



BT600ARPLC

Automatic Brine Making System

With Auto Salinity Control, Auto Storage Tank Filling,

Auto-Recirculation, And

Auto Shut-off

Owner's Manual



M. S. Foster & Associates, Inc.

1866 N. Country Lane, Michigan City, IN 46360

Phone 219-380-3266 or 219-879-9225 • Toll Free 888-452-4053

Fax 219-879-9313 • email: sales@msfoster.com

www.msfoster.com

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System Features

- Overall dimensions: ~11'6" x 5'2" x 5'4"
- Heavy duty 304 stainless steel tank construction will last for years.
 - ~800 Gallon dissolution tank.
 - ~600 Gallon brine tank.
- 2" corrosion resistant centrifugal pumping system.
- Single phase electric motor – 110/220VAC (can also run at 208VAC). Requires 20 amps.
- Simple operation – just add salt and turn it on!
- Ability to circulate between brine and dissolution tank.
- Automatic shut-off. Uses level sensors to detect upper and lower brine levels
- Manual overrides.
- Turn-key system.

Electronic Components

- Programmable Logic PLC
- M111 Inline Refractometer for accurate salinity control
- Over flow sensors in brine and dissolution tanks
- Low level sensor to protect pump from running dry.
- "Cycle Start" Control - for automatic production
- "Cycle Stop" Control - will shut system down
- Emergency "E" Stop Button
- Auto/manual select switch
- Manual Pump Control Start/Stop
- Manual override switches for electric valves
- High level switch for mounting inside remote storage tank
- All electrical components housed in a NEMA 4X rated enclosure

Description of Automatic Brine Making System

When the cycle starts, the brine mix tank containing the granular salt will fill with water and begin to fill the dilution chamber with "rich" brine. The salinity sensor located in the dilution chamber discharge pipes will send a signal back to the PLC which will then open/close the fresh water proportioning valve accordingly. This will dilute the "rich" brine down to your desired pre-set salinity level. The finished brine travels through the spillway into the brine side of the tank. The pump will start when the brine side has reached the high level sensor and transfer the finished brine to your storage tank. The cycle will continue until the storage tank is full. The system will not run if the storage tank is full. The system can also be run manually, if and when required.



Automatic Brine Maker Steps (Overview)

- Ensure power cord is securely plugged into proper outlet or if hard wired directly, ensure breaker is on.
- Ensure water supply is securely fastened to solenoid valve and the water supply is turned on.
- Load salt to proper level (just below the screen) of the dissolution side of the tank. Do not over fill.
- Open the ball valve that feeds water to the dissolution side of the tank.
- Open the brass ball dilution valve located on the dilution pipe that feeds the spillway.
- Be sure the Salinity Set Point is preset to 23.3% on the control panel.
- Push the Auto Cycle Control Start button. The water supply solenoid valve will automatically open. This valve will close automatically when the upper water level sensors in the dissolution tank float.
- The dissolution side of the tank will begin to fill with water, percolating up through the salt. The water will become saturated with salt and is now "rich" brine.
- The "rich" brine will travel through the spillway where the salt content will be measured by the salinity monitor.
- The electrical controller will open the proportioning "dilution" valve to dilute the rich brine to the preset salinity level.
- When the finished brine side of the tank is full, the electrical controller will open the electric "pump out" valve and start the pump.
- The finished brine will be pumped out to the storage tank.
- When the storage tank is full, the machine will shut down.



Main Control Panel



TOP ROW – Left to Right

- Auto/Manual select switch
- Start/Stop switch for Auto Mode
- User interface – mainly used for setting and visually monitoring salinity

MIDDLE ROW – Left to Right

- Fault light – lights up when machine shuts down prior to filling storage tank – usually due to inadequate amount of salt in dissolution side of tank
- E-STOP Button – used to stop machine in an emergency

BOTTOM ROW – Left to Right – (Manual Mode Controls)

- Pump Start/Stop switch
- Water solenoid valve switch
- Recirculation solenoid valve switch
- Pump out solenoid valve switch

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AUTOMATIC OPERATION

1. Ensure that the main water source is securely fastened and turned on.
2. Ensure that the 2" poly ball valve that feeds the brine dissolution side of the



2" poly dissolution valve

tank is partially open (about 1/4 way).

3. Ensure that the 1" manual brass dilution valve is fully open.



1" Brass dilution valve

4. Ensure the 2" poly valve that feeds the pump, located at the bottom of the brine side of the tank, is fully open.



2" Poly pump feed valve

5. Ensure the storage tank valve is open and the storage tank is ready to receive brine.
6. Ensure that there is ample salt in the dissolution side of the tank (Note – keeping the salt level consistently high during operation will minimize the amount of movement on the dilution proportioning valve).



7. Ensure the main power is connected.
8. Check that the "E" Stop is not depressed.
9. Turn the "AUTO/MANUAL" switch to "AUTO".
10. Press the "START" button on the Auto Cycle Control.
11. Push "STOP" button on the Auto Cycle Control to stop the machine, if you want to stop the brine making before the storage tank is full.
12. The machine will stop automatically when the storage tank is full.
13. Turn off the water supply.



MANUAL OPERATION

1. Ensure that the main water source is securely fastened and turned on.
2. Ensure that the 2" poly ball valve that feeds the brine dissolution side of the tank is partially open (about ¼ way).
3. Ensure that the 1" manual brass dilution valve is closed.
4. Ensure the 2" poly valve that feeds the pump, located at the bottom of the brine side of the tank, is fully open.
5. Ensure the storage tank valve is open and the storage tank is ready to receive brine.
6. Ensure that there is ample salt in the dissolution side of the tank (Note – keeping the salt level consistently high during operation will minimize the amount of movement on the dilution proportioning valve)
7. Ensure the main power is connected.
8. Check that the "E" Stop is not depressed.
9. Turn the "AUTO/MANUAL" switch to "MANUAL"
10. Turn the "WATER" switch to "ON".
11. Take salinity reading using your hydrometer or Refractometer and make necessary adjustments by opening or closing the 1" brass dilution valve as required.
12. The machine will not run if the storage tank is full.
13. When your brine making session is complete, turn the machine off.

TANK CLEAN OUT

1. Make sure there is enough room in the storage tanks for the brine.
2. Make batches of brine in "AUTO" until the salt hopper is near empty and the machine cannot achieve the preset salinity level.
3. Turn the "MANUAL / AUTO" switch to "MANUAL" mode.
4. Open the 2" ball valves on the left side of the brine maker that connect the two sides of the tank.
5. Open the recirculation valve. Push the "PUMP CONTROL START" button to start the pump motor.
6. Recirculate until your Refractometer reading reaches the desired level in the brine side of the tank.
7. When your Refractometer reading reaches the desired value, shut the pump off using the "PUMP CONTROL STOP" button.
8. Open the discharge to storage valve and close the recirculation valve.
9. Push the "PUMP CONTROL START" button to start the pump motor to discharge the brine into the storage tank.



10. Repeat this procedure as necessary until you can no longer reach the desired salinity level. At this point there will be virtually no usable salt left in the dissolution side of the tank.
11. Clean the dissolution tank as necessary.



MAINTENANCE

1. Clean the spillway screen as required.
2. If operating outside in below freezing temperatures, be sure to drain fresh water at the end of each session and be sure to winterize the fresh water dilution line at the end of each session.
3. At the end of the season it recommended to completely empty the entire system and thoroughly clean it.
4. Be sure to leave enough fresh water (providing there no risk of freezing temperatures) in the tank and in all lines.
5. It is highly recommended to run the pump at least once per week for about 5-10 minutes in order to keep the pump well lubricated and avoid salt crystallizing in the pump which will cause premature wearing on the mechanical seal as well as possible seizing.

PRECAUTIONS

As with all plumbing, the BT600A is susceptible to damage from freezing. Therefore it is important to closely monitor all installations where freezing of the liquid stored in the BT600A might occur. If temperatures near or below the freeze point of the liquid are expected, RMES recommends that all plumbing lines be kept from freezing using appropriate measures or the system be drained completely.

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Road Maintenance Equipment & Services Contact Information

Sales and Service	905-372-1124
Fax	905-373-4773
e-mail	info@rmes.ca
website	www.rmes.ca
Mailing Address	106 Buchanan St. Cobourg, Ontario, Canada K9A 1Z1
Shop Address:	106 Buchanan St. Cobourg, Ontario, Canada K9A 1Z1



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