

SCE275: CM<sup>3</sup>  
Under-the-counter

**Technical Training**

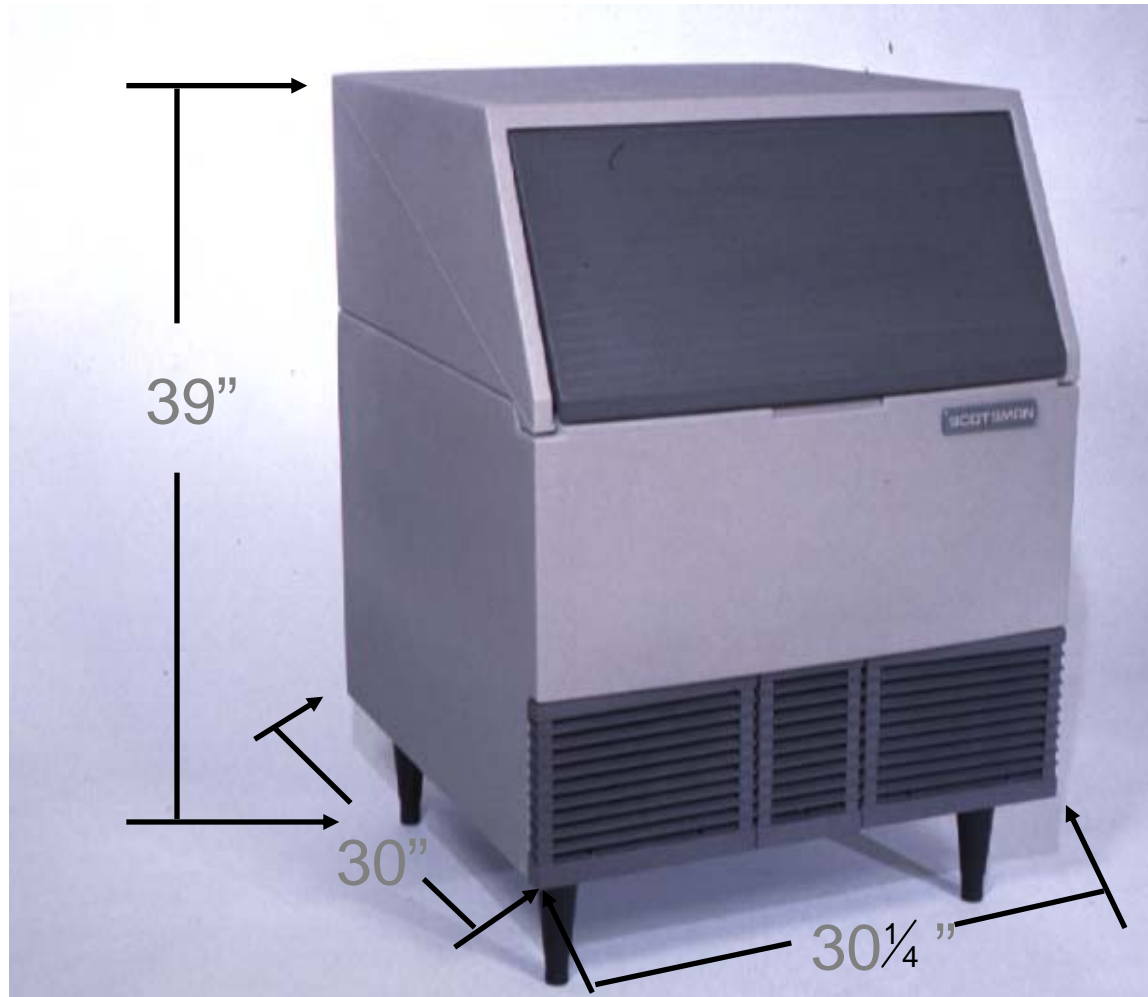
# Scotsman® SCE275 Cube Ice Machine

- Individual Cubes
- CM<sup>3</sup> Controls
- SCE170-type cabinet
  - Two piece
  - Rust-free
- R-404A
- Air or Water Cooled

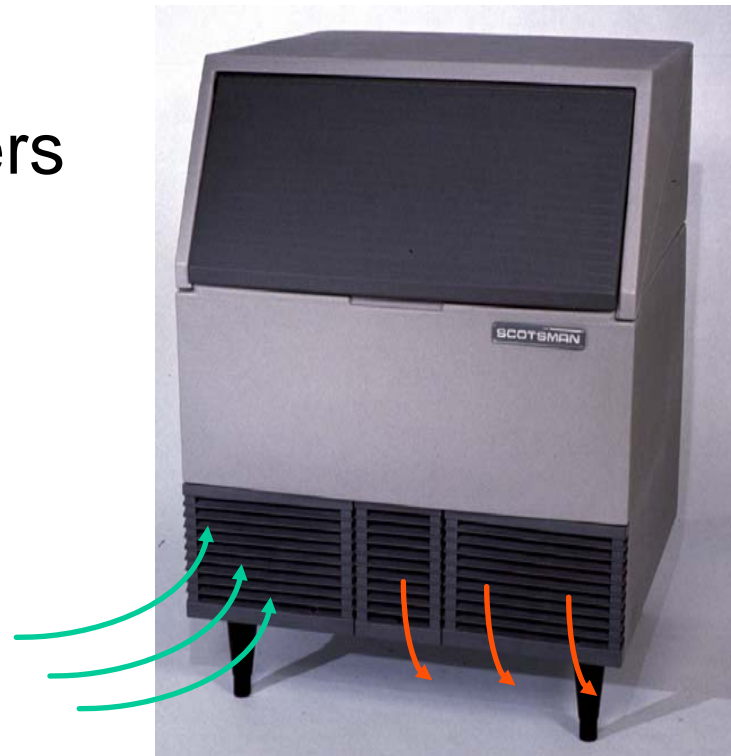


**Scotsman**<sup>®</sup>

**SCE275 Cabinet Size**

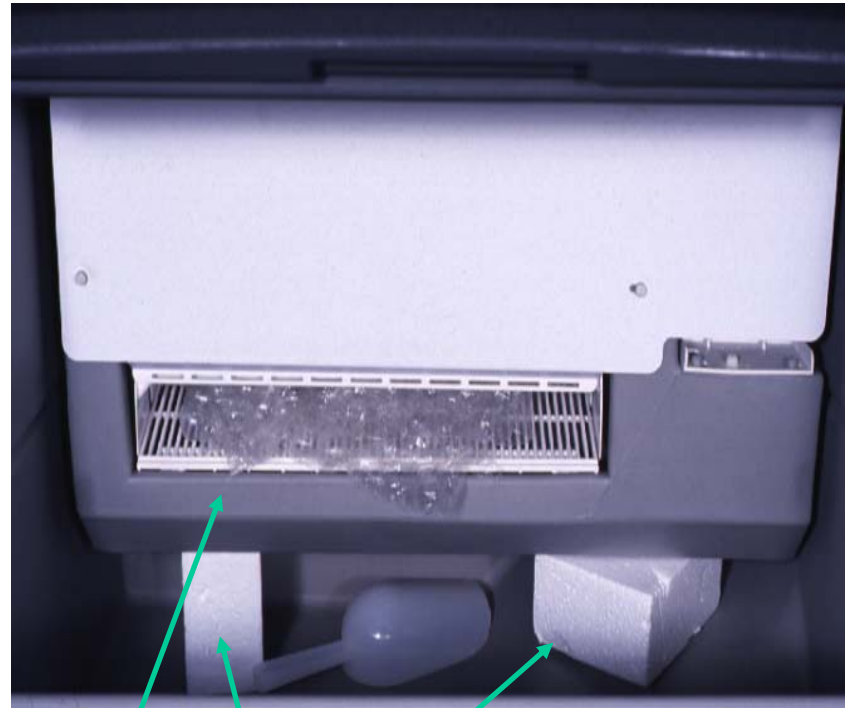


- May be Built In
  - Top
  - Both Sides
- Must use legs or casters
  - Better draining
  - Bottom not smooth



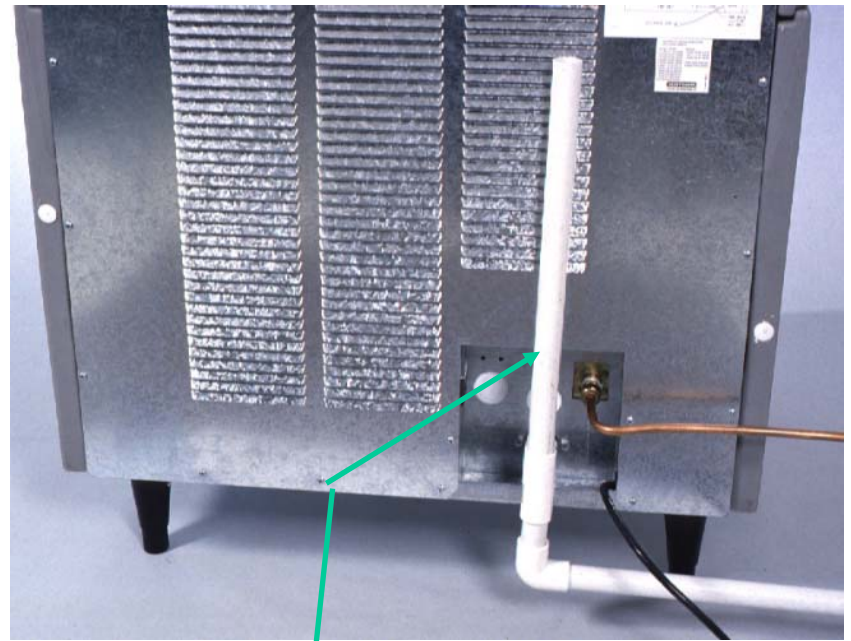
Air Flows In and Out the Front

- Unpack
  - Remove shipping materials
  - Locate Manual
- Follow Installation Instructions!



Remove Shipping Materials

- Unit is supplied with a power cord
- Water inlet and drain in recessed box on back
  - 3/8" male flare inlet
  - 3/4" FPT Drain
  - Install New Tubing
    - Do Not Reuse Old



Vent The Drain

- Use a water filter
  - Keeps sediment out of the inlet water valve
  - Filters with treatment systems reduce scale formation
- If there is an existing filter - **CHANGE THE CARTRIDGE!**



- Move the unit to its final location
- Level the unit, check at the reservoir
  - Storage bin drain is at the front, do not tilt the machine to the back!







Remove Screws



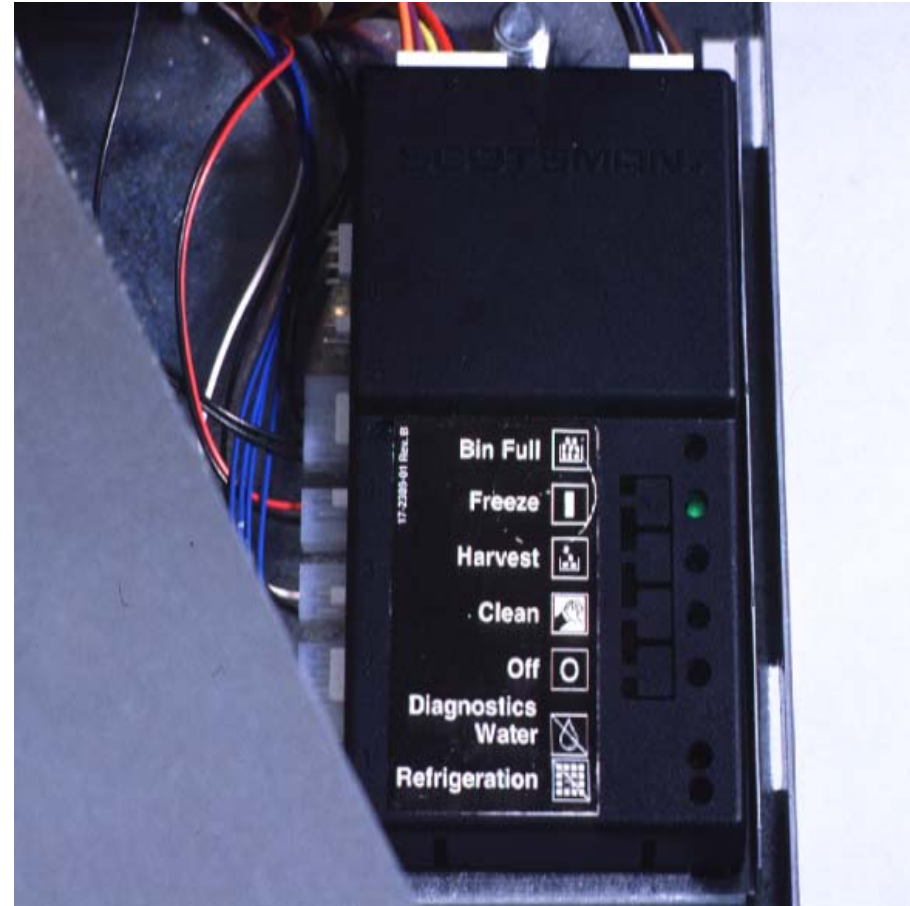
Push Grill Down  
& Tilt Out

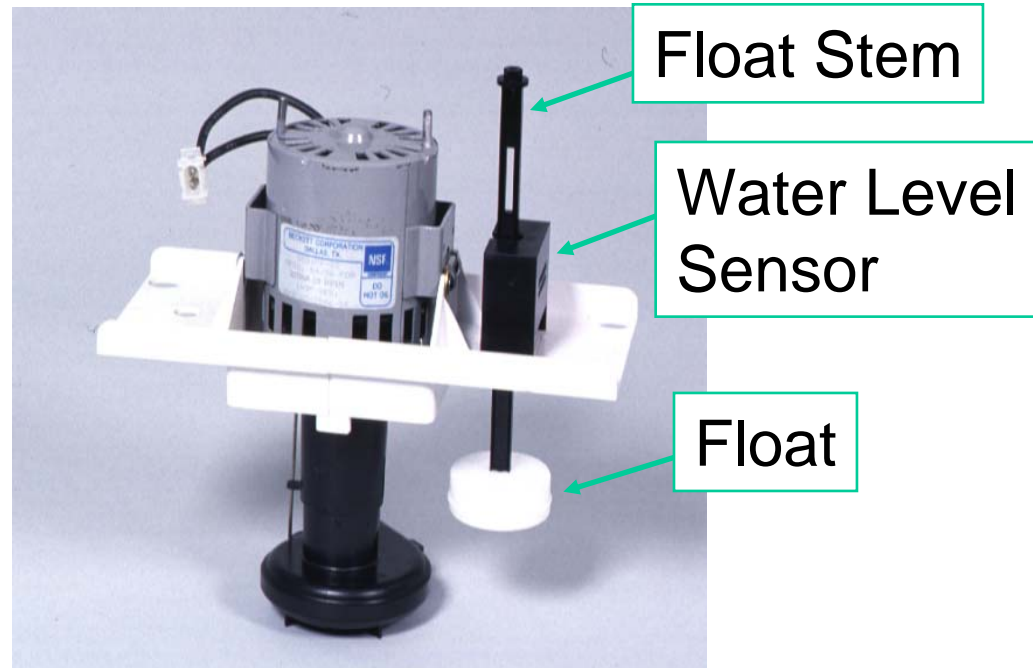
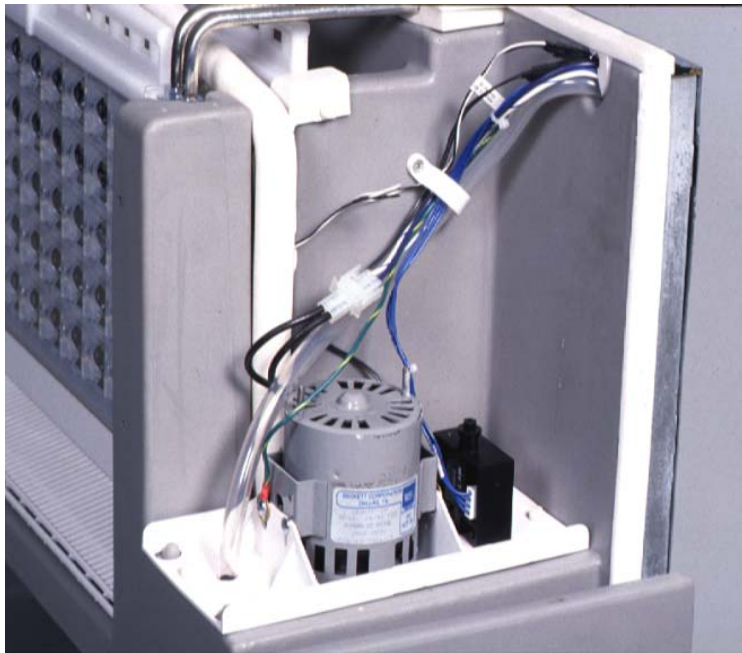


Locate Controller &  
Push Freeze

Note: 2003 Controller Location Moved to Left Chassis Wall

- The initial freeze cycle begins
  - Water flows in
  - Must fill reservoir before pump or compressor will start





Pump and Water Sensor System

- Water Temperature
  - Used to confirm system operation
  - Used for diagnostics
- Standpipe
  - Rinse water overfills and drains out thru standpipe
  - Height critical

## Water Temperature Sensor



## Reservoir Overflow Standpipe

- 3 minutes into freeze
  - Discharge temperature measured
  - If less than 150°F., the fans cycle on and off every 30 seconds

- Reservoir water must cool to a preset point in 5 minutes
  - Controller checks water and discharge temps
  - Check to confirm that refrigeration system is functioning
  - And that the inlet water valve is not leaking thru

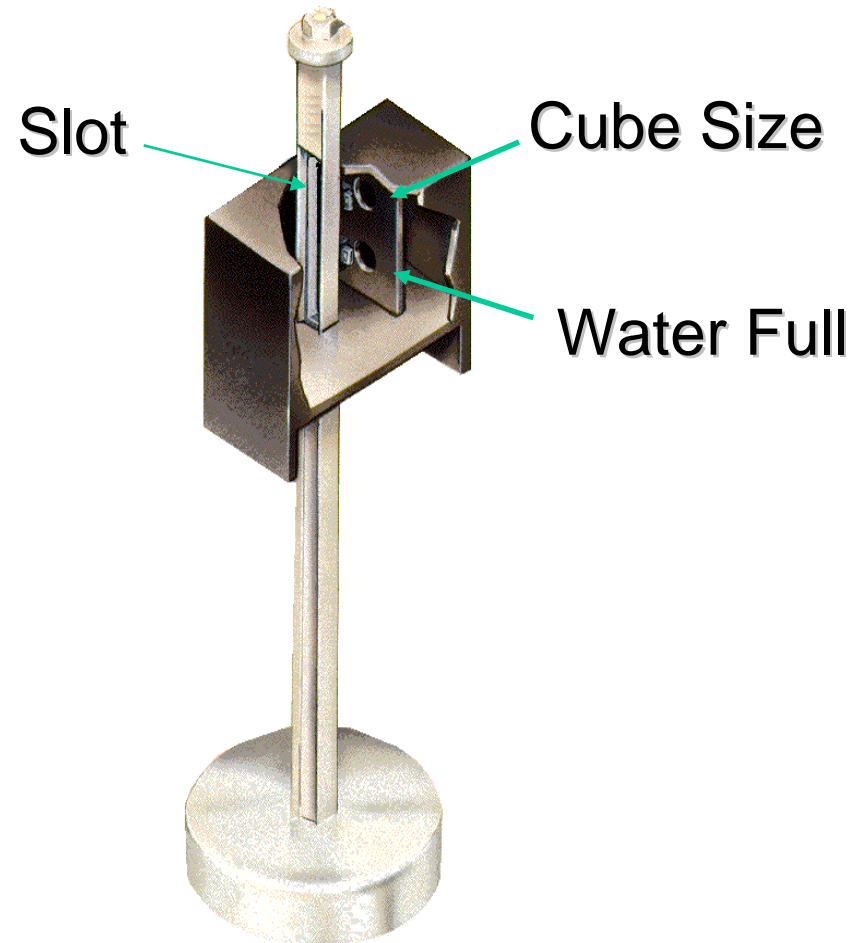
- The first 3 cycles after any restart have a water temperature check
  - If less than the preset limit, the pump switches OFF for 30 seconds
  - Water refills the reservoir after the pump restarts

- Water Re-fill
  - The water valve will open two times in the freeze cycle to refill the reservoir
  - This makes the System Controller for the SCE275 different from the CM<sup>3</sup>
  - Controllers are NOT interchangeable between this self-contained machine and CM<sup>3</sup> modular machines

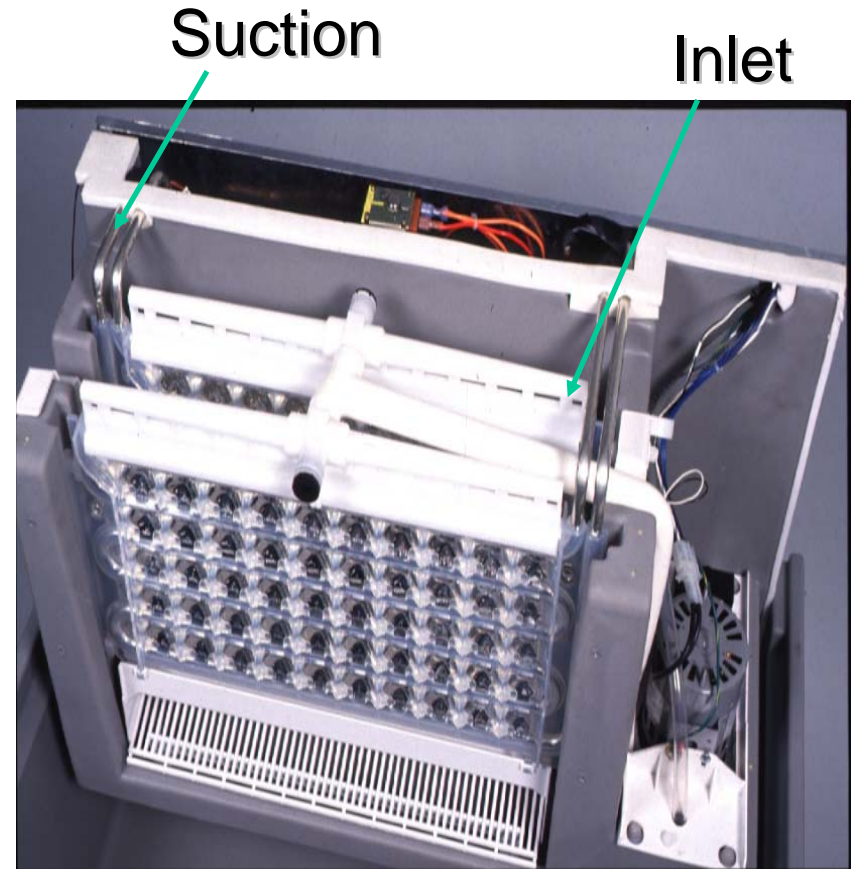


- End of freeze determined by the water level
  - Fans switch off just before harvest to build up heat
    - Fan off time varies by discharge temperature
      - If low, more fan off time is used
      - Varies between 0 and 60 seconds

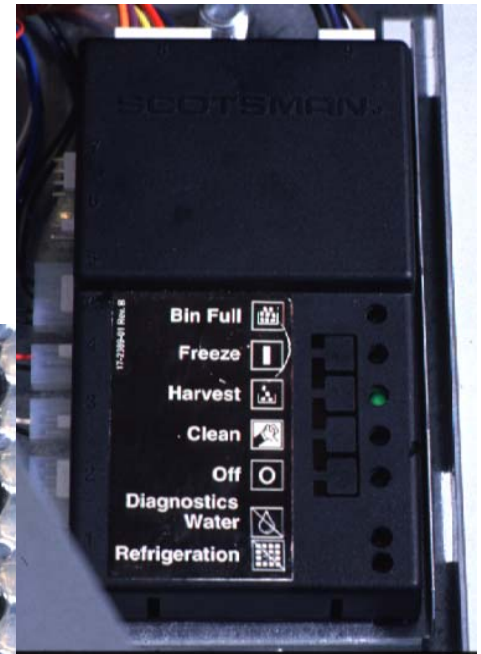
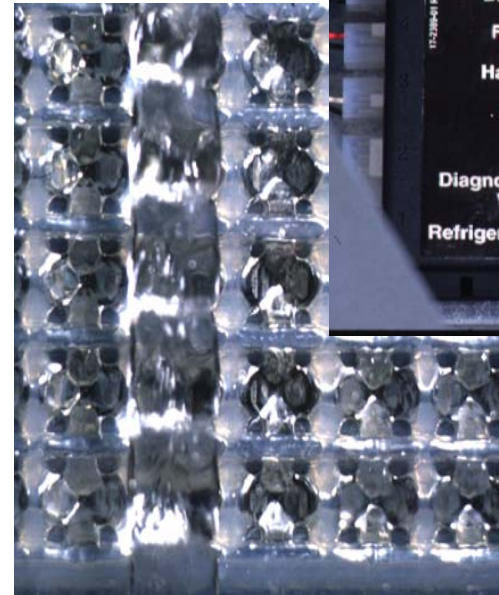
- Sensor Module
  - Two photo-electric eyes
  - Bottom one senses water fill
  - Top one senses water fall
    - reservoir refills
    - full cubes
    - end of freeze
  - Slot size determines cube size - NOT ADJUSTABLE



- Two 5 row x 10 column evaporators
- In Series
  - Inlet at bottom of each
- Same ice making area as CME256



- Fans shut off before the end of freeze
  - Builds up heat
- Water pump shuts off at the beginning of harvest
  - On again in 40 seconds
- Hot gas valve opens
- Water inlet valve opens
  - Until reservoir is full + percentage of fill time



- Ice Level Sensors
  - Between the evaporator plates
  - Two photo-electric eyes
  - Sense ice harvesting
  - Sense bin full when ice fills up to block the infrared light



- SCE275 harvest time adapts to changing conditions
  - Bin control sensors “see” ice falling
  - The first harvest cycle will be 5 minutes long to establish a baseline
  - The controller then adjusts the harvest cycle time to match the requirements for an efficient harvest

Harvest Begins

Harvest Ends

Total Current Harvest Cycle Time  
(prior cycle actual + a % of actual)

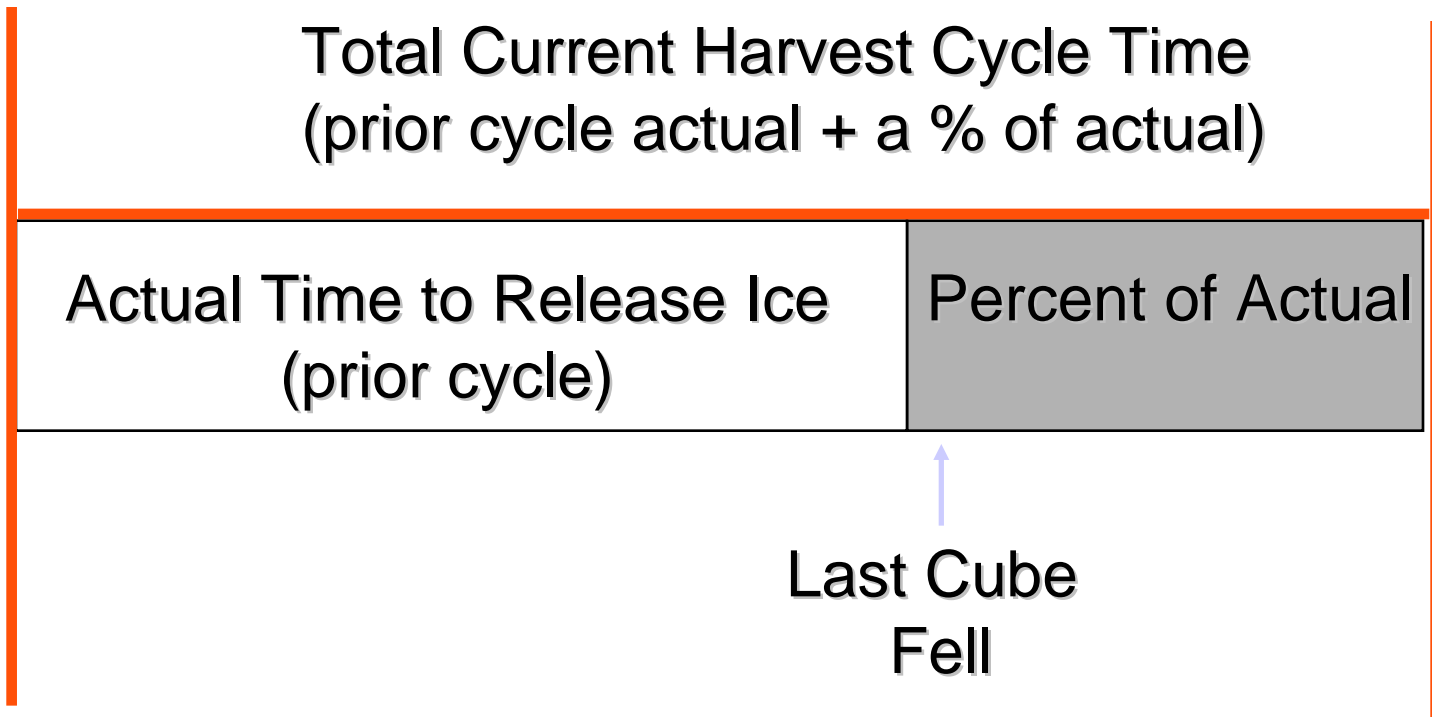
Actual Time to Release Ice  
(prior cycle)

Percent of Actual

Last Cube  
Fell

Harvest  
Began

Harvest  
Ended

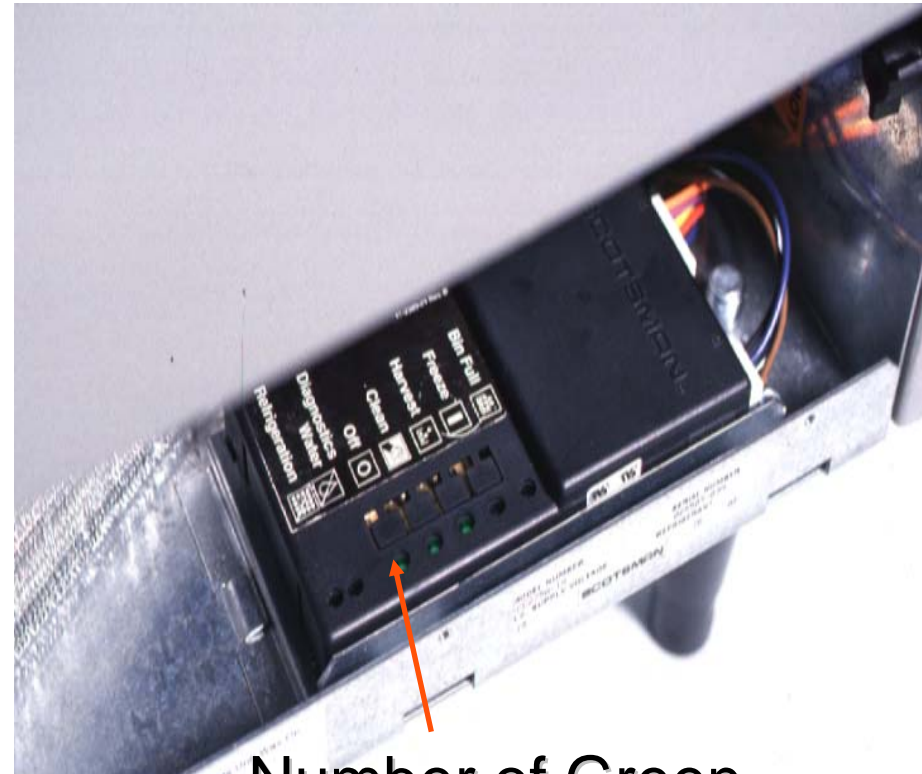


- Pump is off for 40 seconds
- Fans are off
- Water valve opens
  - Shuts off when reservoir is full + overflow
- Pump off after 6 minutes of harvest
- Pump off when bin is full
- Last harvest 5 minutes long



- Fill rate calculated every cycle
  - Time from water valve open to water sensor satisfaction
- Overflow time adjusted every cycle
  - Percent of fill time is used for overflow
- Amount of overflow rinse adjustable
  - Percent manually adjustable
- Water has limited time to fill reservoir

- There are 5 levels of rinse to adjust to
  - Maximum
  - Heavy
  - Standard - Factory setting
  - Moderate
  - Minimum



Number of Green  
Lights = Rinse Setting

- Harvest time expired
  - Returns to freeze OR if Bin is full
  - Shuts down when ice level controls are blocked for 20 seconds or more
- If maximum harvest time occurred
  - Will try one more cycle
  - Will shut down if it happens again

- When the light receiver no longer senses light for 20 seconds or more
  - Bin full light on controller glows
  - Machine shuts down at the end of the next harvest cycle
  - Cannot restart for 4 minutes



# **Scotsman**® Restarts: Power Interruption

- Automatic Restart
  - Open hot gas valve
  - Open water valve to reservoir
  - Start pump
  - Start compressor, freeze for 30 seconds
  - Harvest for 4 minutes

# **Scotsman**® Restarts: Water Interruption

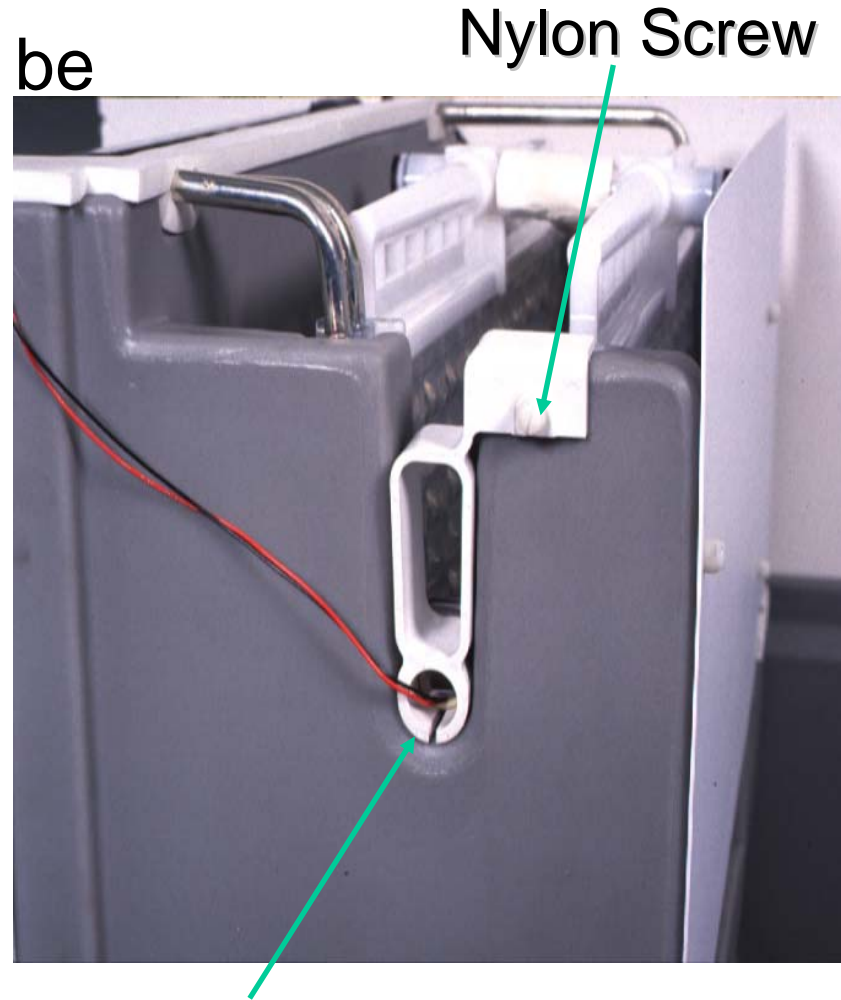
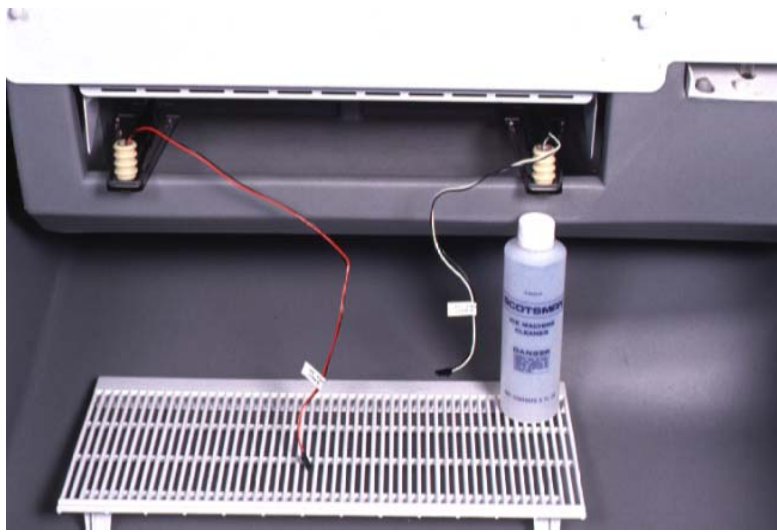
- Automatic restart
  - Shuts off when can't refill reservoir fast enough
  - Attempts a restart every 20 minutes

- Air Filter
  - Remove left grill
  - Pull filter out thru slot in base
  - Filter between fans and condenser
  - Cleanable filter
  - Now also used on
    - AFE400
    - SCE170





- The ice level controls must be cleaned
  - Place them in the reservoir

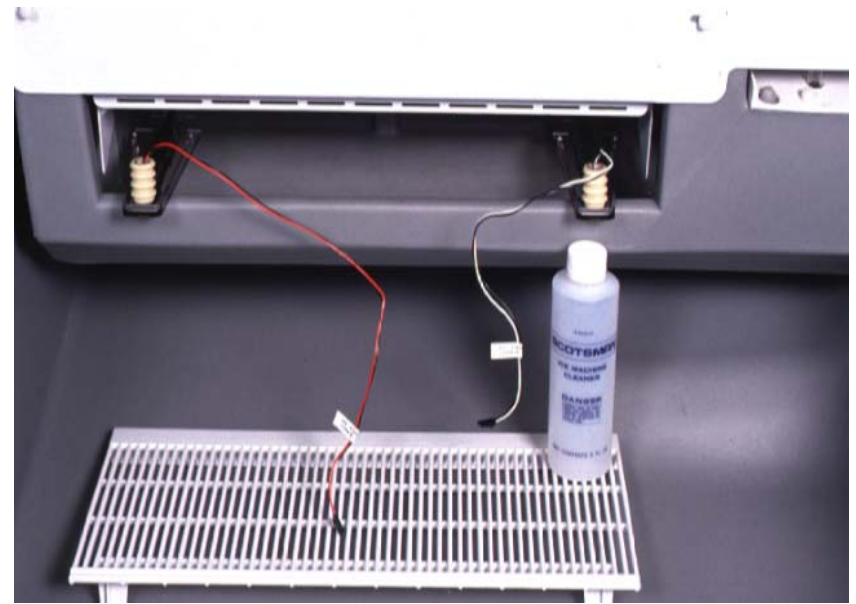


Left Ice Level Control

- Locate the “Clean” button on the controller
- Push and release the “Clean” button to start the cleaning process
  - Pour in cleaner when pump restarts



- Circulate cleaner for 10 minutes
  - Push Clean again to rinse system
- After 20 minutes
  - Push Off & reassemble unit
  - Push Freeze to restart

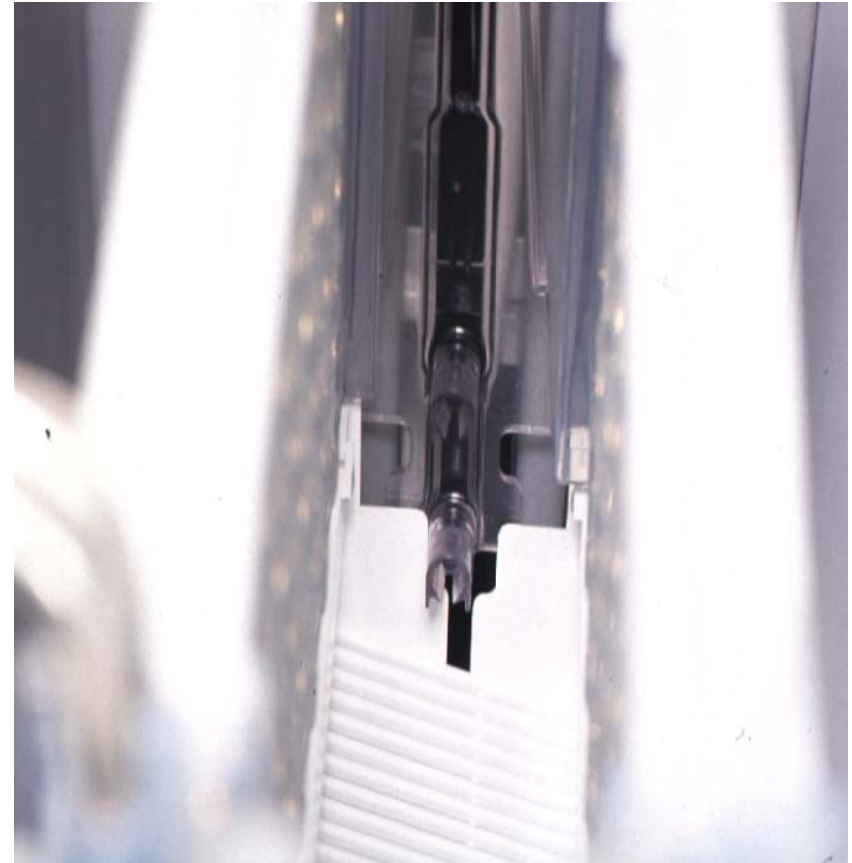


Soak Cube Deflector in  
Cleaning Solution

- Water Distributors must be clean
- Slots at the top of the evaporators must be clean



- Proper assembly
  - Ice Level Controls Behind Water Trough Flanges
  - Water Troughs Marked Front and Back - do not reverse



- Component Access
  - Cabinet may be removed while machine is built in and installed
  - Begin by removing fasteners holding hood to bin



- Component Access
  - Then slide hood off bin



- Component Access
  - Then remove all grills
  - Remove two fasteners holding bin to chassis





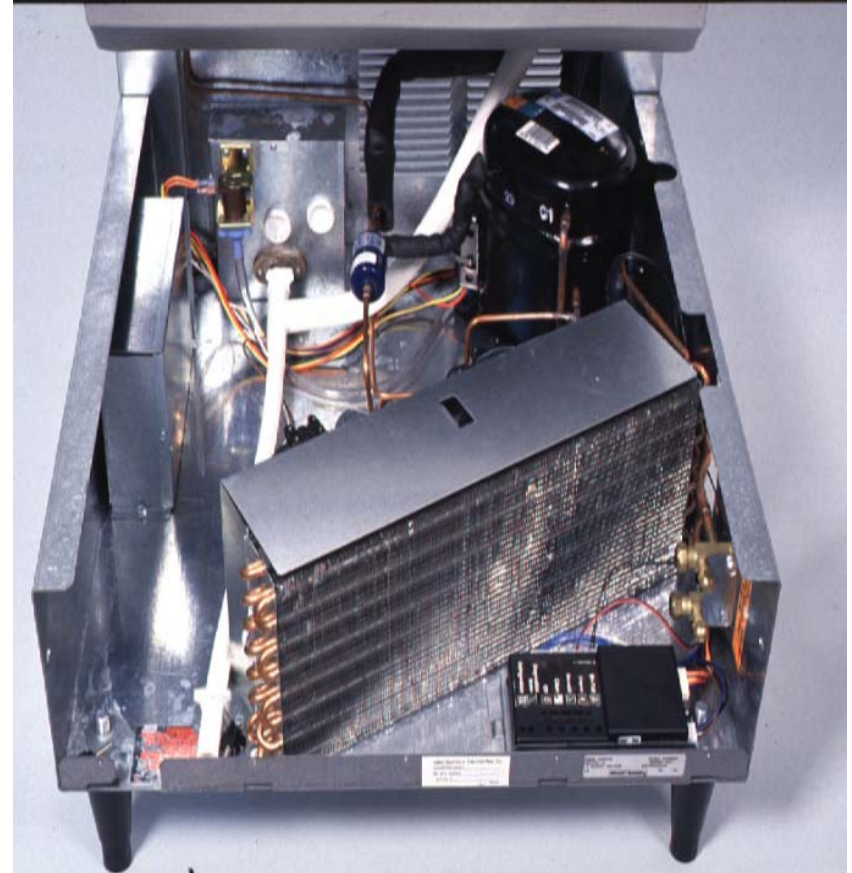
- Component Access
  - Disconnect bin drain hose



- Component Access
  - Rotate the bin up and remove it from the chassis



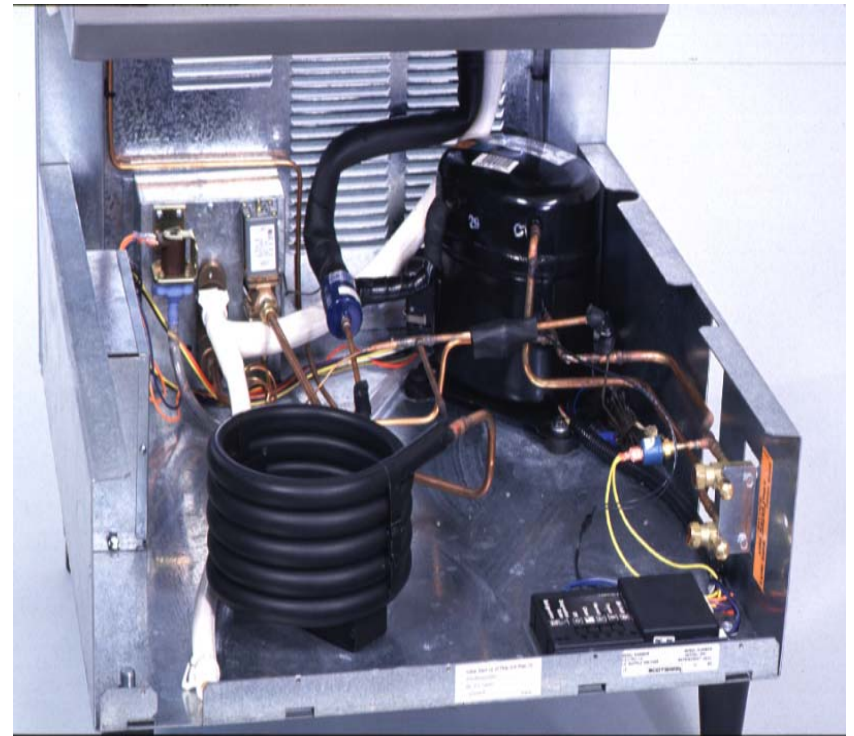
- Air Cooled Chassis
  - Blow-thru condenser
  - Two fans
  - R-404A refrigerant
  - Access valves in front
  - Controller in front

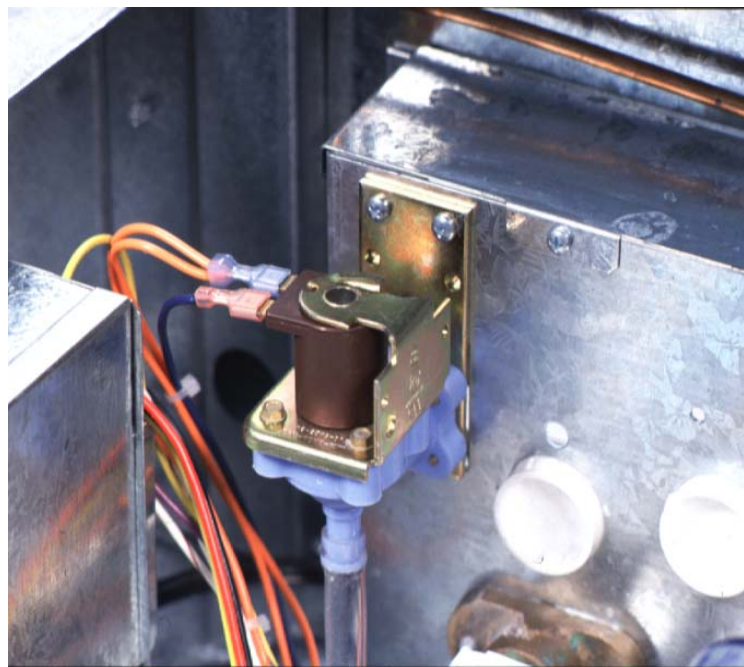


- Water Cooled Chassis

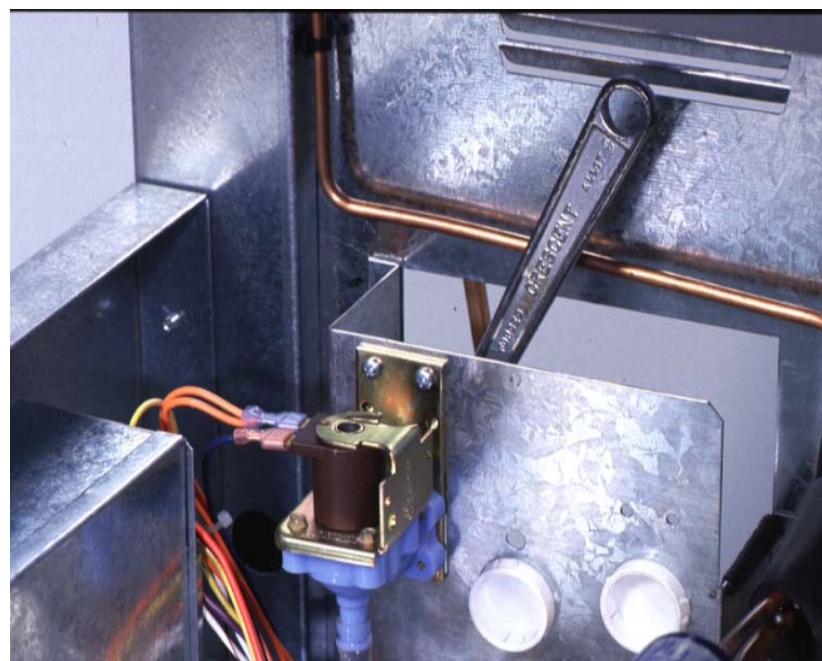


Tecumseh Compressor  
for both Air and Water Cooled





Water Valve Mounted to Recessed Utility Box

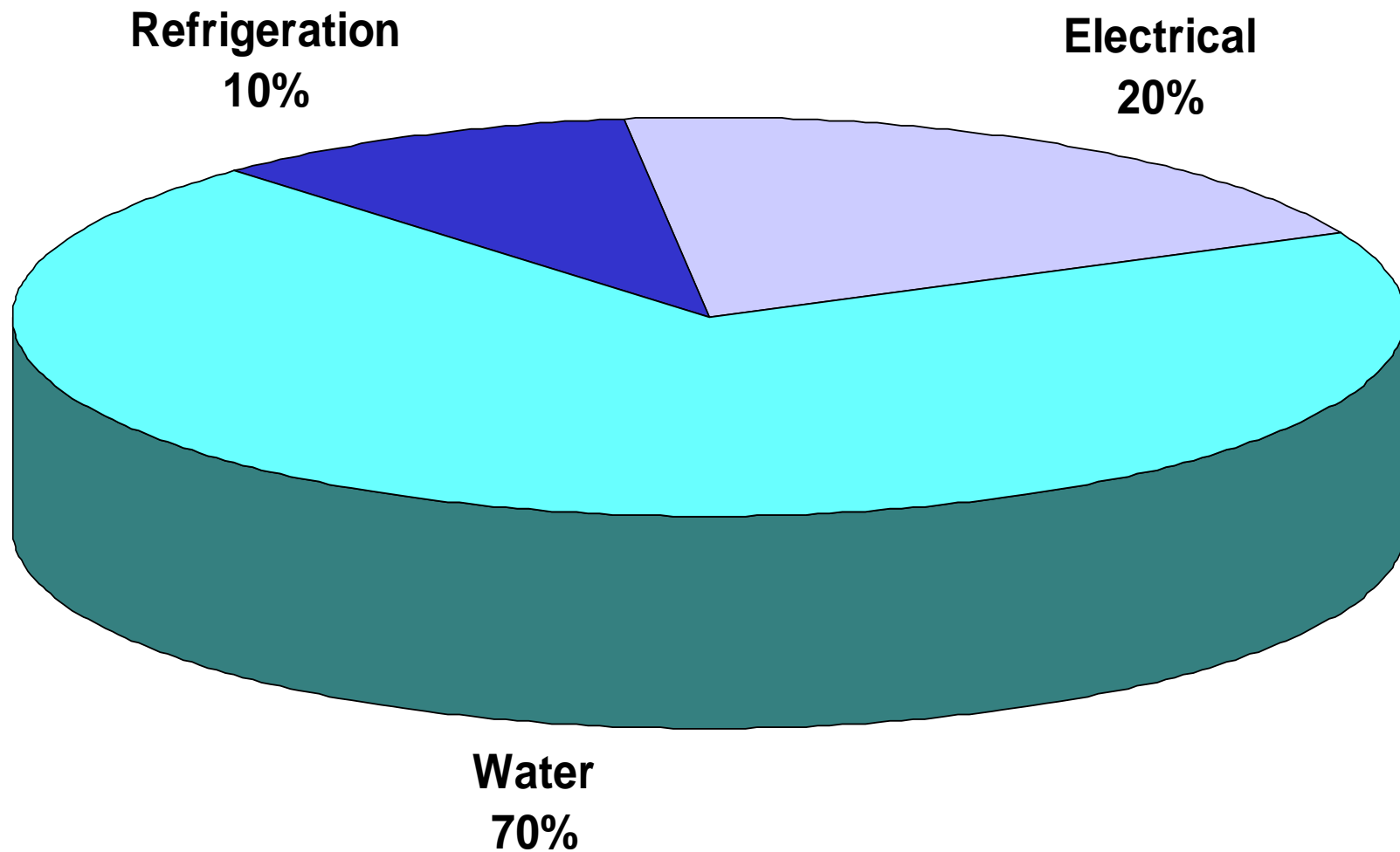


Top of Box May be Removed to Disconnect Water Inlet Line

- Compressor Relay
- Capacitors
- Transformer
- Contactor
- Box may be moved up for better access









- Unit shuts down & light glows
  - Restarts automatically after 50 minutes
    - Shuts down again if another malfunction occurs
    - Shuts down and needs manual restart if another (the third consecutive) occurs
  - Will auto-restart indefinitely if shut down for lack of water
  - Two consecutive maximum harvest cycles will cause a shut-down

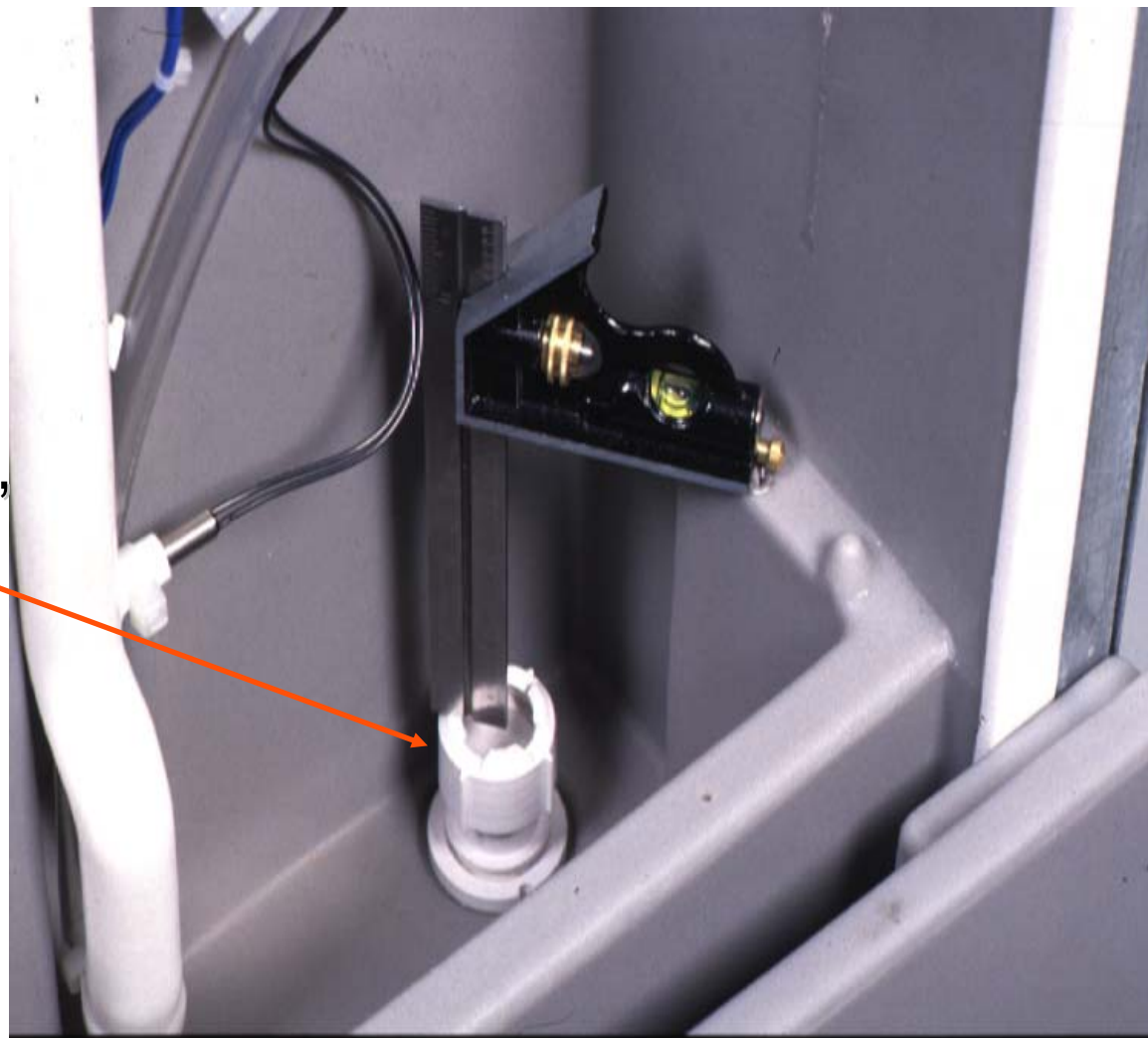
- Water Diagnostic Light Blinks Once and Repeats
  - Check Water Pump & Hose



- Water Diagnostic Light Blinks Twice and Repeats
  - Check For Slow/No Water Fill
    - Dirty Water Filter
    - No/Low Pressure
    - Standpipe too low



Standpipe Height  
is Critical  
Must be  $3 \text{ \& } 27/32''$   
From Top of  
Standpipe To  
Nearest Ledge



- Water Diagnostic Light is ON all the time - Does NOT blink
  - Check for water valve leaking thru rapidly



- Refrigeration Diagnostic Light Blinks Once and Repeats
  - Indicates Maximum Harvest Time Needed to Release Ice



- Refrigeration Diagnostic Light Blinks Twice and Repeats
  - Indicates That NO Ice Was Harvested
  - May be an Ice Level Control Problem



- Check Ice Level Controls
  - Leave Hood ON
  - Block Ice Level Controls and Check Bin Full Light
    - Light should be ON
    - If not, unplug #4 on the controller & jump the pins together
      - Light should blink
      - If it does, the controller is OK, but the ice level controls must be replaced





- Refrigeration Diagnostic Light Blinks 3 Times and Repeats
  - Indicates High Discharge Temperature



- Refrigeration Diagnostic Light Is ON all the Time, Does NOT Blink
  - Indicates Either a Maximum Length Freeze Cycle or
  - Low Discharge Temperature



- Both Diagnostic Lights are On
  - Indicates Thermistors are unplugged or not working

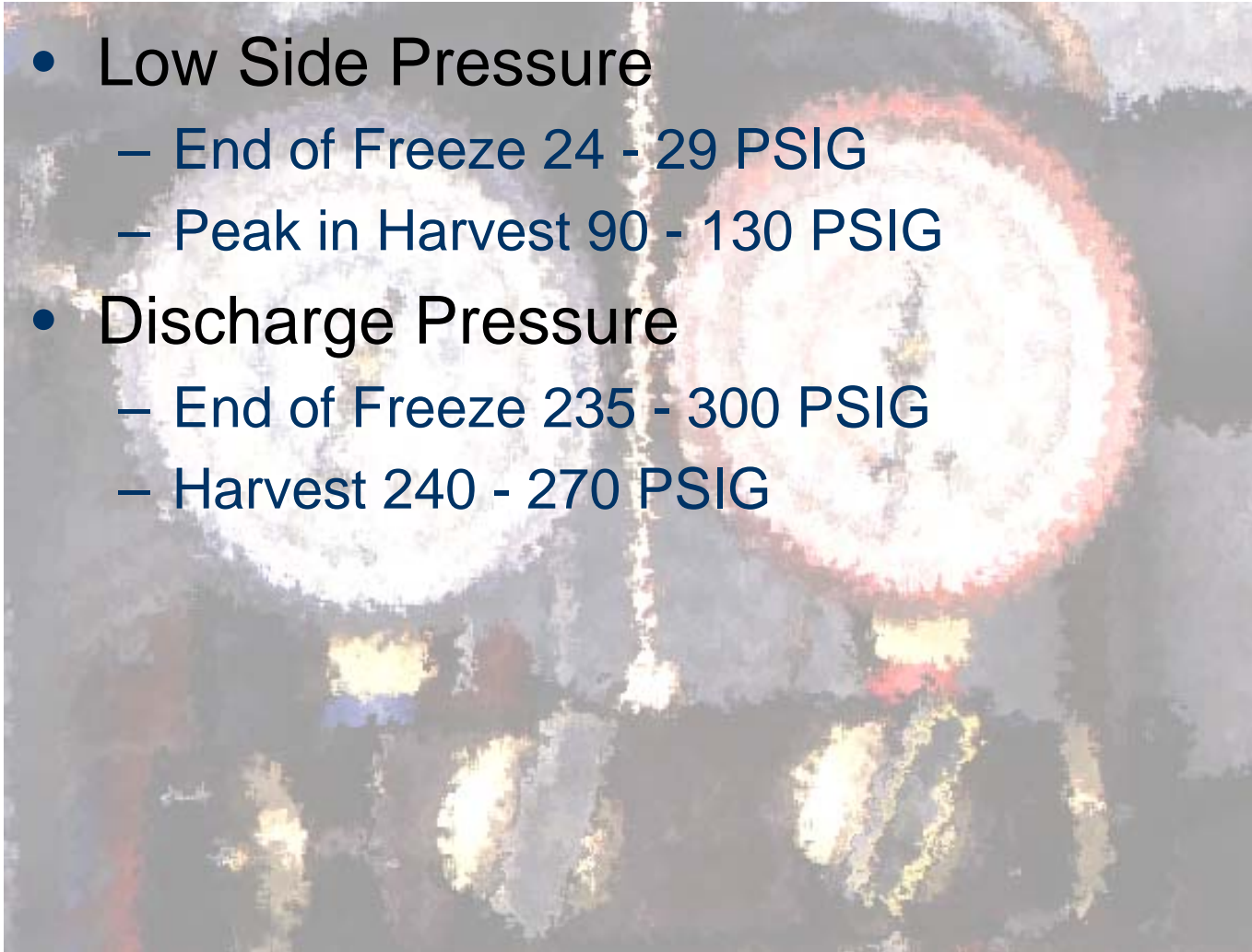


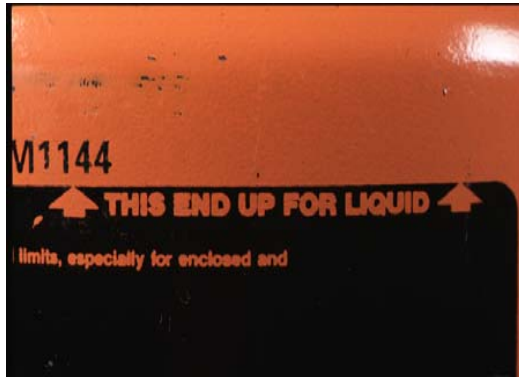
- Air Cooled
  - One fan not working causes low capacity
  - Dirty air filter can result in refrigeration diagnostic light on steady
- Compressor
  - Overheating compressor can result in refrigeration diagnostic light on steady
    - Most likely from dirty air filter

- Water Cooled
  - Water interruption causes compressor to shut off - automatic reset HPC
  - Control system keeps going
  - When water is restored, compressor re-starts
    - But maximum freeze time may have been exceeded

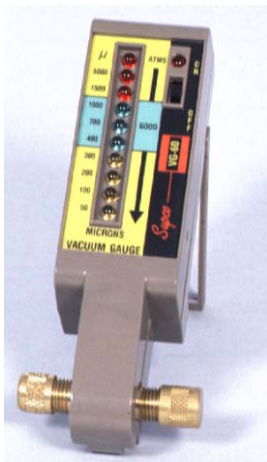
- Hot Gas Valve
  - If it leaks thru, will be hot on both sides during freeze
  - If it will not open, frost will be on evaporator tubing during harvest
- TXV
  - Restricted valve = high superheat
  - No metering = low superheat

- Low Side Pressure
  - End of Freeze 24 - 29 PSIG
  - Peak in Harvest 90 - 130 PSIG
- Discharge Pressure
  - End of Freeze 235 - 300 PSIG
  - Harvest 240 - 270 PSIG





Liquid Charge



Evacuate to 300 microns

## R-404A



Weigh In Charge



Use HFC Leak Detectors



Use Nitrogen Purge



- CM<sup>3</sup> technology under-the-counter
  - No altitude or seasonal adjustments
- SCE serviceability
  - Cabinet removable while unit is installed
  - Cabinet is non-rusting polyethylene
- Air flow in and out the front
  - May be built-in at the top and sides