



Technical Training Prodigy Undercounter Cubers

Models CU1526,
CU2026 and CU3030

List of Major Topics

- Introduction
- Installation
- Operation
- Maintenance
- Diagnosis
- Service



Prodigy with a Bin

- 3 models

- CU1526

- 115 volt 60 Hz
 - 230 volt 50 Hz

- CU2026

- 115 volt 60 Hz
 - 230 volt 50 Hz
 - 208-230 volt 60 Hz

- CU3030

- 115 volt 60 Hz
 - 230 volt 50 Hz
 - 208-230 volt 60 Hz

- Prodigy

- Control system

- WaterSense auto purge

- Ice form

- Harvest assist

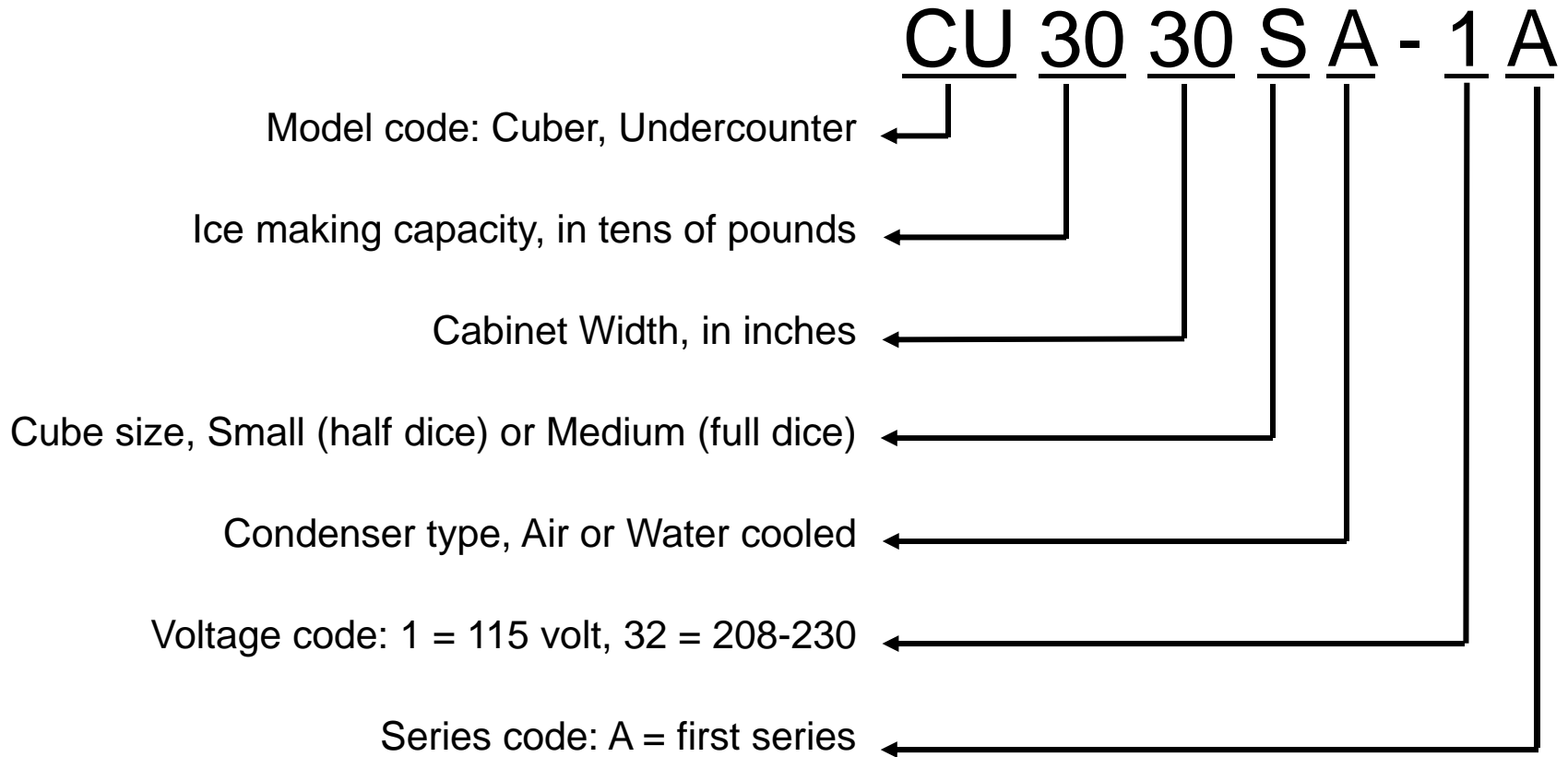
- Water distribution

- Scotsman Undercounter

- Removable bin

- Front air in and out

Model Numbers



CU1526 and CU2026 Cabinet Size



CU3030 Cabinet Size



Installation

- Build-in capability
 - Air in and out the front
 - Washable air filters
 - Bin is removable for in place service
 - On - off switch on front
 - Water cooled also
 - Kits for floor mounting without legs

Air Flow



CU3030 Air Cooled – Air in the left front and in the bottom, out the right front

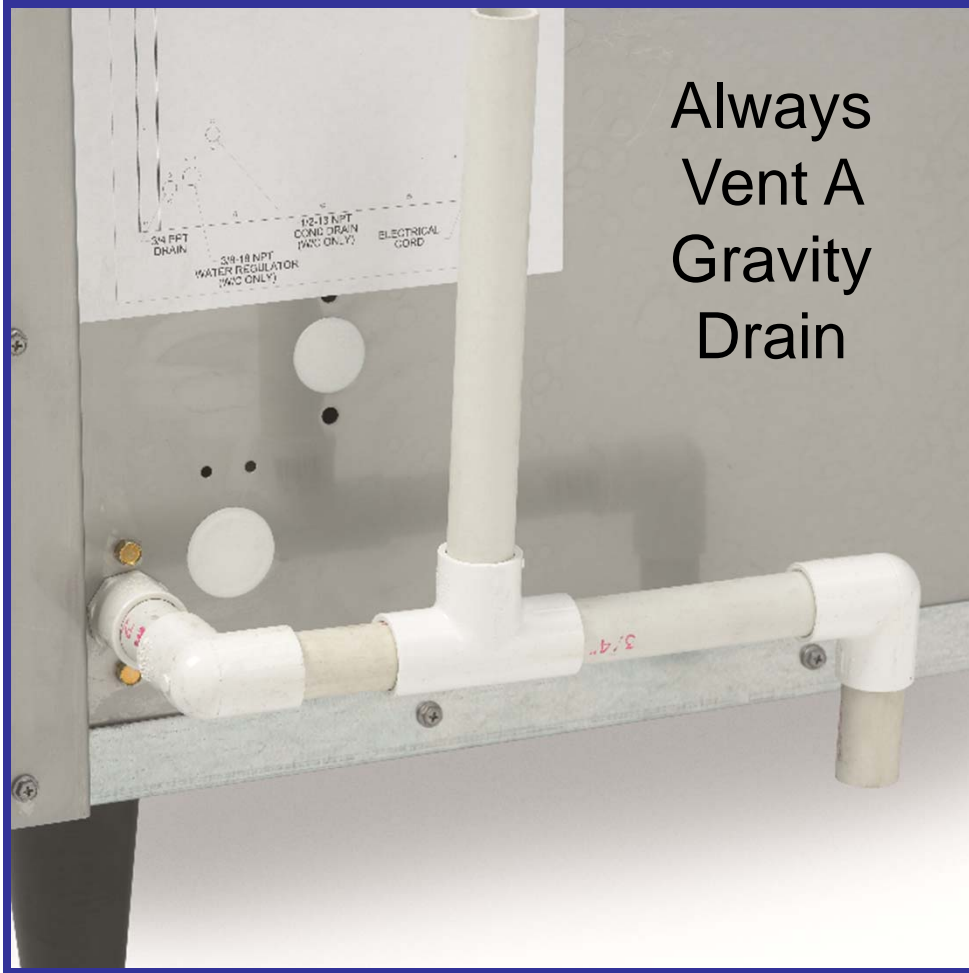


CU1526 or CU2026 Air Cooled – Air in the left front and out the right front

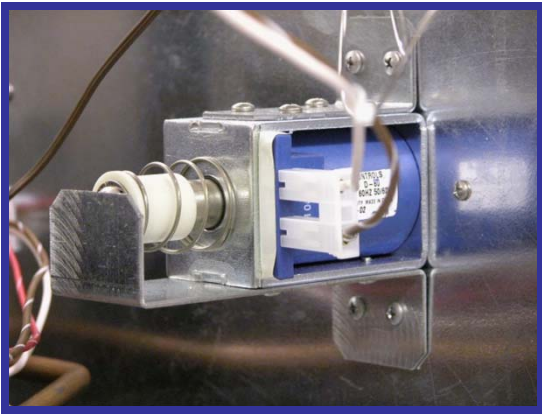
Installation

- Power:
 - Power cord on all models
 - 115 volt AC, 15 amp service - all
 - 208-230 volt AC, 15 amp service – CU2026 and CU3030
- Potable Water:
 - 3/8" male flare connector at back of cabinet
- Bin and Reservoir Drain:
 - 3/4" FPT drain fitting at back of cabinet

Installation



Component Location



Harvest Assist Solenoid



Ice Thickness Sensor



Controller



Purge Valve

Initial Start Up

- Remove unpacking material, including tape from the curtain
- Remove left front grill
 - Provides access to controller
- Connect power, turn on water supply.
- Move On-Off switch to ON
- Push and release the On button

Sequence of Operation

- Freeze cycle
 - Start Up
 - Water drains and refills
 - Compressor and water pump switch ON
 - When discharge pressure builds up to 240 PSIG, pressure control switches fan motors ON
 - When sump water reaches preset point, pump stops for 30 seconds, then restarts
 - Freeze continues until ice thickness sensor is touched by water
 - Controller's Ready for Harvest light switches on, fan motors stop

Sequence of Operation

- Harvest
 - Hot gas valve opens
 - Harvest assist solenoid powered
 - Drain cycle begins – time varies by purge setting
 - Purge valve opens
 - Water pump pumps out water, then stops
 - Purge valve closes
 - Float refills reservoir
 - Harvest continues until curtain opens

Water Level

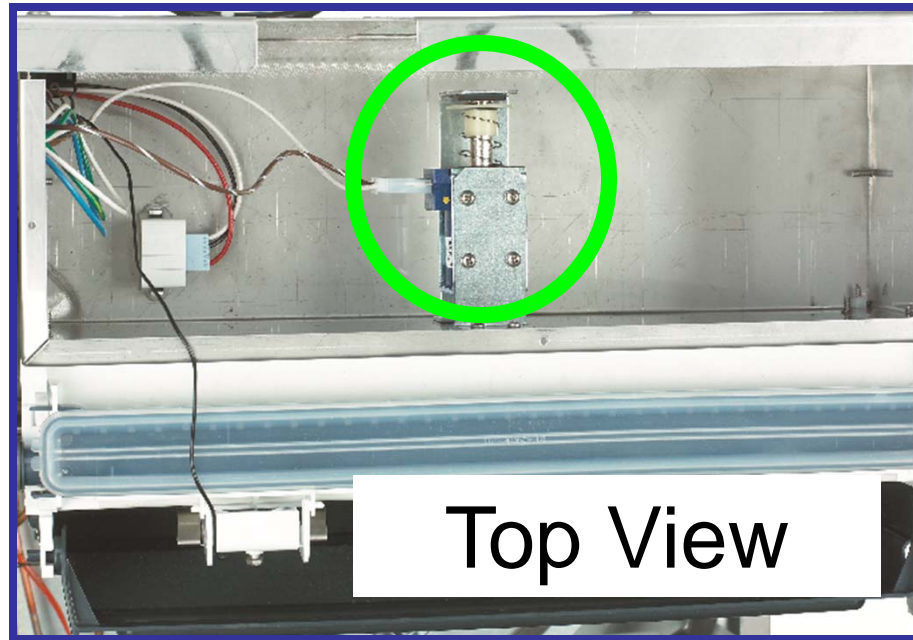
- Controlled by float valve
- Normal water level is 1" deep at left end of reservoir

1 inch deep



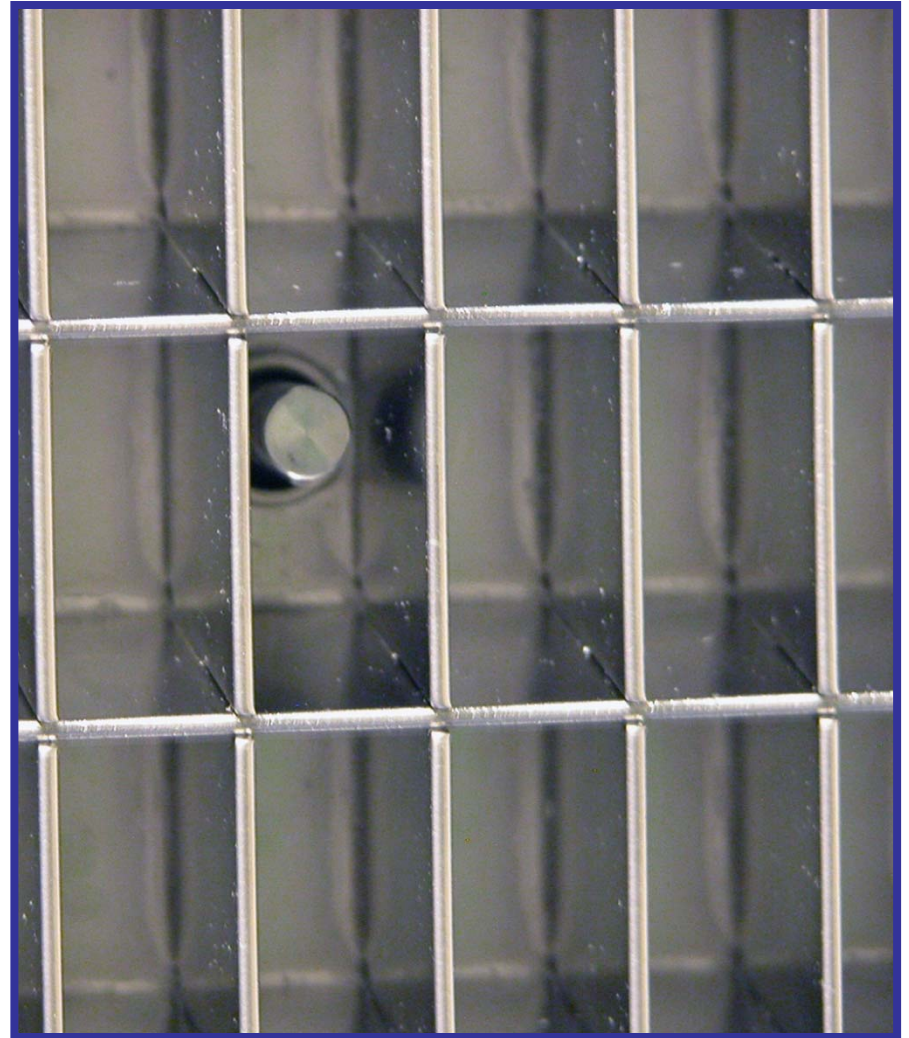
Harvest Assist

- Solenoid mounted behind evaporator pan



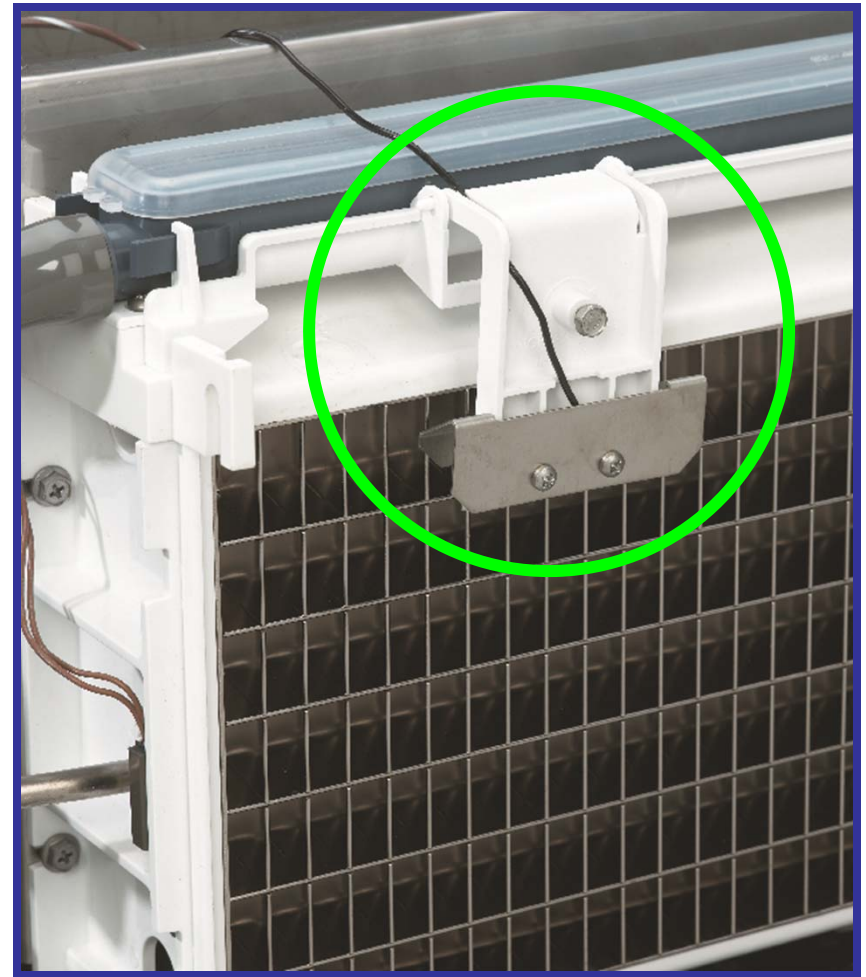
Harvest Assist

- Push rod end in back of ice cell
- Push rod adds force to assist ice release during harvest
- Rod does not move until ice is loose



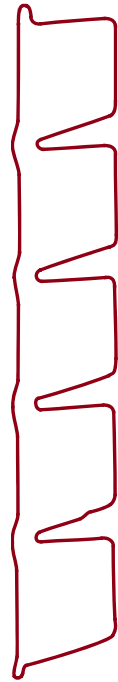
Ice Thickness

- Continuity sensor in front of evaporator
- Ice build up moves water flow closer to sensor
- Water contact triggers the end of freeze

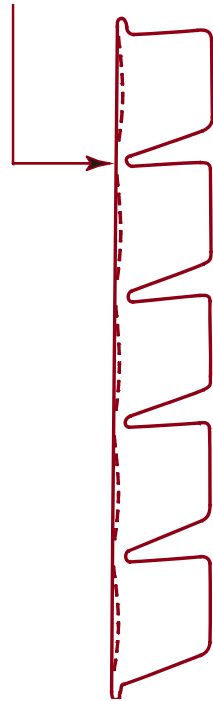


Ice Bridge

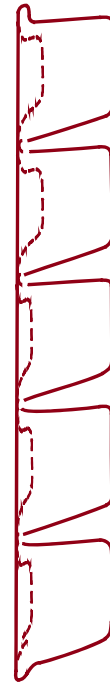
1/8" Bridge



Too Big



Just Right,
most models



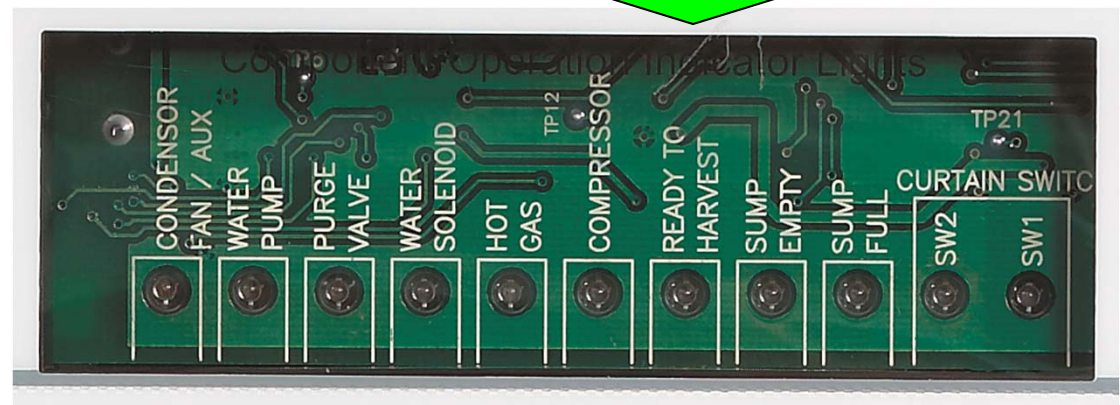
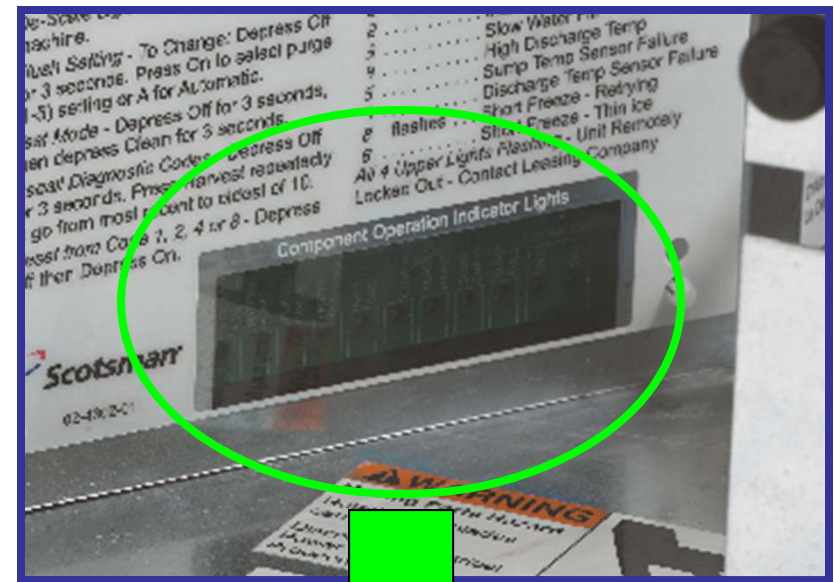
Just Right,
Medium cube



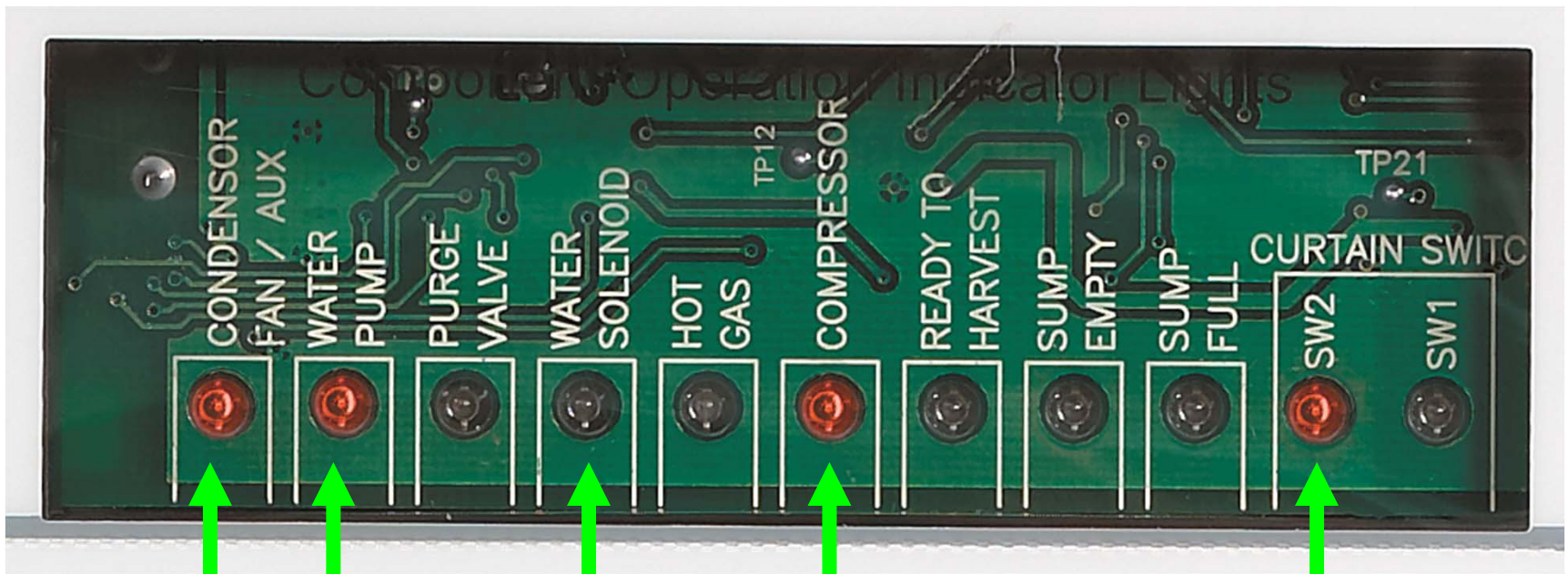
Too Small

Controller Component Indicator Lights

- Condenser Fan
- Water Pump
- Purge Valve
- Water Solenoid – not used
- Hot Gas
- Compressor
- Ready to Harvest
- Sump Empty
- Sump Full
- SW2
- SW1



Example: Freeze Cycle



Not used these models

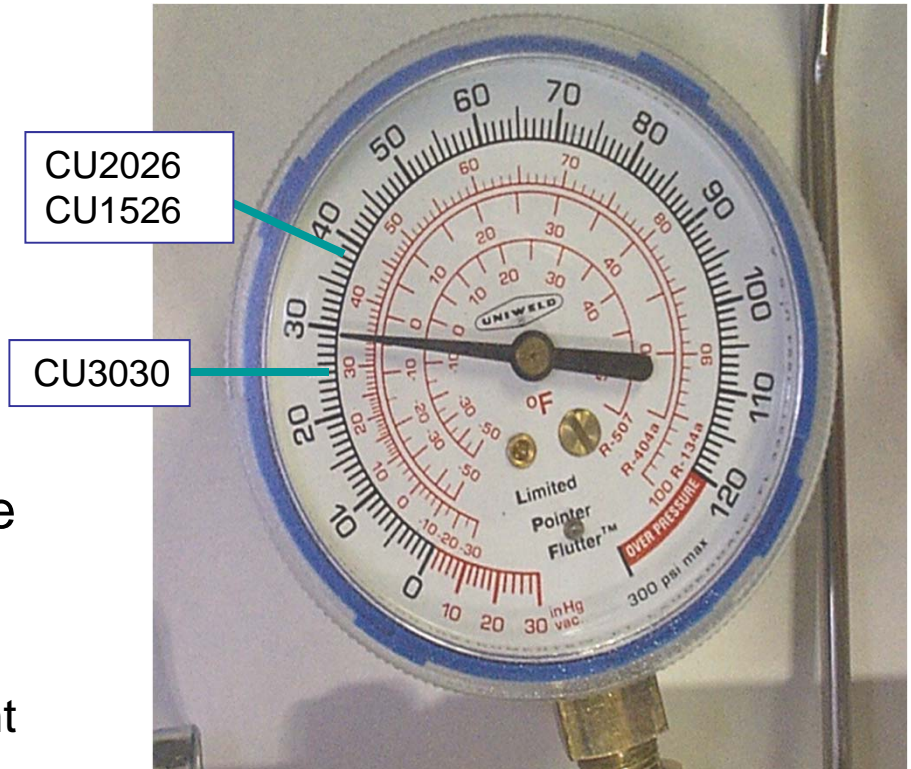
One light ON all the time

System Pressures – R-404A

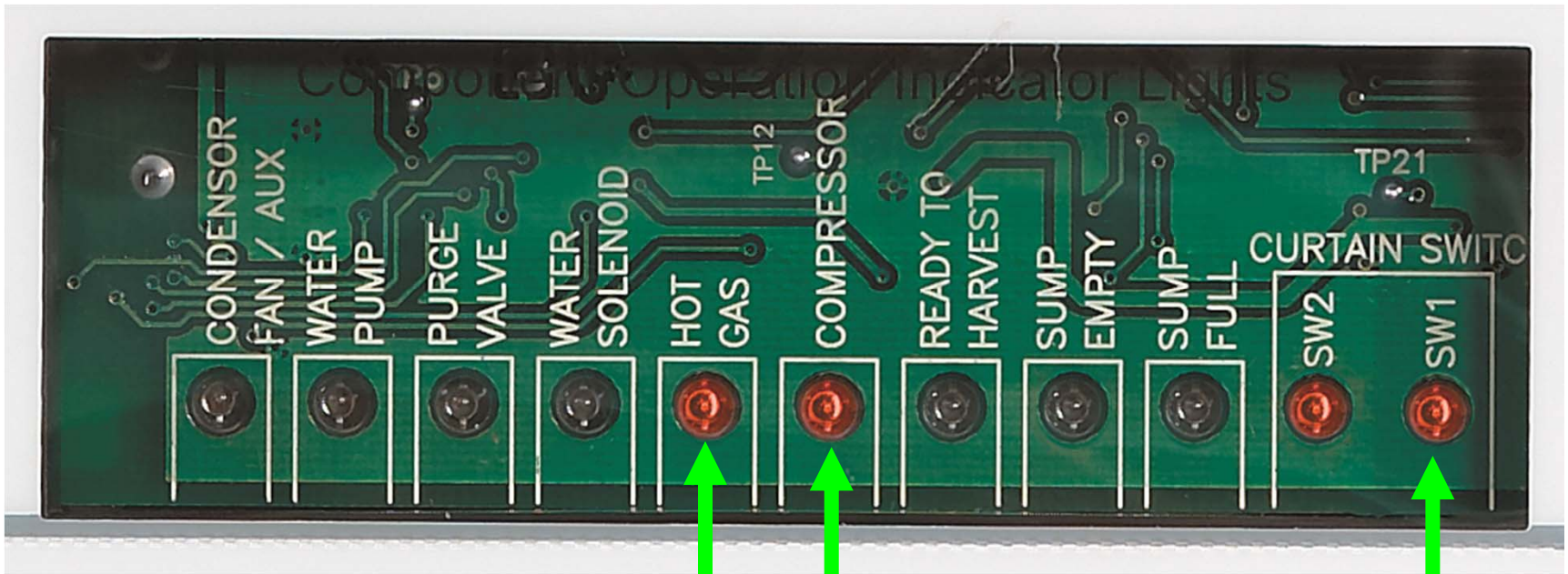
- End of Freeze Cycle

Suction

- Normal ranges vary by capacity and ambient
 - CU1526 and CU2026 end the freeze cycle at about 38 PSIG
 - CU3030 ends the freeze cycle at about 28 PSIG
 - Lower at low ambient
 - Higher at high ambient



Example: Harvest Cycle



Light Blinks
when curtain
opens

Stays ON
when bin is full

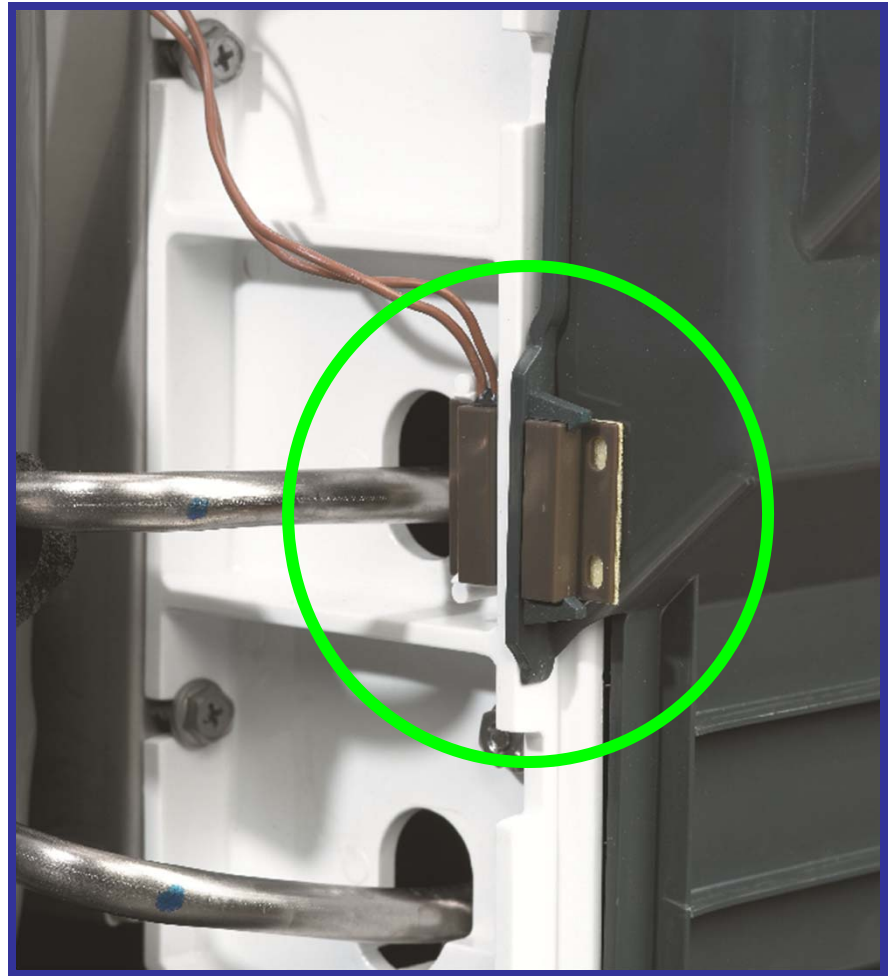
System Pressures – R-404A

- Harvest Cycle Suction
 - CU1526 and CU2026
 - 100 - 105 PSIG (70/50)
 - 115 – 125 PSIG (90/70)
 - CU3030
 - 85 – 90 PSIG (70/50)
 - 100 – 105 PSIG (90/70)



Ice Level Control

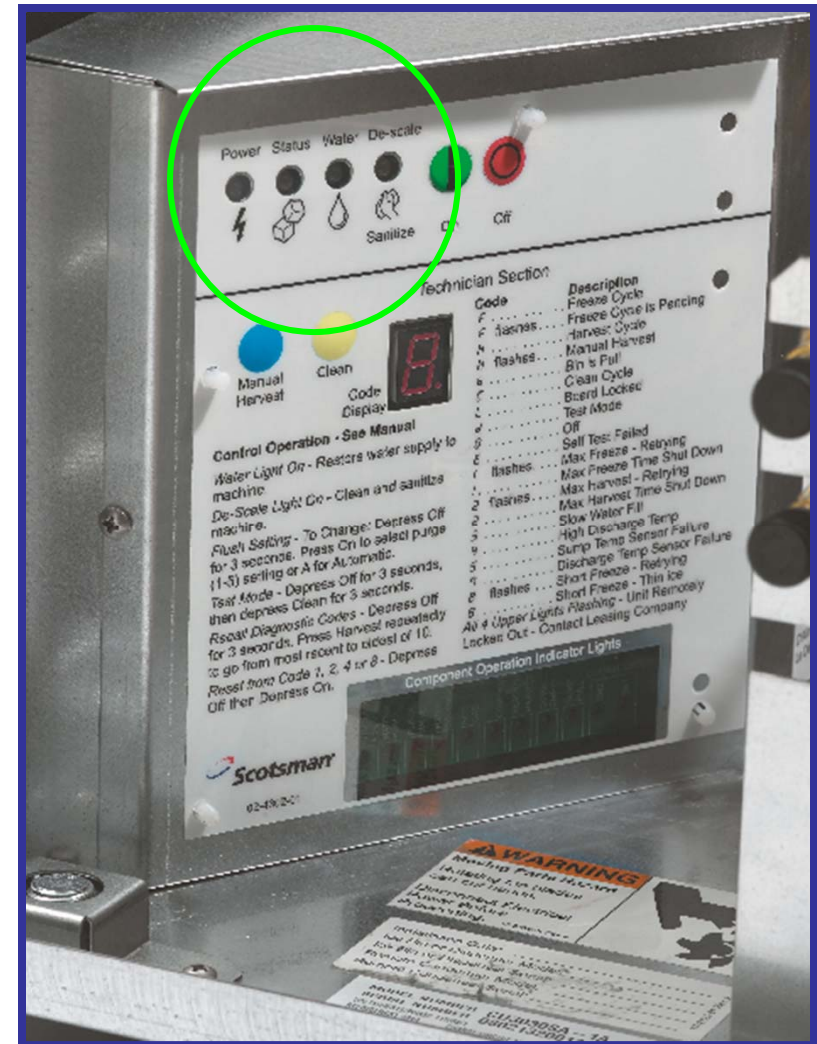
- Curtain switch
 - Terminates harvest when it opens
 - Terminates ice making when it stays open
 - For 30 seconds
 - Different cut out distance from the modular models



Controller Operation

• Indicator Lights

- Power
- Status
 - Green when in ice making mode
- Water
 - Normally off
- De-Scale
 - Normally off
 - Clean process clears



Controller Code Display

- Common codes:

0 = Off

F = Freeze

H = Harvest

b = Bin full

l = Long freeze cycle

2 = Long harvest

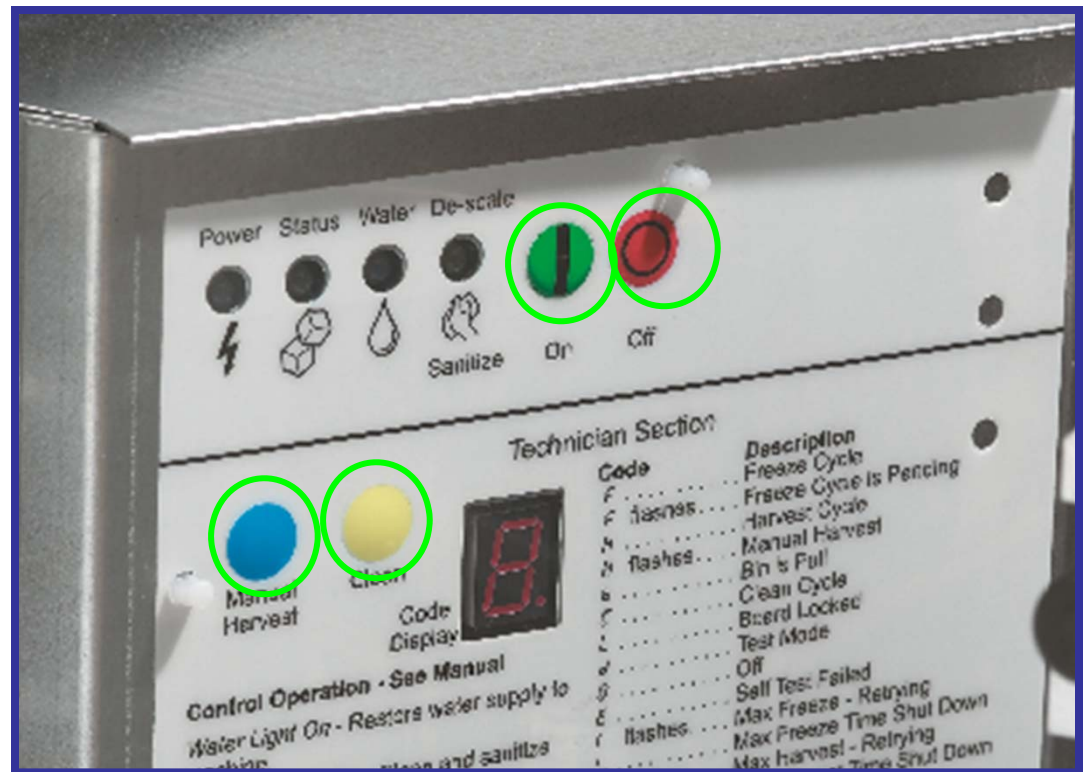
3 = Long water fill

8 = Short freeze cycle



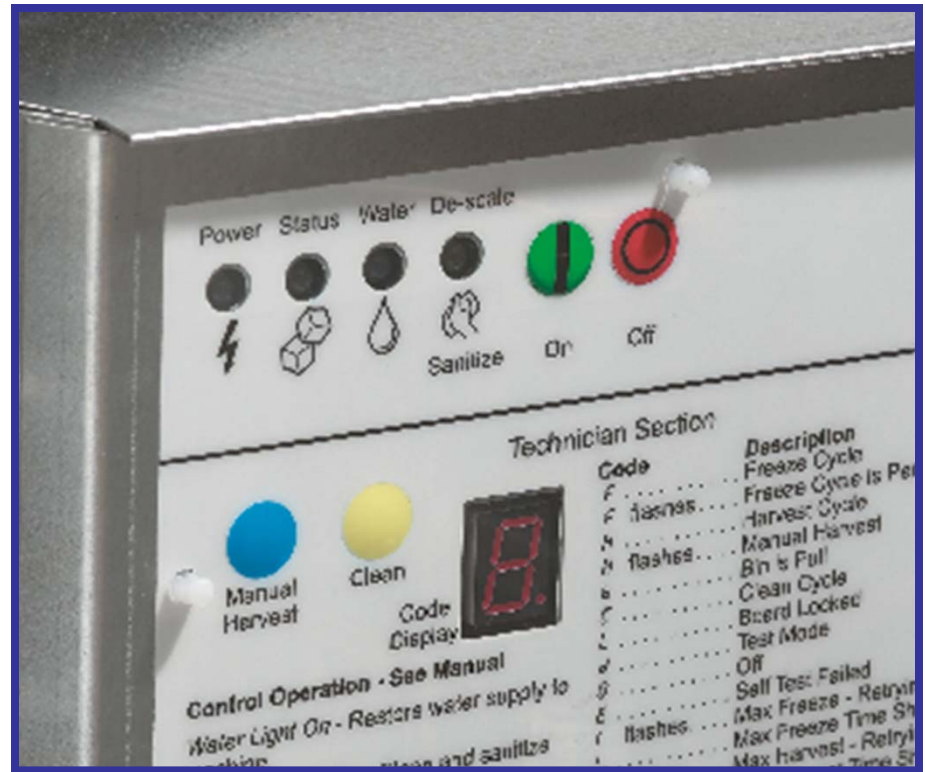
Controller Switches

- On
- Off
- Manual Harvest
- Clean



Controller Button Processes

- Reset
 - Push and release Off,
 - push and release On



Control Button Processes

- Recall diagnostic code
 - Push and hold Off to shut the machine down
 - Push and hold Off again until the display code changes
 - Push and release the Harvest button to cycle thru the last 10 diagnostic codes, from latest to oldest

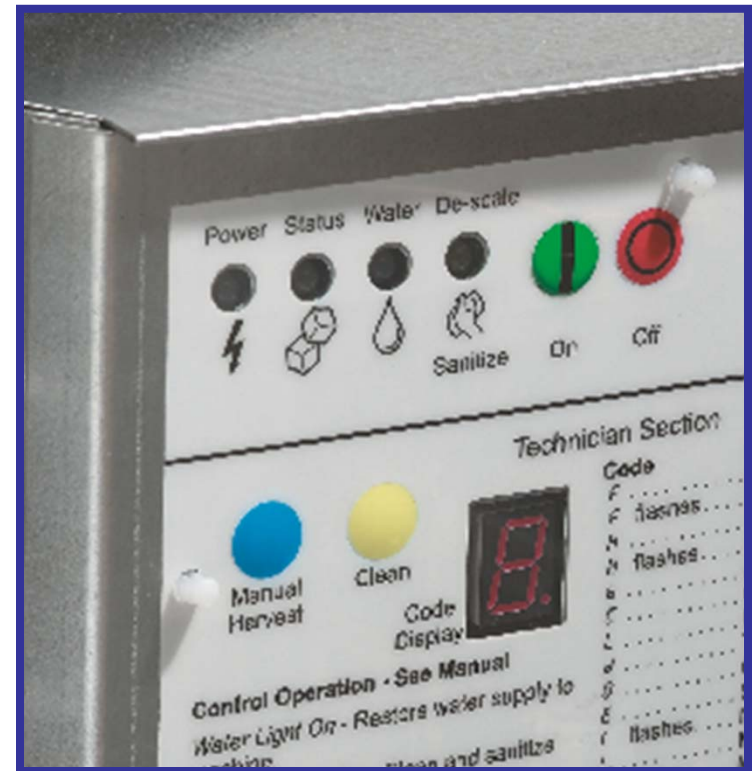


Controller Button Processes

- Clear all diagnostic codes
 - Push and hold Off to shut the machine down
 - Push and hold both the Clean and Harvest buttons for 3 seconds

Controller Button Processes

- View/Change water purge
 - Push and hold Off to shut the machine down
 - Push and hold Off again until the display code changes – code displayed is the current purge setting
 - Press and release the On button to cycle to another setting – 1 to 5 or A for Automatic



WaterSense Automatic Purge

- Controller measures conductivity of the reservoir water
- Adjusts purge water amount based on the water's dissolved solids
 - Display shows an A if set to Automatic (factory default)
- Purge can also be manually set
 - 1 is minimum
 - 5 is maximum

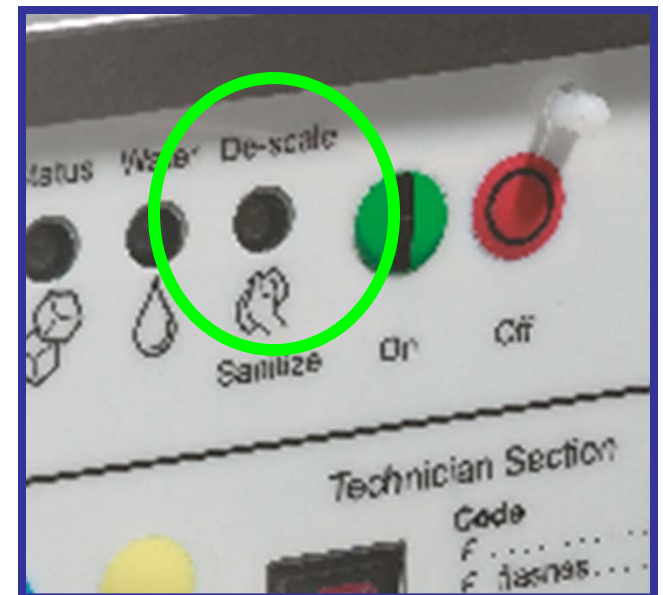
Maintenance - Air Filters

- CU1526 and CU2026 air cooled models have a single filter attached to the inside of the left louvered section
 - Wash out to clean
- CU3030 air cooled has the same filter PLUS a filter under the chassis
 - Pull the under-filter out to remove
 - Wash both out to clean



Maintenance – Water System

- De-scale and sanitize
 - Yellow light indicates time to remove scale
 - Standard interval is 6 months of power up time
 - First remove scale
 - Second sanitize
 - Remove left louver
 - Harvest ice
 - Stop operation
 - Push Clean button



Remove Scale

- Clean light flashes
 - Purge valve drains & float refills reservoir
 - Pour 8 ounces of Scotsman Clear 1 scale remover into the reservoir
 - Circulate scale remover at least 10 minutes, or as long as needed
 - Push Clean button again
 - Clean light on steady, control system will flush out the reservoir, continue to flush for 20 minutes then push Off

Sanitize

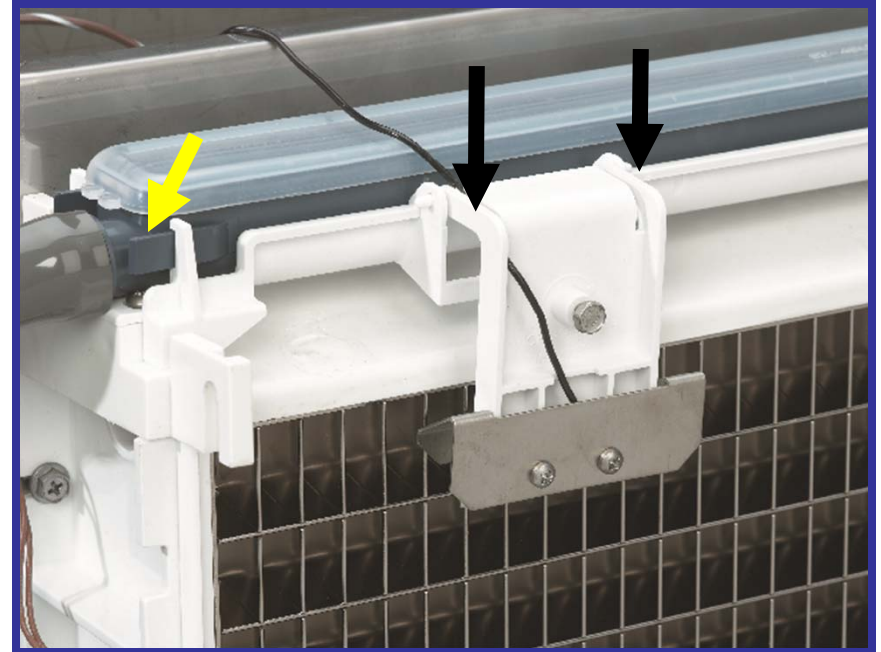
- After removing scale, De-scale light will be off, unit can be sanitized
 - Mix a sanitizing solution
 - Push and HOLD the clean button in to drain the reservoir, when done draining, add the sanitizer
 - After a few minutes push Clean again
 - Control will flush system, after 20 minutes push Off

ITS & Water Distributor

- Remove door
 - Top if not built in
- Remove curtain (flip up & lift right end)
- Remove ice thickness sensor (at black arrows squeeze & lift off)
 - Inspect for scale

Water Distributor

- Remove pump hose
- Release distributor (squeeze catches) & pull left, lift from unit
 - Remove cover, inspect for scale



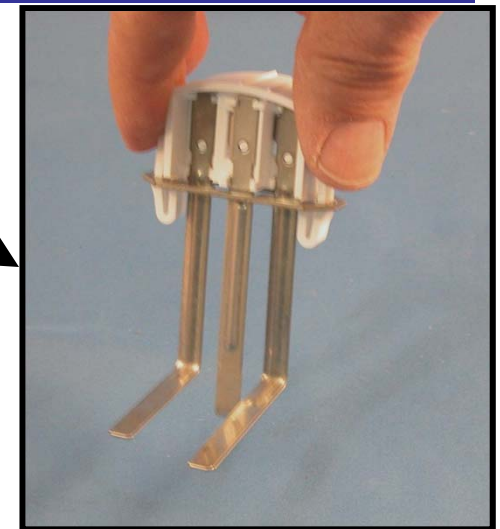
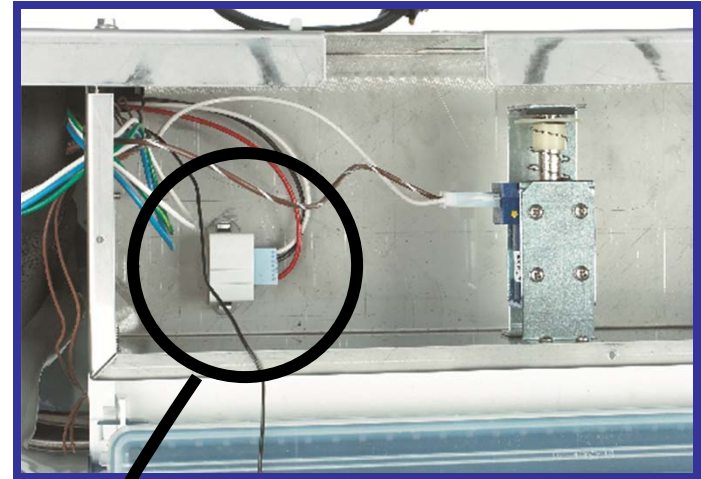
Water Distributor

- No fasteners
- Release catches, pull and lift off mounting track
- Pull cover off, rinse out



Water Sensor

- Water sensor
 - Confirms water in reservoir – signals controller to shut off if dry
 - Senses water quality for auto flush system
- NOT used to control water level



Service Diagnosis

- The Recipe for Ice:
 - Add **Water** – just the right amount
 - Apply strong amount of **Refrigeration** effect to take heat from the water & release the ice
 - Use an **Electrical System** to Operate and Control the machine to deliver ice of the correct form when its needed
 - If an ingredient is missing or out of balance, performance will suffer – and you will be called!

5 Controller Shut Down Causes

- Exceeds limit on water fill time
 - 5 minutes
- Exceeds limit on maximum freeze time
 - 84 minutes
- Exceeds limit on maximum harvest time
 - 3.5 minutes
- End of freeze triggered too soon
 - Before 6 minutes into the freeze cycle
- Discharge temperature too high
 - Exceeds 250 degrees F.

Controller Reaction

- Exceeds water fill time
 - Shuts down, rechecks every 20 minutes
- Exceeds maximum freeze time
 - Completes harvest, tries another cycle
- Exceeds maximum harvest time
 - Shuts down, restarts after 50 minutes
- End of freeze triggered too soon
 - Completes timed harvest, tries another cycle.
- Discharge temperature exceeds 250 degrees F.
 - Immediate shut down

Controller Auto Restart

- From diagnostic causes
 - Retries 2 times, if fails again 3rd time, machine must be manually reset
- From water interruption
 - Will continuously restart every 20 minutes
- From power failure
 - Goes thru a timed harvest (3 minutes)

Diagnostic Process - Example

- No ice complaint
 - Check diagnostic code
 - How?
 - Code 1: Maximum Freeze Cycle
 - What can cause the freeze cycle to be too long?
 - What would you look for?
 - Recipe for ice:
 - Water
 - Refrigeration
 - Control

Diagnostic - Refrigeration

- Maximum harvest time exceeded
 - Limit is 3.5 minutes – 210 seconds
 - Typical cycle is much shorter
 - 30 to 80 seconds
 - Slow harvest could be caused by?

Diagnostic Process - Example

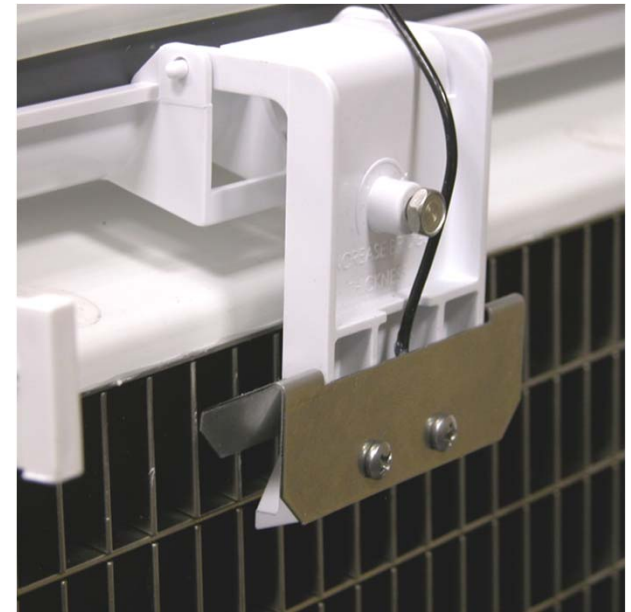
- No ice complaint
 - Check diagnostic code
 - How?
 - Code 3: Slow or no water fill
 - What can cause that?
 - What would you look for?

Diagnostic – Test Mode

- Depress and HOLD Off for 3 seconds, release then
 - Depress and HOLD Clean for 3 seconds
 - The controller will go through a programmed sequence of switching the components on and off.
 - The component lights will switch on and so will the load
 - » Fan motor is an exception, the fan pressure control will keep the fan motor off
 - If the light is ON and the load is not, further check of the motor or solenoid coil is required.
 - If the lights all match component operation, there is nothing wrong with either the controller or the components.

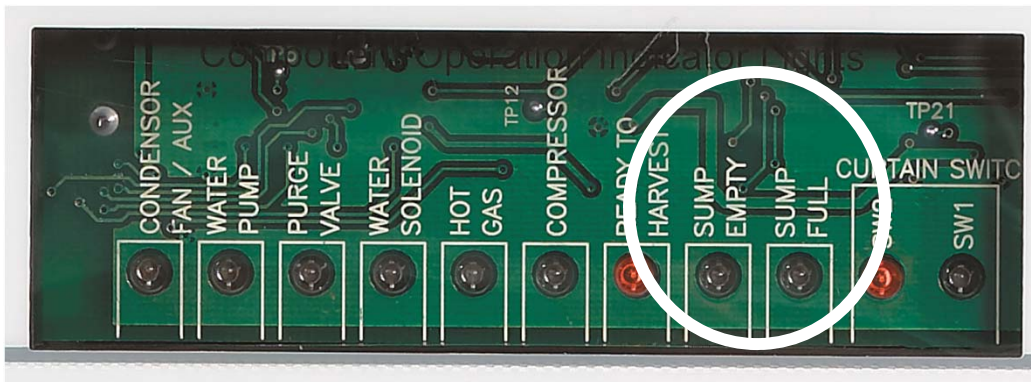
Diagnostics - Sensors

- Ice thickness sensor
 - Continuity probe
 - Check by grounding metal tip to cabinet and observing Ready To Harvest light



Lack of Water

- Water – part of the recipe
 - Sump empty light may be on
 - Restricted or shut off supply
 - Water filters plugged?
 - Float water valve not operating

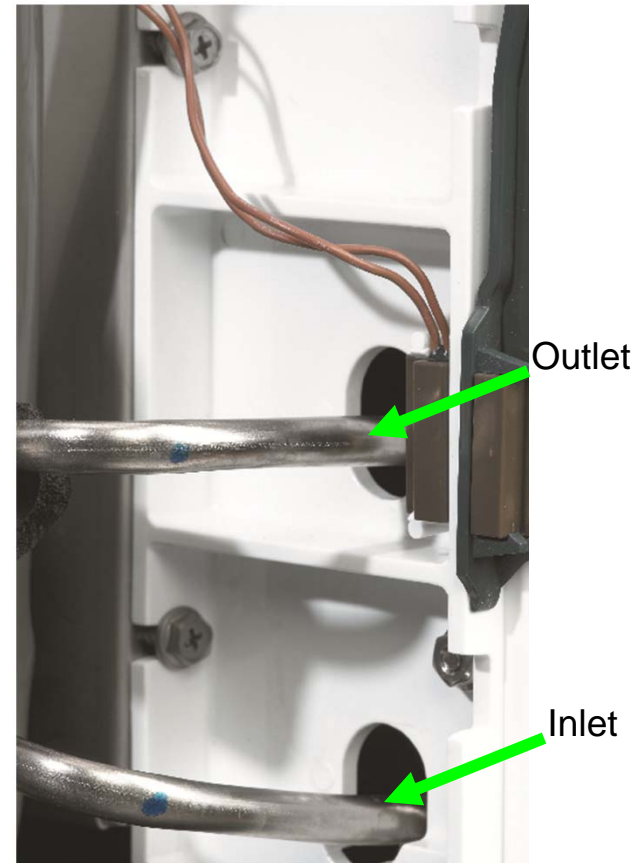


Diagnostic Process - Example

- No ice complaint
 - Check diagnostic code
 - How?
 - Code 4: High discharge temperature
 - What can cause that?
 - What would you look for?

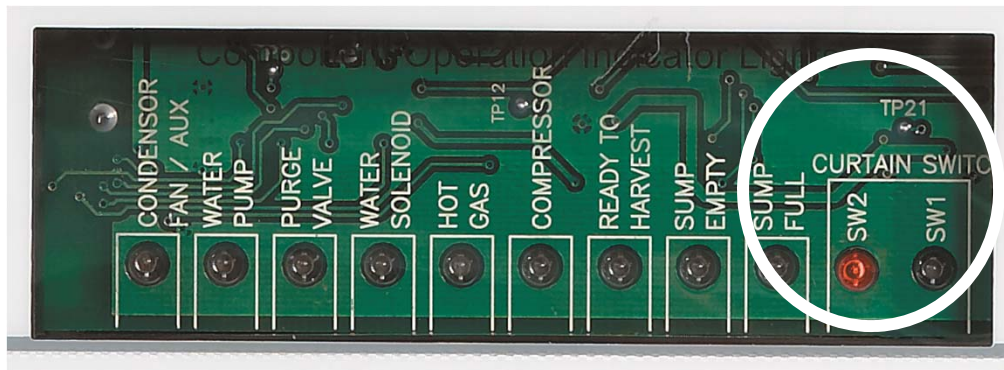
Service Notes: Refrigerant Charge

- Ice machines are critically charged
- Refrigerant leak symptoms are progressive – they change as the amount of refrigerant lost increases
 - Thinner ice at evaporator area near tube outlet
 - Longer cycle times, both freeze and harvest



Diagnostics – Curtain Switch

- Light is ON when switch is Open
 - Unused switch light is always on
- Move the curtain
 - Check if the light cycles with the curtain's movement or
 - Use ohmmeter on switch leads

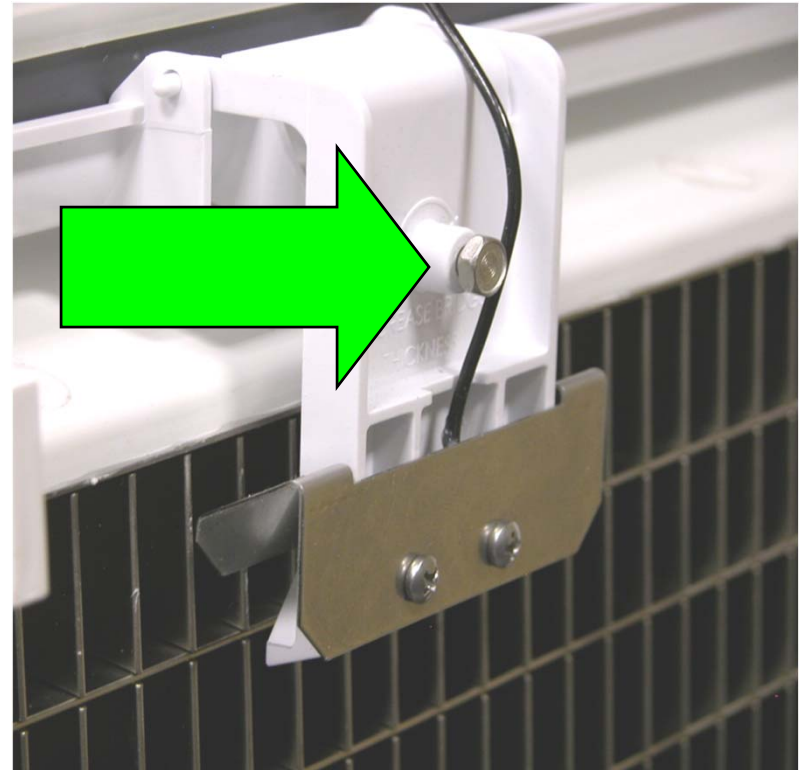


Diagnostic Process - Example

- No ice complaint
 - Check diagnostic code
 - How?
 - Code 8: Short freeze cycle
 - What can cause that?
 - What would you look for?

Service Notes - Ice Thickness Adjustment

- Adjustment screw is very sensitive
 - Rotate only slightly to adjust bridge thickness
 - 1/8 turn is TOO MUCH



Service Notes - Bin Removal

- Remove door
 - Open slightly, lift up one end, open more to release
- Remove top
 - Remove thumbscrews under front edges of top
 - Push top back and lift up to remove



Bin Removal

- Remove grills at front of machine
- Unplug switch
- Remove thumbscrews holding bin to chassis
 - One inside of bin – by pump
 - Two below bin
- Remove drain hose from bin



Bin Removal

- Slide bin forward and off of the chassis



Bin Removed

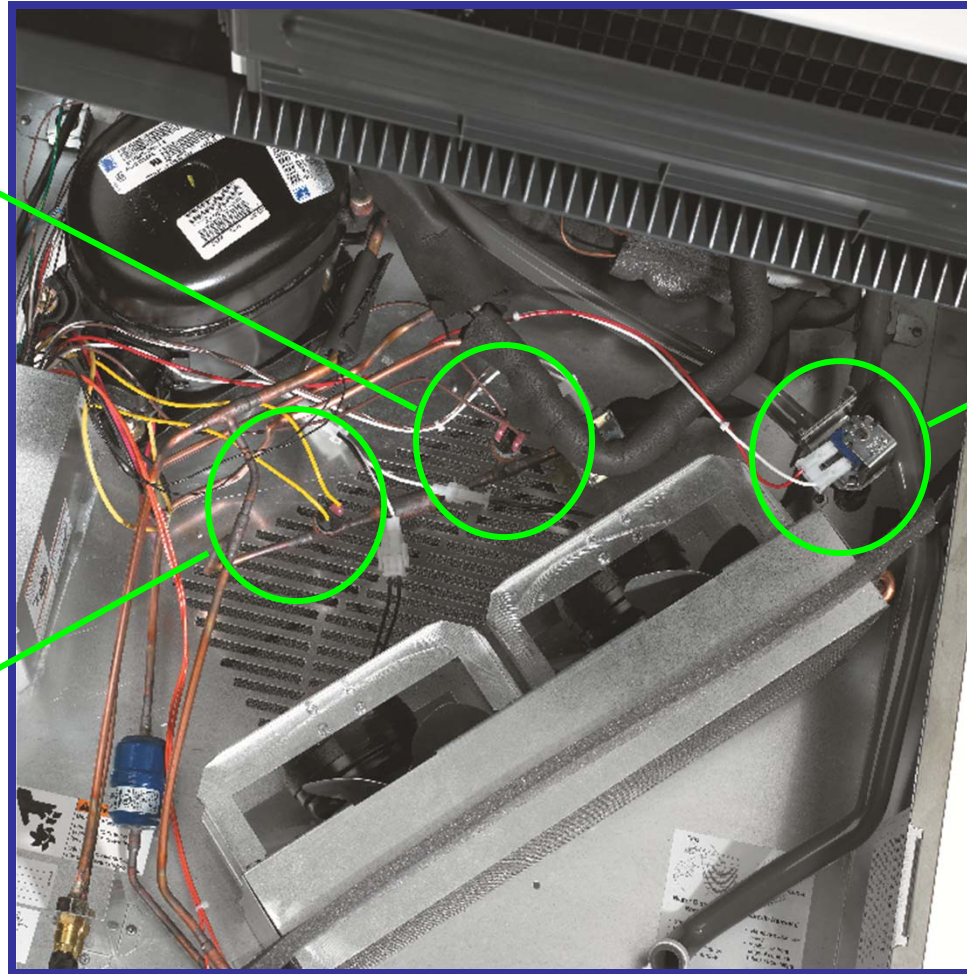
- Chassis with bin removed
- Access to
 - Compressor
 - Controller
 - Fan Motors
 - Purge valve
 - Hot gas valve
 - TXV



Condensing Unit Area

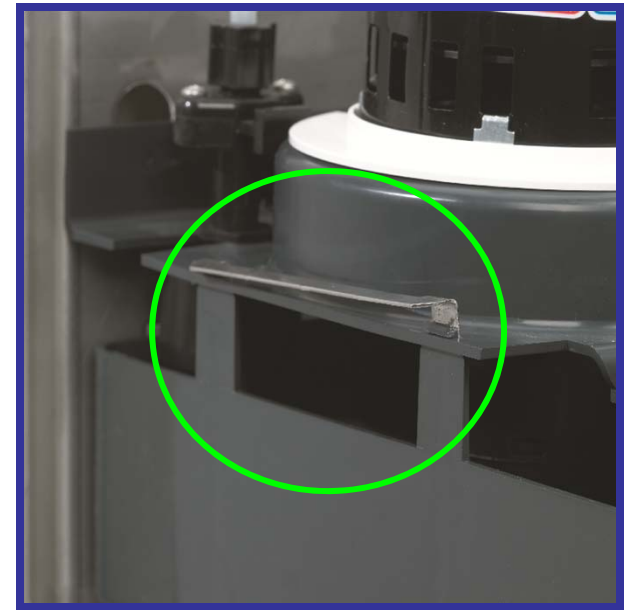
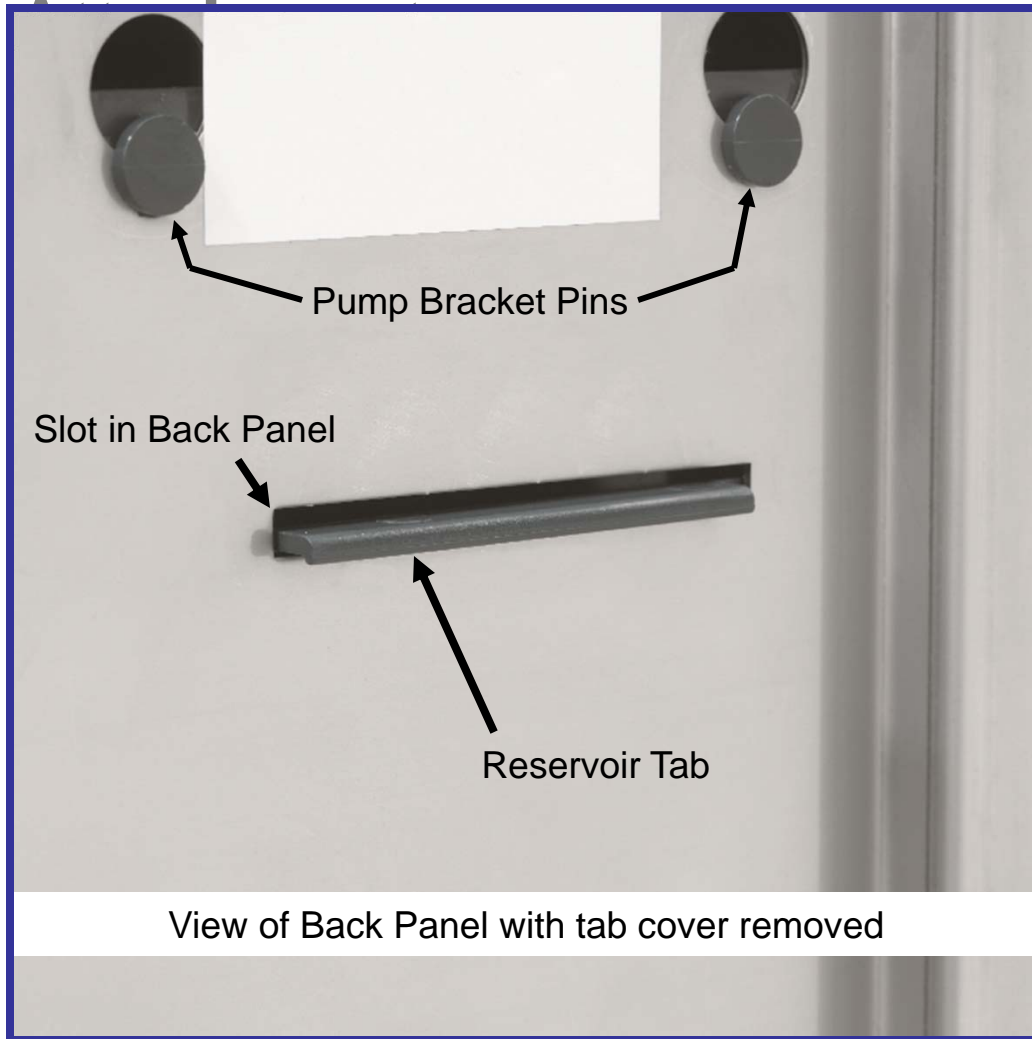
Fan Motor
Pressure
Control
CI - 240
CO - 190

High Pressure
Cut Out
AC CO - 500
CI - 390
WC CO - 400
CI - 300



Purge Valve

Pump Bracket and Reservoir

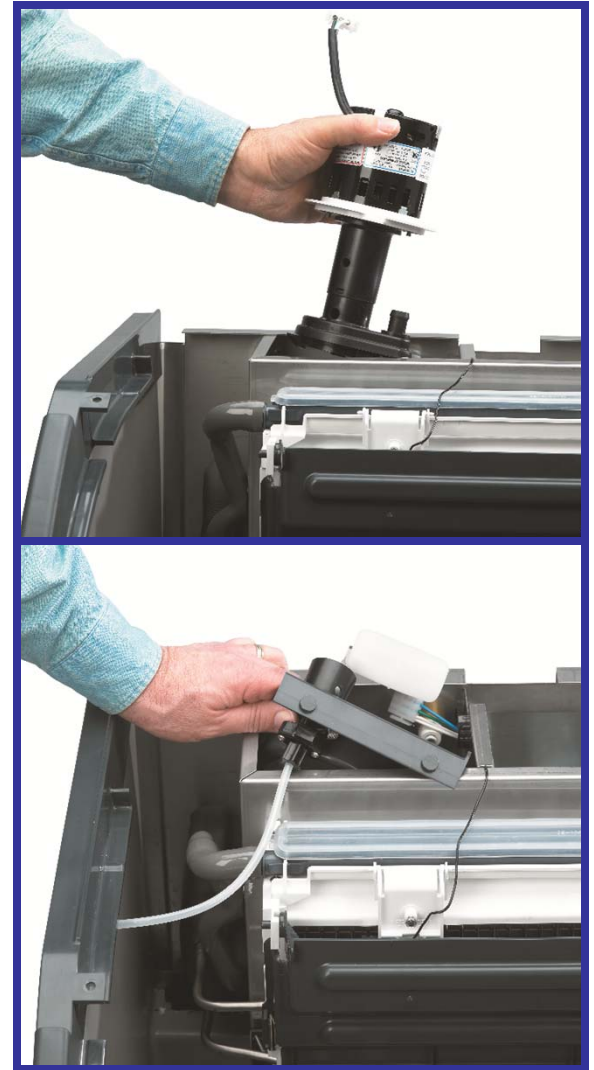


CU3030 Reservoir

Remove metal clip to release tabs from pump bracket

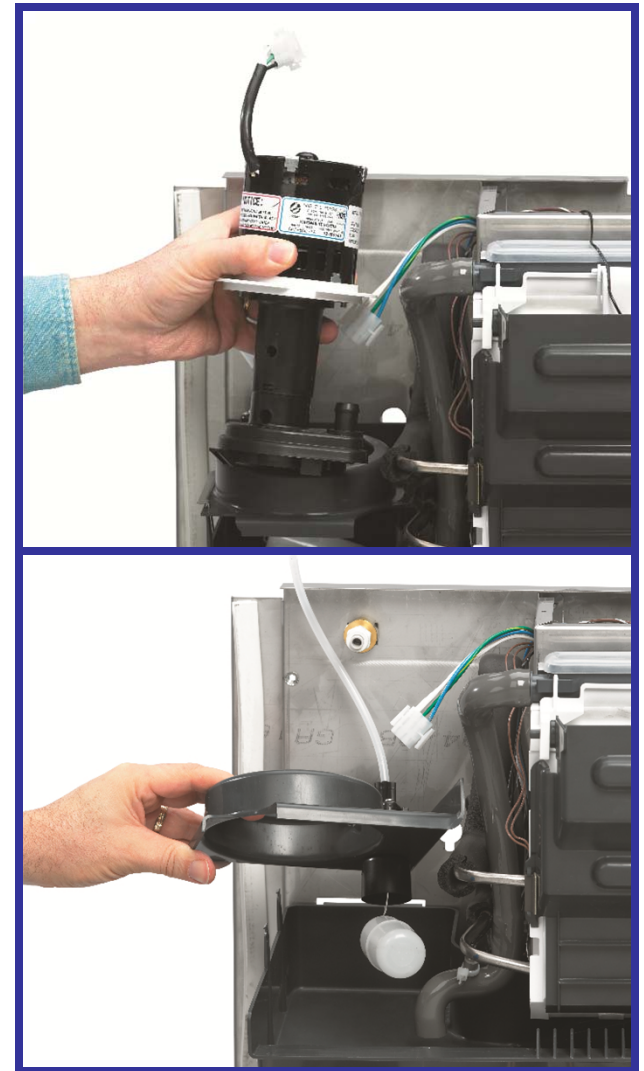
Pump & Float Service – CU1526 & CU2026

- Float attached to pump bracket
 - Shut off water to unit
 - Remove top
 - Remove reservoir mounting screws, lower sump
 - Remove water pump
 - Disconnect hose and electrical
 - Twist CCW and lift pump out
 - Lift pump bracket & float valve up and out of machine



Pump & Float Service - CU3030

- Float valve is attached to pump bracket
- Remove pump
 - Disconnect hose & electrical
 - Twist CCW & lift pump up and out of machine
- Disconnect reservoir from pump bracket, lift bracket up and out of machine



Summary

- CU1526, CU2026 and CU3030
 - All models can be built in
 - All models use the same evaporator
 - All models use the same water pump
 - All models use the same controller – shared with all Prodigy models
 - All models use the same ice thickness sensor
 - All models use the same curtain switch
 - All models use the same float valve