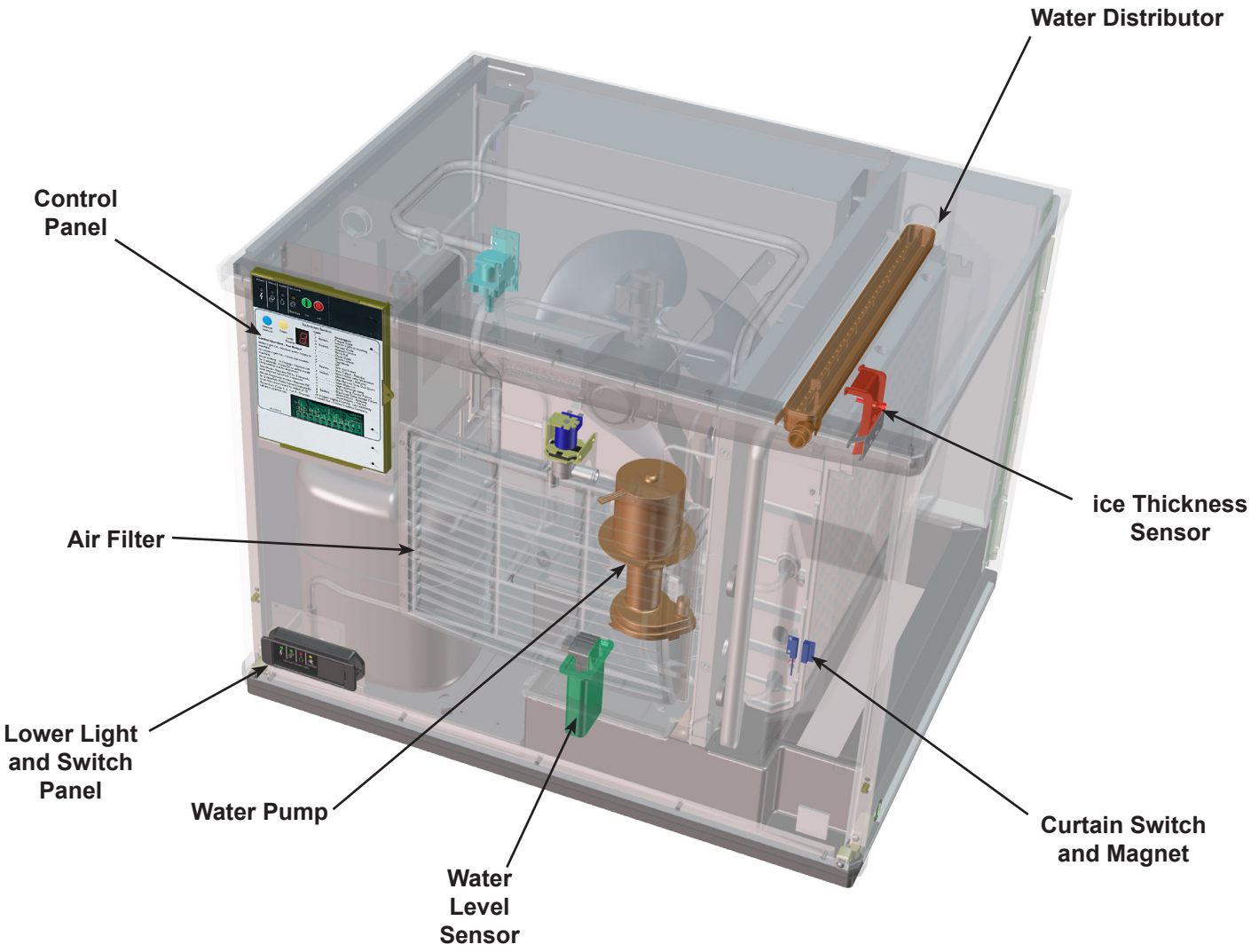
Scotsman
Ice Systems

Prodigy Cuber D Series
Technical Review



Prodigy D Series Cuber - Control System

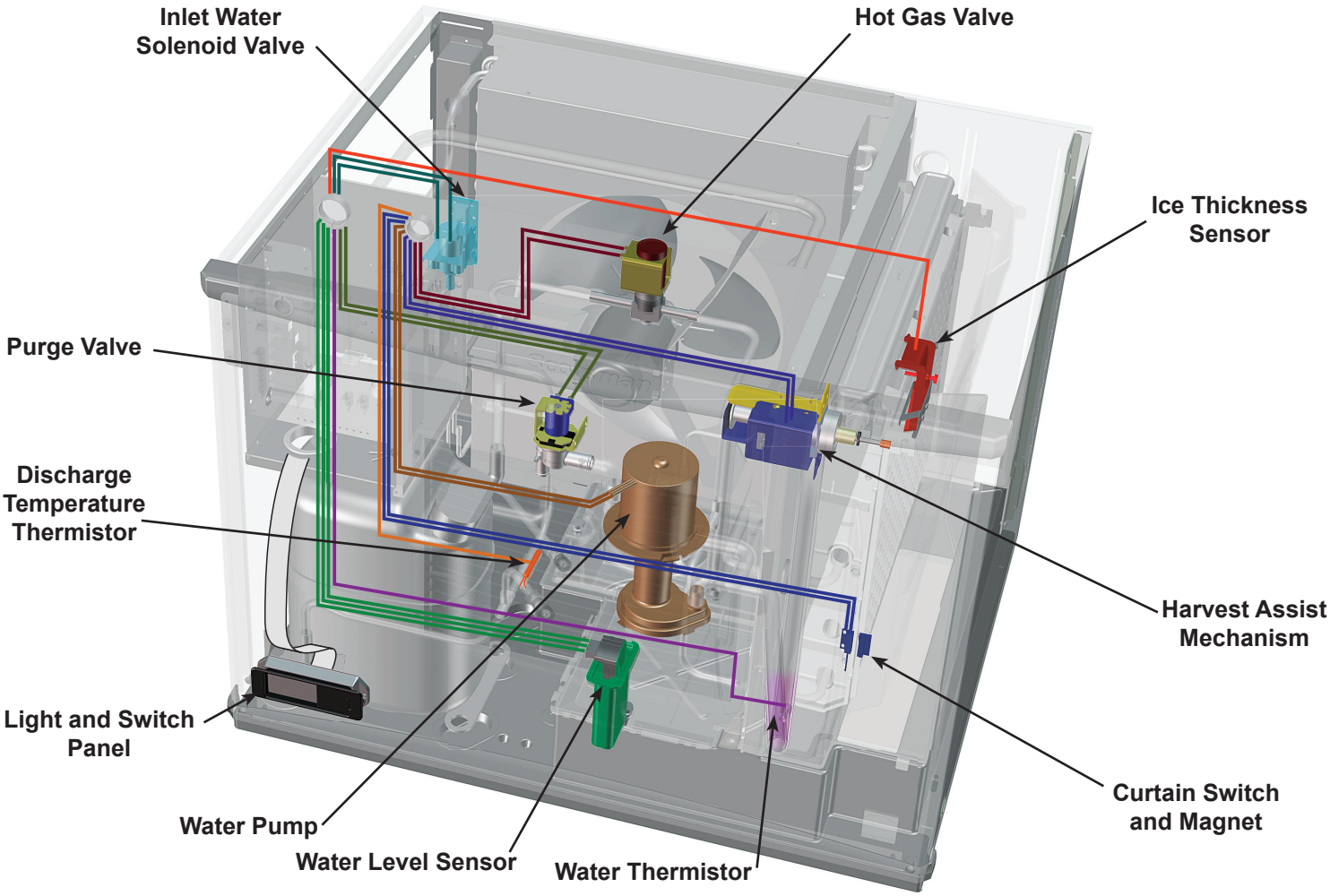
The control system of this ice machine consists of a central controller, an ice thickness sensor, a water level sensor, a curtain switch, a water temperature sensor and a discharge temperature sensor. Most models also include a high pressure cut out switch and the air cooled models have a pressure control switch for the fan motor. An external switch and light panel is visible at the lower left corner of the front panel.

The ice thickness sensor and the water level sensor are conductivity probes. The water and discharge temperature sensors are thermistors. The high pressure and fan motor switches are refrigerant pressure controls. The high pressure cut out, which shuts the compressor off if the discharge pressure gets too high, will automatically reset when the discharge pressure falls below its set point.

The controller operates from a 12 volt power supply, and uses inputs from the sensors to switch relays on and off. The relays operate the motors and solenoids. All solenoids are line voltage.

The thickness of the ice forming on the evaporator surface is directly sensed by the ice thickness sensor; when the water over the ice comes in contact with the sensor, a circuit is made to the controller. The controller then initiates the harvest cycle to release the ice.

During harvest the harvest assist mechanism adds pressure to the back of a centrally located ice cube to speed ice release. Harvest continues until the ice slab releases from the evaporator, as it falls, it pushes the curtain open. At the edge of the curtain is a curtain switch, which signals to the controller the opening, closing or not closing of the curtain. If the curtain opens and closes during a harvest cycle, the controller will start a fresh freeze cycle. If the curtain remains open during harvest, the controller will shut the machine off.

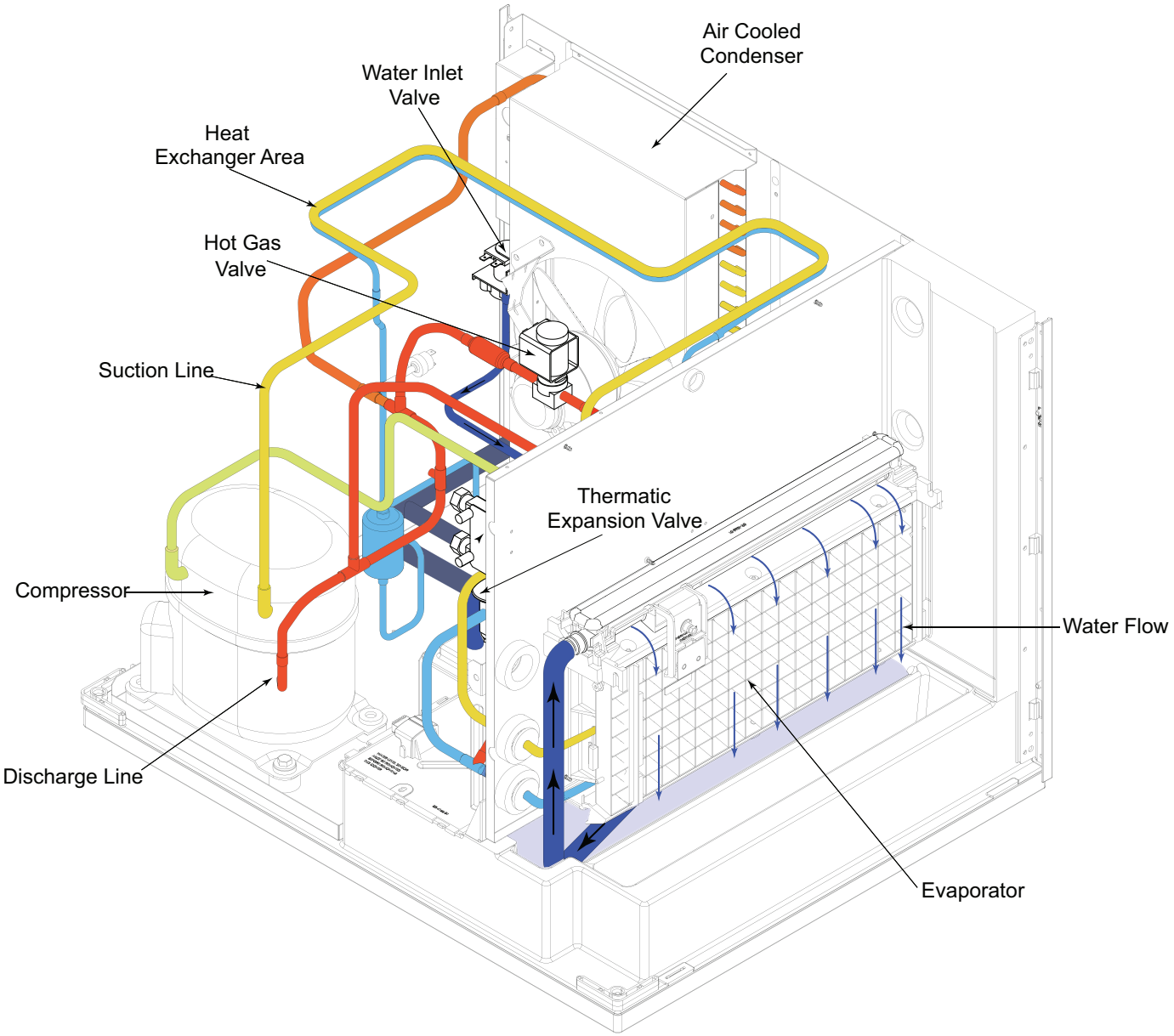


Prodigy D Series Cuber - Water and Refrigeration

The insulated water reservoir fills one time during an ice making cycle and that water is used to make the next batch of ice.

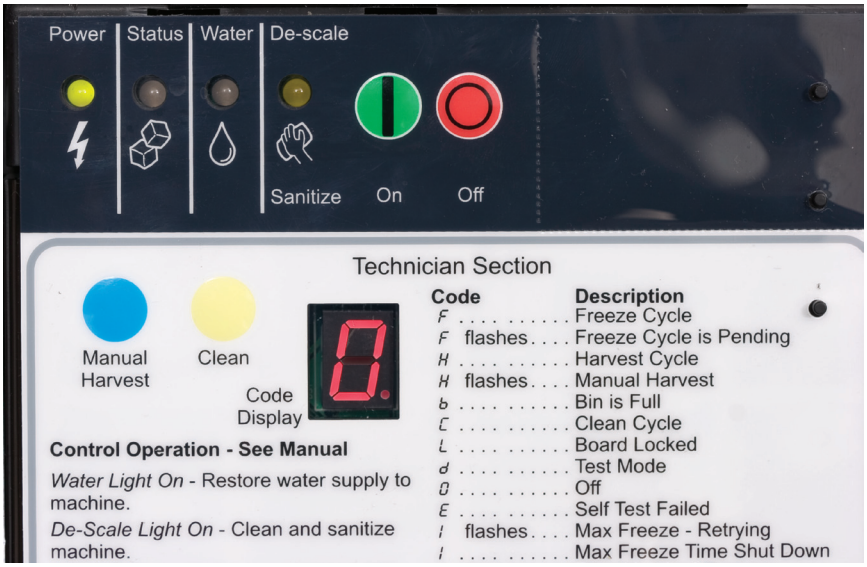
Water fills the reservoir through an inlet water solenoid valve, which is operated by the controller. The controller senses the level of the water from the three probes of the water level sensor. When the top probe contacts water, the controller shuts off the inlet water solenoid valve. When the middle probe loses contact with the water, the controller opens the inlet water valve to refill the reservoir. Water fill can occur at any time, but in reality, only happens during harvest after the purge valve has opened.

The controller drains a portion of the left over freeze cycle water during the beginning of the harvest cycle, the amount of water drained is determined by the purge setting of the controller. Draining occurs when the controller opens the water purge valve and pumps water out of the reservoir.



Prodigy D Series Cuber - Sequence of Operation

Initial Start Up or Restart



When power is supplied, the four lights at the top and the display indicator will blink on and off one time. Then the Power light will be on and the 0 displayed.

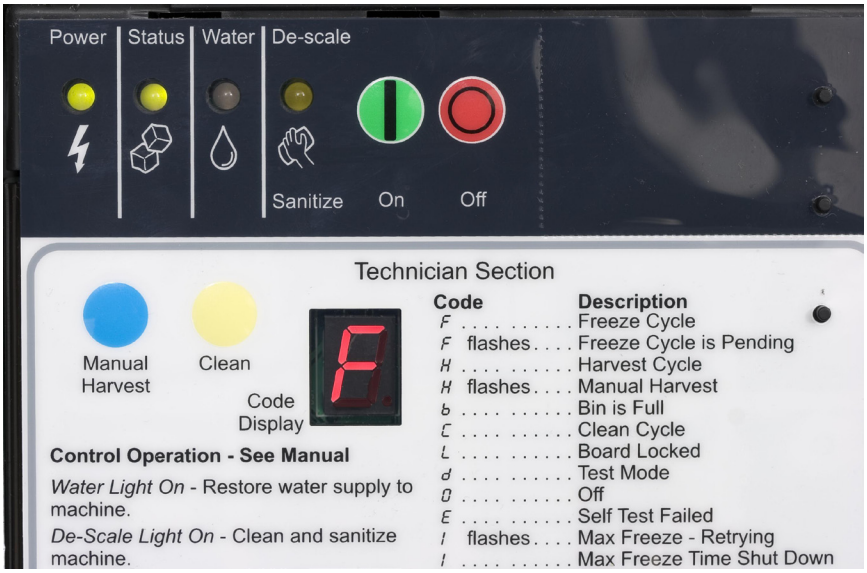
When the Power light is ON and the Status light is OFF, the controller is in the Standby mode.

Push and release the lower On button to start the ice making process.

The Status light will then switch On; it and the Power light will normally both be On during machine operation.

Note: Main Controller Lights and Switches are Duplicated on the Lower Light and Switch Panel

Freeze Cycle



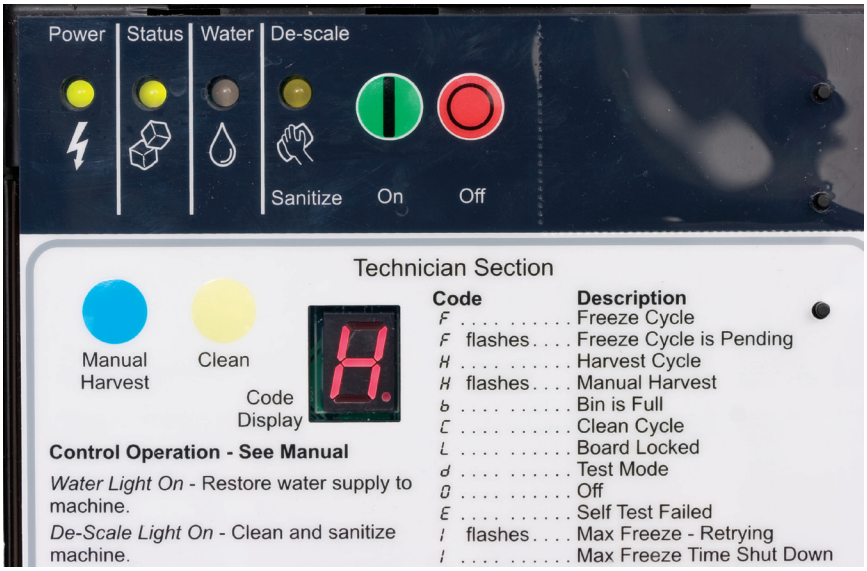
At the beginning of any restart or the first cycle after start up, the controller will display a blinking F.

Once the compressor has started, the F will be displayed continuously.

The water pump will be stopped for 30 seconds early in each freeze cycle.

Water can fill the reservoir at any time the water sensor mid probe is uncovered.

Harvest Cycle

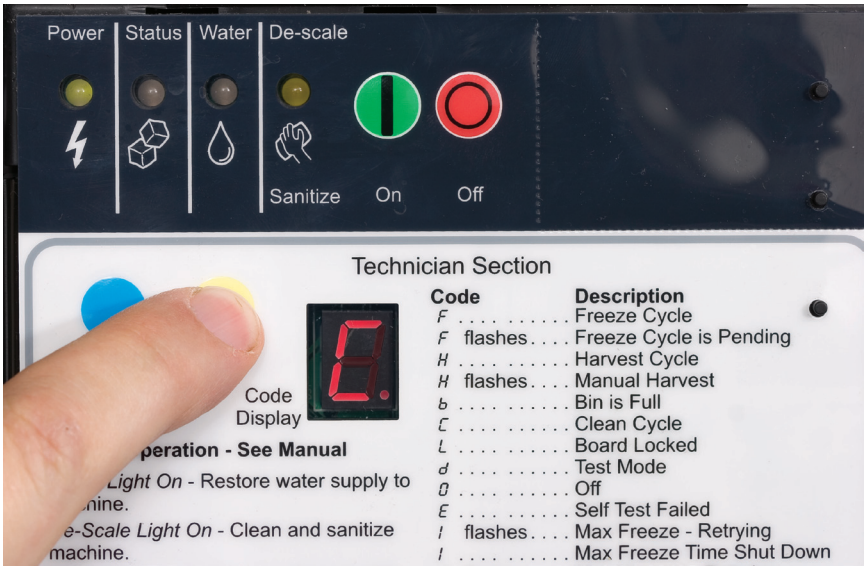


The harvest cycle starts when the ice thickness sensor is contacted by water running over the ice. During harvest, the display indicates an H.

Harvest continues until the ice is released and forces the curtain to open. If the curtain re-closes the controller switches the machine back into a freeze cycle, where an F is displayed again.

If the bin is full, the newly released ice cannot fall far enough for the curtain to re-close. When that occurs the controller shuts the machine off and displays a b.

Scale Removal and Sanitization



After 6 months of power up time, the De-Scale & Sanitize light will be switched On. It will switch off after the machine has been run through the cleaning process.

Pushing and releasing the Clean button starts the automatic cleaning process. The controller will harvest any ice, drain the reservoir, refill and begin circulating the manually added scale remover. During this time the controller blinks the yellow De-Scale & Sanitize light and displays a C.

After a timed period, the controller starts the rinse-out part of the process, and the yellow De-Scale & Sanitize light is on steady.

The controller will shut off and display O when complete.

Adjust Purge

The amount of water purged during a cycle be manually set or left on automatic. To set manually:

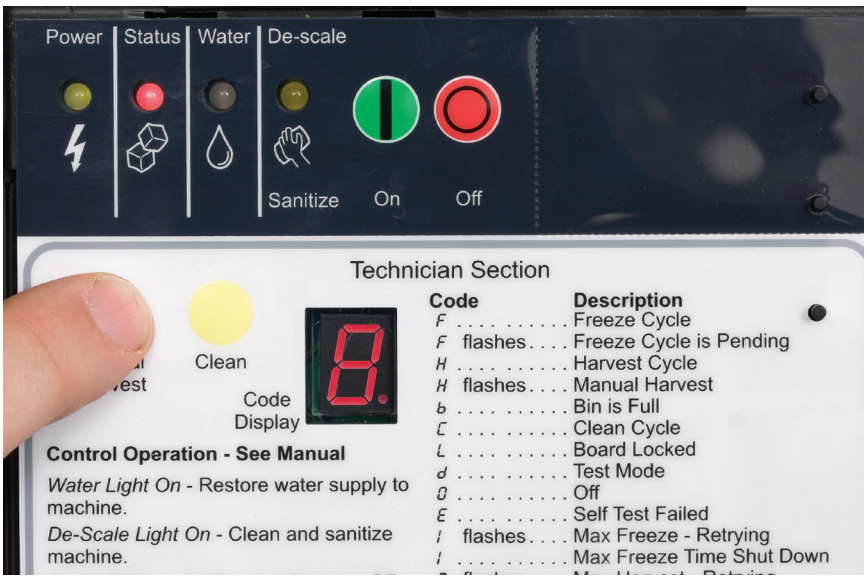
From the standby state (status light is off), hold the Off button in until a number or the letter A shows on the display.

Press and release the On button repeatedly until the number on the display corresponds to the desired setting.

Press and release the Off switch again to return to the normal control state.

Note: Main Controller Lights and Switches are Duplicated on the Lower Light and Switch Panel

Recall Diagnostic Codes



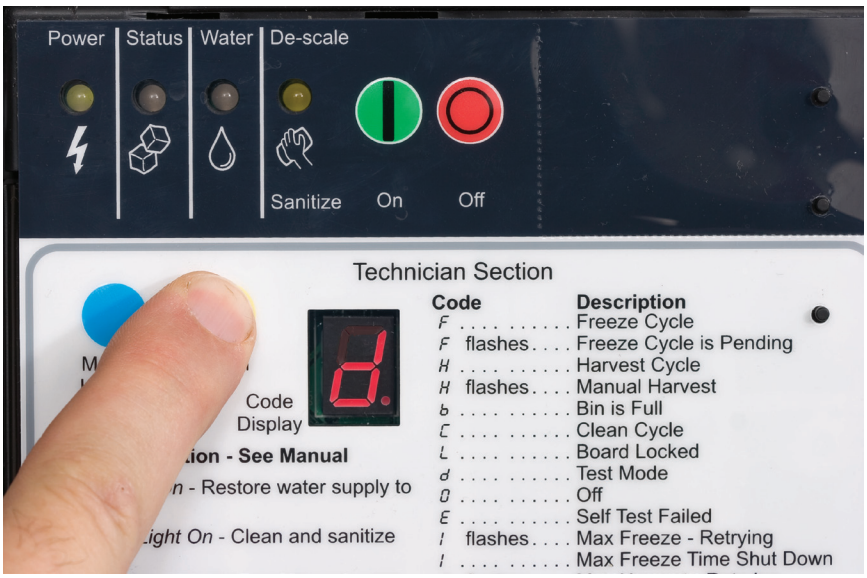
From the standby state, press and hold off button in for 3 seconds, then release it.

Press and release the Harvest button to cycle through each of the last 10 error codes from most recent to oldest.

The list of code meanings is on the label next to the display.

To clear all diagnostic codes, press and hold the Clean and Harvest buttons in for 3 seconds.

Test Cycle



The control can be put into a Test Cycle, where it switches all the loads on and off in a logical sequence. This allows the technician to confirm controller operation of all parts.

To start the test cycle, from the standby state depress Off for 3 seconds then release it. Then depress Clean for 3 seconds.

The Status light will blink green, and the display will show d.

During the test, the Fan motor will not start because the fan pressure control is open.

The test cycle will begin and end

Drain Reservoir

Put the control into the standby mode, then push and Hold the Clean button for 3 seconds. A “-” will be displayed. The pump and purge valve will be On for 30 seconds, repeat as needed to drain the reservoir.

Lock the Controller

The control can be locked to prevent unauthorized tampering with it. To lock it, hold On button in for 3 seconds, keep holding then press and release Off twice.

Normal button press operations are disabled when the control is locked. Repeat the same to unlock it.

Operational and Diagnostic Codes

Code	Description
F	Freeze Cycle
F flashes	Freeze Cycle is Pending
H	Harvest Cycle
H flashes	Manual Harvest
b	Bin is Full
C	Clean Cycle
L	Board Locked
d	Test Mode
0	Off
E	Self Test Failed
n	no serial number in controller
1 flashes	Max Freeze - Retrying
1	Max Freeze Time Shut Down
2 flashes	Max Harvest - Retrying
2	Max Harvest Time Shut Down
3	Slow Water Fill
4	High Discharge Temp
5	Sump Temp Sensor Failure
7	Discharge Temp Sensor Failure
8 flashes	Short Freeze - Retrying
8	Short Freeze - Thin ice

All 4 Upper Lights Flashing - Unit Remotely Locked Out