

# INSTALLATION INSTRUCTIONS

## CONTROL BOARD REPLACEMENT KIT 322DM & 322/330 "I" SERIES, 50 HZ

**NOTE:** Leave the operating and checkout information with the ice machine for future reference and repair.

Table 1. Loose-Shipped Parts			
Item No.	Part No.	Name	Qty.
1		Control Board	1
2		Wire Harness	1
3		Resistor Plug (Water cooled & remote only)	1
4		Electrical Line Splice Connectors	2
5		Controller Wire Assembly (Straight 8-pin to Molex)	1

### Directions:

1. Turn off power supply to the ice maker at the source. Do not just turn off at the ice maker switch.
2. Remove the front panel.
3. Remove the electrical box cover.

**NOTE:** The following steps will involve the removal of wires from locations in the control box and replacing them with wires in the harness supplied in the kit.

4. Follow the brown wire from the DT1 terminal of the control board and remove it from the on-off clean switch terminal. Then, connect the brown wire of the harness to that vacated terminal.
5. Follow the white wire connected on the DT2 terminal of the control board and remove it from its terminal strip location. Then, connect the white wire from the harness to that vacated terminal strip location.
6. Follow the black wire from the control board power relay terminal DT3 and remove it from its terminal strip location. No other wire will connect here.
7. Follow the red wire from the hot gas valve terminal DT4 of the control board and remove it from its terminal strip location. Then, connect the red wire from the harness to that vacated terminal.
8. Follow the blue wire from the pump terminal DT7 and remove from the terminal on the on-off clean switch. then, connect the blue wire from the harness to that vacated terminal.
9. Remove the black wire from the control board fan terminal DT5. Then push onto on to one end of a spade connector union supplied in the kit. Now push the black wire of the harness on to the other end of the spade connector.

**NOTE: Completion of the following 2 steps will depend on the ice maker being air cooled or water cooled.**

10. If air cooled, follow the orange wire from the power relay coil terminal DT6 of the control board and remove it from the terminal on the power relay. Then, connect the orange wire from the harness to the vacated terminal on the power relay.

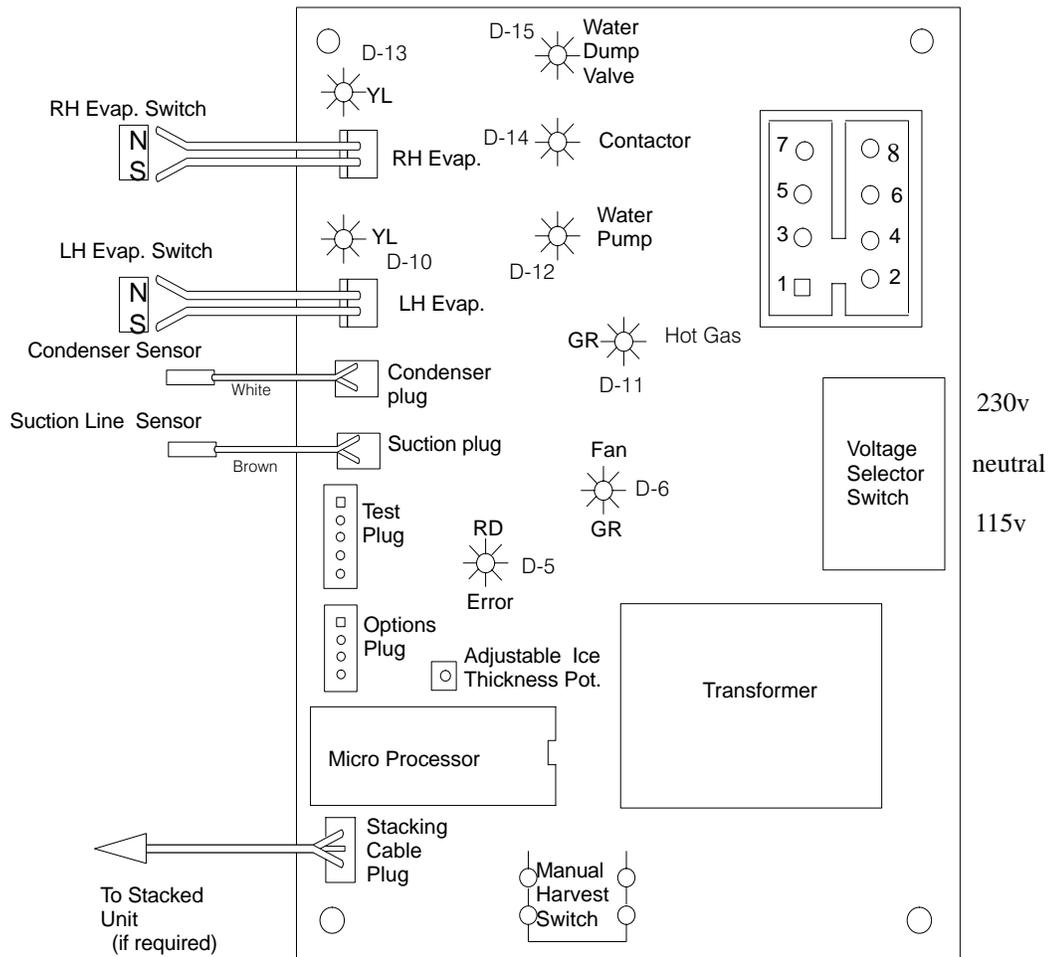
If water cooled **remove** the orange wire from the DT6 terminal of the control board and push it onto one end of a spade connector union. Then push the orange wire from the harness onto the other end of the spade connector.

11. **Remove** the yellow wire from the top terminal #3 of the dump solenoid switch and either a terminal strip location or the hot gas valve terminal DT4 of the control board depending on the age of the ice maker being serviced. This wire will no longer be used. Then connect the yellow wire from the harness to the dump switch terminal just vacated.
12. Disconnect the sensor and proximity switch from control board terminals DC1 and DC2.
13. Release the old control board from the plastic standoffs and remove it from the electric box.
14. Install the new control board onto the plastic standoffs in the electrical box the original board was mounted to.
15. Plug the white harness connector from unit into controller wire assembly. Plug straight 8 pin into new control board.  
**NOTE: 322DM and 322/300 "I" series, this plug is polarized and will plug in or connect in one way only.**
16. Plug the evaporator sensor lead onto terminal J5 on the new board.
17. Plug the proximity switch lead onto the J9.
18. Plug the resistor assembly onto terminal J6 on the new control board. (this necessary because no condenser sensor is utilized withy these units and the board needs a valve to allow it to function properly).
19. Check all wire connections and the power switch for proper voltage setting and turn on electrical power supply to the ice maker.
20. Allow the ice maker to run at lease 3 cycles to insure proper bridge thickness.

If adjustment is required follow procedure contained in the [checkout, testing and operating information](#) that follows.

### Checkout, Testing and Operating Information

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2. Operating Status Led Indicator Chart.	8. Harvest Safety Termination Voltage Checks Evaporator Proximity Switch Voltage Selector Switch Stacking Cable Connection Sensor Diagnosis
5. Circuit Board Diagnosis	9. Sensor Diagnosis Continued
6. Adjusting Bridge Thickness Total Ice Capacity Ice Production Check	10. Dump Cycle and Float Valve Flow Washer Information



## LED Indicators

The LEDs are board circuit indicators. If the LED in the functional board circuit is complete, check component.

Example: Contactor does not energize and LED is "ON", board circuit is OK. Check contactor, coil, leads, & connections.

Yellow:

- Evaporator switch(s) (proximity)

Green:

- Water dump valve
- Compressor contactor
- Water Pump
- Hot Gas Valve
- Condenser Fan (cycles on & off with fan)

Red:

Error in system operation. Product shut down.

## STATUS INDICATOR

D6	Green LED	Condenser Fan
D10	Yellow LED	Left Water Curtain
D11	Green LED	Hot Gas Valve
D12	Green LED	Water Pump
D13	Yellow LED	Right Water Curtain
D14	Green LED	Compressor Contactor
D5	Red LED	Error
D15	Green LED	Dump Valve

### Curtain Open

D13	Yellow LED	off	Right evaporator curtain open.
D10	Yellow LED	off	Left evaporator curtain open.

### Pre-Chill Mode

D6	Green LED	(on or off)	Condenser fan cycles on & off depending upon condenser temperature.
D14	Green LED	(on)	Compressor contactor active – Compressor running.
D13	Yellow LED	(on)	Right evaporator curtain closed.
D10	Yellow LED	(on)	Left evaporator curtain closed (only if unit has two evaporators).

### Ice-Making Mode

D6	Green LED	(on or off)	Condenser fan cycles on and off depending upon condenser temperature.
D12	Green LED	(on)	Water pump active.
D14	Green LED	(on)	Compressor contactor active – compressor running.
D13	Yellow LED	(on)	Right evaporator curtain closed.
D10	Yellow LED	(on)	Left evaporator curtain closed (only if unit has two evaporators).

### Harvest Mode

D11	Green LED	(on)	Three seconds after water dump valve becomes active, the hot gas valve becomes active.
D12	Green LED	(on) 15 sec.	Fifteen seconds after water dump valve becomes active, the water pump deactivates.
D14	Green LED	(on)	Compressor contactor active – compressor running.
D15	Green LED	(on) 15 sec.	Water dump valve becomes active at the start of harvest. Water dump valve is active for 15 seconds.
D13	Yellow LED	(on)	Right evaporator curtain closed. When the ice falls and the curtain opens, the LED will turn off.
D10	Yellow LED	(on)	Same as D13 if there is a second (left) evaporator.

### Error LED

D5	Red LED	(on)	EVAPORATOR OPEN THERMISTOR CIRCUIT - thermistor open / broken wire / poor connection. Ice maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	(on)	EVAPORATOR HIGH TEMP. ERROR: Six minutes into the Freeze cycle the suction line temperature failed to reach 40°F or below. Ice Maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	(on)	TWO REPEATED FAILED HARVEST CYCLES - No ice drop.
D5	Red LED	Flashing, 1/sec	CONDENSER OPEN THERMISTOR CIRCUIT (Air Cooled only) - Thermistor open / broken wire / poor connection. Ice Maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	Flashing, 1/sec	CONDENSER LOW TEMPERATURE CONDITION. - Condenser midpoint reaches 36°F - Ice Maker is SHUT DOWN.
D5	Red LED	Flashing, 1/sec	CONDENSER HIGH TEMPERATURE SAFETY SHUT DOWN.

# Circuit Board Diagnostic Procedure

Turn the power switch to the "ON" position. The D-5 red LED (error indicator) will be illuminated for 2 seconds. After the D-5 red LED goes out, short across the bottom two terminals of the Test Plug with a jumper wire or a pocket screwdriver and then remove the jumper. The circuit board is now in the test mode.

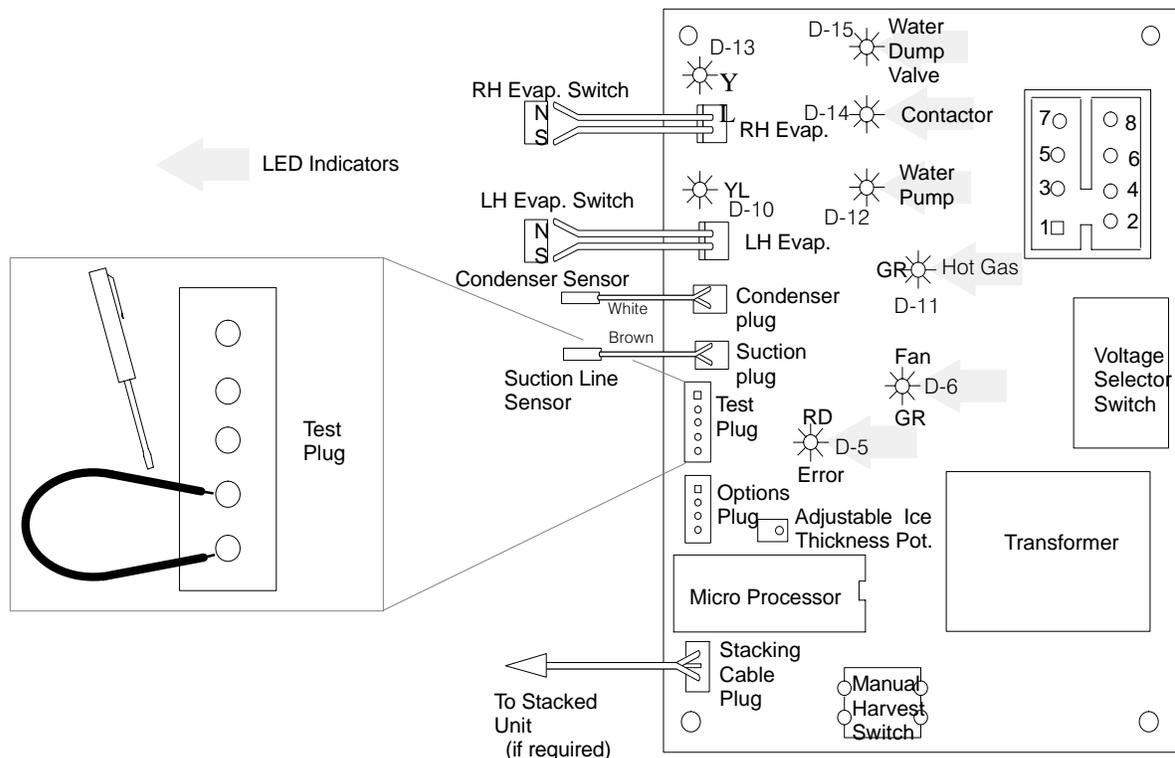
One of these two conditions will exist:

- If the Ice Thickness Potentiometer is within the factory setting the D-5, red LED will flash continuously.
- If the Ice Thickness Potentiometer is not within the factory setting, the D-5 red LED will not be illuminated.

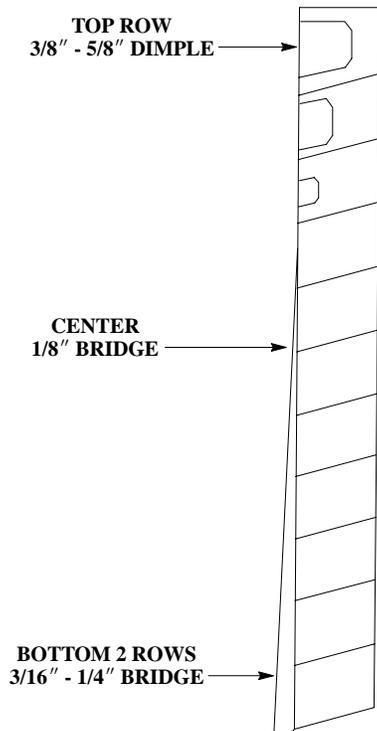
In either case the Green LED indicators will illuminate for 2 seconds each in the sequence shown below. They will continue to sequence until you turn the power off and stop the procedure.

D-6	Green	Fan
D-11	Green	Hot Gas
D-12	Green	Water Pump
D-14	Green	Contactor
D-15	Green	Dump Valve

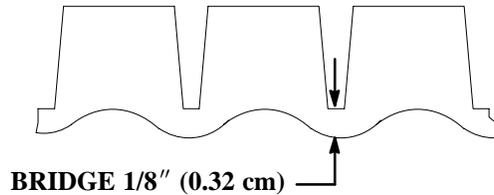
Failure of the green LED's to cycle in this sequence indicates a defect in the circuit board.



## Adjusting Bridge Thickness



For optimum ice production and maximum cube separation, the ice connecting the individual cubes should be a minimum of 1/8" (.32cm) thick at the center area of the ice waffle.



It is normal for the ice slab to be slightly thicker at the bottom and taper off in a slight wedge pattern at the top. The top row of cubes must have a complete pattern of ice on all four sides and the back wall. Remember, when you operate the product with the panels off during testing the additional heat at the top of the evaporator will cause thinner ice at the top than when the panels are in place.

Should a different thickness of the bridge be desired, it will be required to adjust the ice thickness "POT", located on the circuit board, as follows:

1. Thinner Bridge – turn the ice thickness "pot" adjustment screw ⚙️ CW one full turn. Allow two cycles before determining if additional adjustments are required.
2. Thicker Bridge – turn the ice thickness "pot" adjusting screw ⚙️ CCW one full turn. Allow two cycles before determining if additional adjustments are required.

**Note:** Never judge the thickness of the ice from the first batch of the ice produced – the first cycle is a balance cycle. Always wait for the second cycle before making any adjustments.

## Total Ice Capacity

Ice capacity of any ice maker is affected by many operating conditions, such as water and air temperature and location factors. Please review the capacity tables in this manual for average 24-hour capacity under various conditions.

**Note:** All printed capacity ratings are  $\pm 10\%$  except 50 HZ units. These products have 12% increase in cycle time and capacity decrease of approximately 17%.

## Ice Production Check

If air cooled, take air temperature at the intake of the condenser, 2" from the condenser fins, and Incoming water temperature at the outlet of the "float" valve.\*

Cycle time (CT) = freeze time plus harvest time, in minutes and seconds. 1440 divided by CT = number of cycles per 24 hours.

Measure weight of ice from one cycle in pounds and fractions of a pound.

**Example:** Weight/cycle x cycles/day = total production/24 hrs. Compare to the production tables.

\* If water cooled, be certain water regulator valve is set to maintain 300/310 PSI head pressure.

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# COMPONENT FUNCTION (CIRCUIT BOARD ETC.)

## Test Plug

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Board manufactures check point.  
DO NOT ATTEMPT ANY VOLTAGE CHECKS AT THESE PINS.

## Sensors

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Condenser sensor (**WHITE**) and suction line sensor (**BROWN**) are thermistors rated 1k ohm at room temperature.

- Condenser sensor signals the circuit board for fan cycling and also serves as the high temperature safety shut down. The red "Error LED" will flash on and off every second, during high temperature safety shut down. Product is functionally shut down. Reset procedure must be performed to restart product operation.
- Suction line sensor signals the circuit board the suction line temperature, to control ice bridge thickness. Also the sensor serves as suction line high temperature signal (Cuber has 6 minutes to reduce suction line temperature to 40°F (4.4°C) in the freeze mode). The red "Error LED" will be steady on. Should this time frame not be met, product is functionally inoperative during this safety shut down. Reset procedure must be performed to restart product operation.

## Reset Operation

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When Cuber is functionally shut down and red "Error LED" is operational, the Cuber power switch must be turned off for 5 seconds and returned to the ON position to reset the circuit board and allow the Cuber to restart operation.

## Evaporator Switches

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Proximity Switches are half mounted to the water curtain, and the other half mounted to the evaporator side rail.

### Switch Notes

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1. Manually holding the curtain open during freeze mode will shut the Cuber down in 5 seconds.
2. During harvest cycle, if curtain is open for 10 seconds, the water pump will stop. The compressor will operate for 20 additional seconds before Cuber shut down takes place. When the water curtain is closed, the Cuber will begin the normal start-up process.
3. In single evaporator machines, the proximity switch connection must be on the top (RH) connection on the circuit board.
4. In dual evaporator machines, both RH and LH switches must open and reset to start the next freeze mode.

## Harvest Safety Termination

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After 4 minutes in the harvest mode, the safety timer in the circuit board will terminate the harvest mode and place the Cuber back into a freeze mode. This safety cycle will protect the evaporator, etc. should the product fail to terminate the harvest mode for any reason.

## Voltage Checks

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### Evaporator Proximity Switch

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Turn Cuber power switch OFF. Disconnect proximity switch plug(s) from the circuit board. Use a digital multimeter set for D.C. Voltage; turn power switch ON, connect leads of meter across the top two terminal pins on the board, (for the switch being tested), meter should read 5 VDC  $\pm$  0.2 output voltage. If not, replace the circuit board.

Note: The proximity switch on the IACS 227 or the IWCS 227 is mounted inside the right hand evaporator side rail. To test the switch, make the voltage test at the circuit board. To replace the switch, remove the upper right hand side service panel. Carefully remove the Mylar shield to gain access to the two nylon screws that hold the proximity switch. Remove the screws and the switch through the service opening. After installing the new switch, replace the Mylar shield and seal with a bead of silicone sealant.

### Voltage Selector Switch

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1. Selector bar in center position, switch is open. Product is inoperative.
2. Selector bar in down position, selection is for 115 VAC.
3. Selector bar in up position, selection is for 230 VAC.

### Stacking Cable

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When stacking the "I" series cuber the connecting cable (connecting the two (2) circuit boards) will allow: the bottom Unit to shut off on the full bin signal (or any error code), the top Unit will then finish the cycle it is in and shut down. The "I" series should never be stacked more than two high.

## Sensor (Thermistor) Diagnosis

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### Sensors

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Condenser or suction line – Turn Cuber power switch OFF. Disconnect sensor plug from board. Use digital multimeter set for D.C. Voltage. Turn power switch ON. Connect leads of meter across the two pins of the sensor being checked. Meter should read 2.5 VDC  $\pm$  0.2 output voltage from the board. If voltage is not correct, replace the circuit board.

Should the cuber operation indicate there may be a fault in the sensor [thermistor] or the control board circuit proceed as follows.

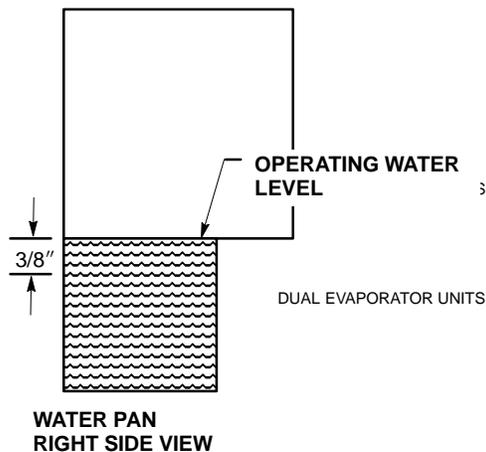
1. Using a good multimeter, check the control board sensor output voltage.
2. If voltage checks are correct do the following:
  - a. Disconnect the suction line sensor (brown lead) from the control board.
  - b. Install the special test cord\* to the control board and re-install the sensor to the test cord terminals.
  - c. Connect the multimeter (set on VDC - milli-volts) to the test cord leads.
  - d. Operate the cuber in the freeze cycle.
3. As the suction line temperature decreases the milli-volt reading will increase.
4. **Sensor Shorted** – milli-volt reading will cease to increase and will remain steady indicating a shorted sensor.
5. **Sensor Open** – The voltage reading will indicate the control board output voltage of 2.5 VDC.
6. Should either “4.” or “5.” happen during this test, the sensor will require replacement.
 

\* Special test cord, part # 164984009, may be ordered through the  
Service Department.
7. **Condenser Sensor (white leads) – self-contained air-cooled only – water cooled and remote systems use a resistor plug on the control board.**  
Complete the sensor and multimeter connections as described in 2- b., c., d.
8. **Shorted sensor** – a steady low milli-volt reading will be recorded. The reading will not change.
9. **Open sensor** – the multimeter will record control board output voltage of 2.5 VDC.
10. Should sensor (thermistor) pass the voltage test proceed to the control board diagnosis for LED sequence (see page 5).

Note:

**The sensor controls the condenser fan cycling from 88/100 degree Fahrenheit. Thus any defects in the condenser circuit will effect the fan cycling rate.**

# Dump Cycle



1. With the proper water level in the water pan, start the water pump to circulate the water. Check that the float will return water level to original setting and stop inlet water.
2. There is a flow washer in the inlet side of the float assembly that will control inlet water pressure from 20/120 PSI (3.4/8.16 Bars). This will prevent float flutter. In low water pressure conditions, 20 PSI (1.37 Bars) or less, the flow washer may have to be removed from the float assembly for proper volume.



3. Push the manual dump switch – allow dump action to drain the water pan. When you release the momentary switch, the pump will stop and the float will return the water level back to its original setting and shut off the water supply.
4. You have the option of selecting dump cycle intervals of:
  - every cycle; (Standard setting from factory)
  - every 3rd cycle;
  - every 5th cycle;
  - every 7th cycle.

Remember, the higher the mineral content in the water supply the more often it will be required to dump the water and/or clean the product if proper water treatment is not used.

