	5.279	0.456	8.188	+26.4
22	1.042	5.8	5.807	0.503	8.175	+25.7
24	1.046	6.4	6.335	0.552	8.159	+25.1
26	1.050	7.9	6.863	0.600	8.144	+24.4
28	1.054	8.5	7.391	0.649	8.129	+23.7
30	1.058	9.0	7.919	0.698	8.113	+23.0
32	1.062	9.5	8.446	0.747	8.097	+22.3
34	1.066	10.0	8.974	0.797	8.081	+21.6
36	1.070	10.5	9.502	0.847	8.064	+20.9
38	1.074	11.0	10.030	0.897	8.047	+20.2
40	1.078	11.5	10.558	0.948	8.030	+19.4
42	1.082	12.0	11.086	0.999	8.012	+18.7
44	1.086	12.5	11.614	1.050	7.994	+17.9
46	1.090	12.9	12.142	1.102	7.976	+17.1
48	1.094	13.4	12.670	1.154	7.957	+16.2
50	1.098	13.9	13.198	1.207	7.937	+15.4
52	1.102	14.4	13.725	1.260	7.918	+14.5
54	1.106	14.8	14.253	1.313	7.898	+13.7
56	1.110	15.3	14.781	1.366	7.878	+12.8
58	1.114	15.8	15.309	1.420	7.858	+11.8
60	1.118	16.2	15.837	1.475	7.836	+10.9
62	1.122	16.7	16.365	1.529	7.815	+9.9
64	1.126	17.2	16.893	1.584	7.794	+8.9
66	1.130	17.7	17.421	1.639	7.772	+7.9
68	1.135	18.1	17.949	1.697	7.755	+6.8
70	1.139	18.6	18.477	1.753	7.733	+5.7
72	1.143	19.1	19.004	1.809	7.710	+4.6
74	1.147	19.6	19.532	1.866	7.686	+3.4
76	1.152	20.0	20.060	1.925	7.669	+2.2
78	1.156	20.4	20.588	1.982	7.645	+1.0
80	1.160	21.0	21.116	2.040	7.620	-0.4
82	1.164	20.4	21.644	2.098	7.596	-1.6
84	1.169	21.0	22.172	2.158	7.577	-3.0
86	1.173	21.4	22.700	2.218	7.551	-4.4
88	1.178	21.9	23.228	2.279	7.531	-5.8
<b>88.3*</b>	<b>1.179</b>	<b>22.0</b>	<b>23.310</b>	<b>2.288</b>	<b>7.528</b>	<b>-6.0*</b>
90	1.182	22.3	23.755	2.338	7.506	-6.0*
92	1.186	22.7	24.283	2.398	7.479	-6.0*
94	1.191	23.3	24.811	2.459	7.460	-6.0*
95	1.193	23.5	25.075	2.491	7.444	-6.0*
96	1.195	23.7	25.339	2.522	7.430	-6.0*
97	1.197	23.9	25.603	2.552	7.417	-6.0*
98	1.200	24.2	25.867	2.585	7.409	-6.0*
99	1.202	24.4	26.131	2.616	7.394	-6.0*
99.6	1.203	24.5	26.285	2.634	7.386	-6.0*
100	1.204	24.6	26.395	2.647	7.380	-6.0*

## Concentration Table

# Brine System Wiring and Plumbing Diagram

NOTE: FIELD PLUMBING AND WIRING BY CUSTOMER  
PER DOT CONTRACT AND TO APPLICABLE BUILDING  
CODES AND APPLICABLE ELECTRICAL CODES



FIELD POWER WIRING 208 3PH 60HZ ———  
 FIELD CONTROL WIRING 12V-DC ———  
 FIELD PLUMBING HYDRAULIC ———  
 FIELD PLUMBING BRINE ———  
 FIELD PLUMBING TAP WATER ———

Figure 16

# Integral Sump Design

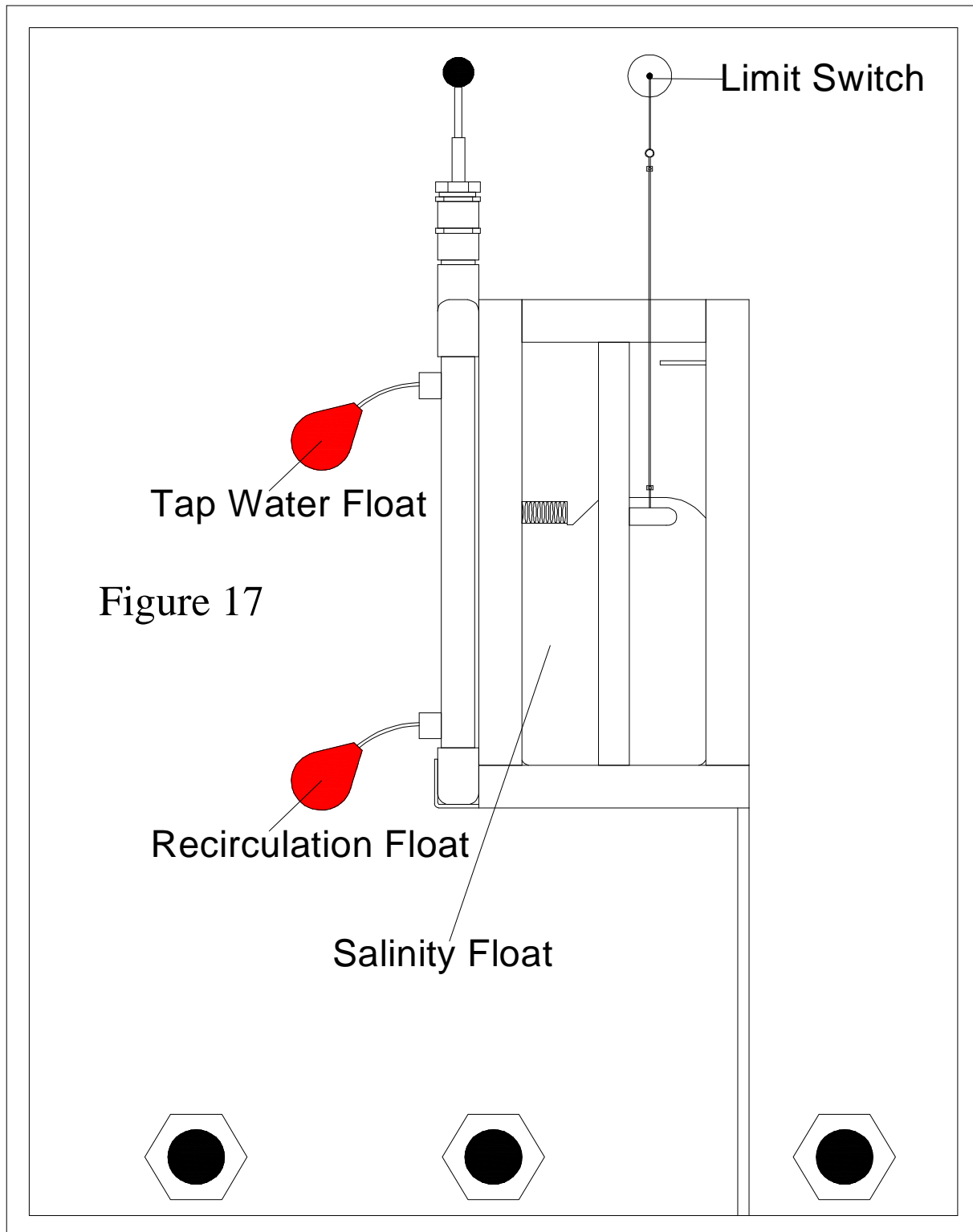


Figure 17

Integral Sump shown with baffling removed