

ScotsmanBrilliance™

Technical Training-Cubers



Major Topics

- Overview
- Installation
- Start Up
- Sequence of Operation
- Maintenance
- Diagnostics
- Service Procedures



50 lb Models

- Two Base Models
 - Gravity Drain
 - Pump Drain
- 15" wide
- 50 lb capacity
 - 50# Production
 - 26# Storage
- Stainless cabinet with unfinished front or with a SS door (-1SS)



30 lb Models

- Two Base Models
 - Gravity Drain
 - Pump Drain
- 15" wide
- Capacity
 - 30# Production
 - 26# Storage
- Stainless Cabinet with unfinished front only

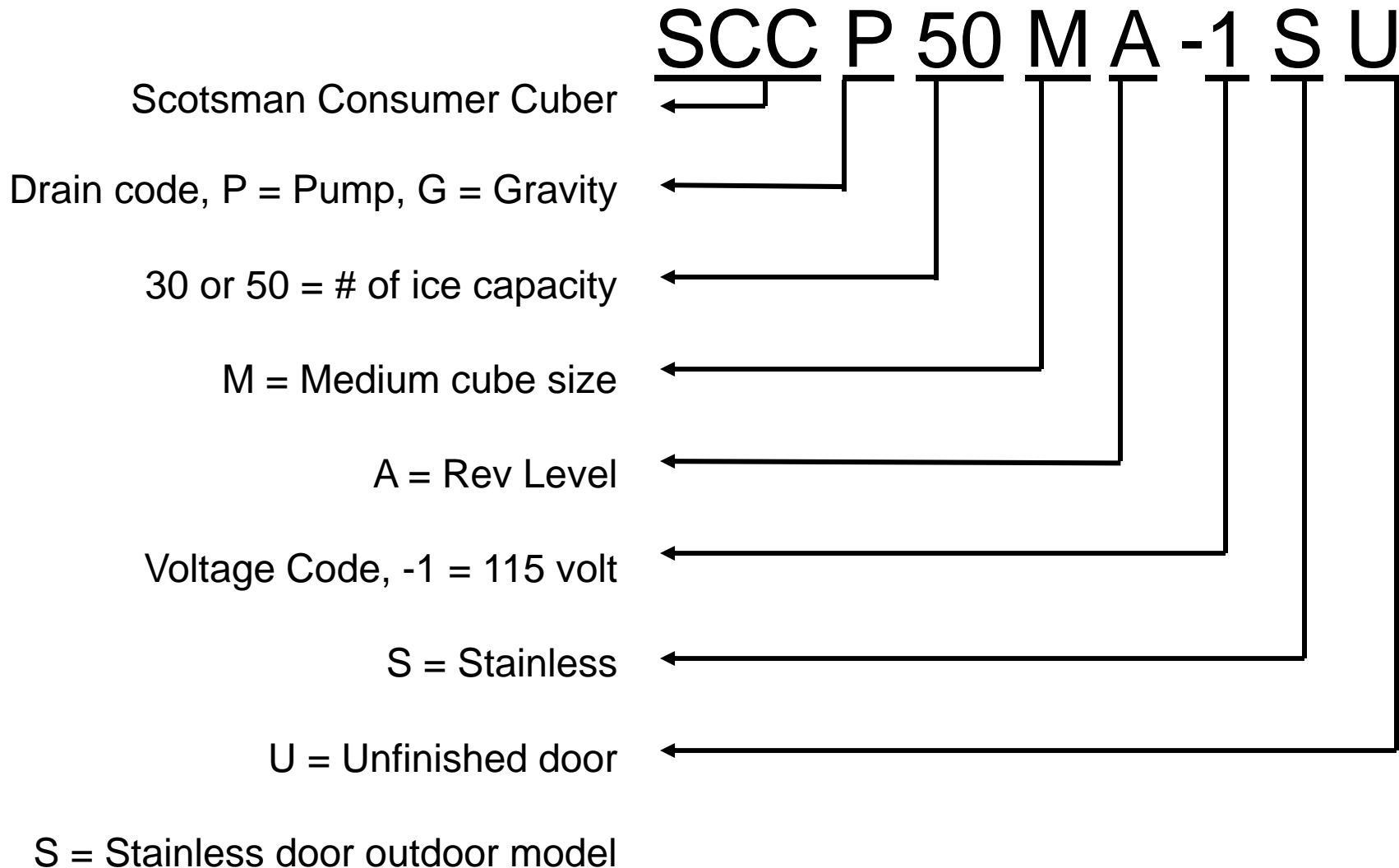


Door Finish Details

- All indoor models shipped with unfinished door
 - Outdoor model ships with stainless steel door
- Available door panel kits
 - KDFR allows use of DCE33 custom panel

Kit	Panel Finish	Handle Finish
KDFW	White	White
KDFWS	White	Stainless Steel
KDFB	Black	Black
KDFBS	Black	Stainless Steel
KDFS	Stainless Steel	Stainless Steel

Model Numbers



Installation

- Confirm / Reverse door swing
- Assemble door panel to door
 - Scotsman kit
 - Custom door
 - Attach panel to door with screws
 - Install hinge mount covers
 - Install hinge covers
 - Install hinge pin – if need to limit door opening to 90 degrees

Reverse Door Swing

- Remove hinge covers
- Loosen the screw on the keyhole slot, remove the other
- Pull door from unit
- Switch hinges on door



Reverse Door Swing

- Remove and replace lower door bracket
 - New brackets shipped loose inside the bin (wrapped in bubble wrap)



Reverse Door Swing

- Remove top panel
- Remove and replace top bracket



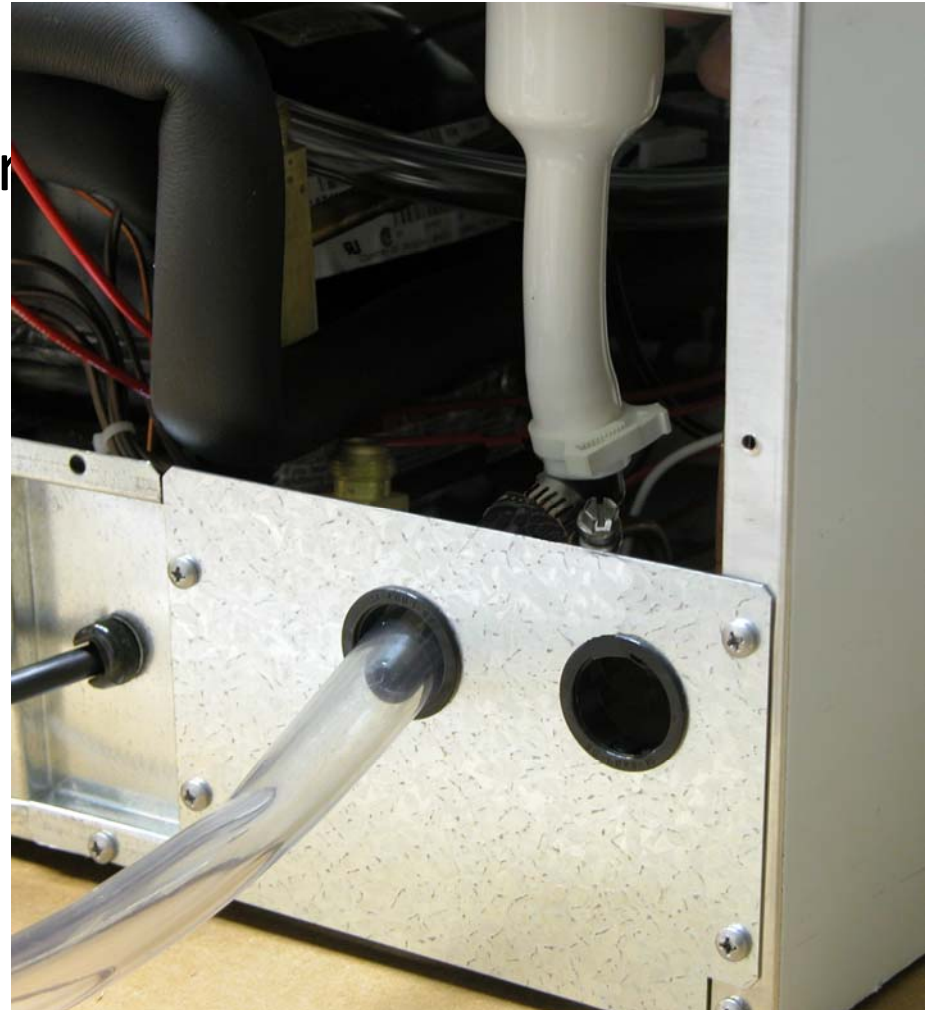
Installation Prep

- Remove front service panel
- If needed, remove kickplate



Installation – Free Standing Gravity Drain

- Route water supply tubing (copper, SS flex or PVC flex) to inlet water solenoid valve
- Attach drain tubing (vinyl or rubber) to bin drain hose
 - Elbow and hose clamps
- Route drain tubing to building drain



Installation – Built In Gravity Drain

- Plan the installation for machine removal
 - Coil of water supply tubing
 - Arrange the drain tubing so it does not kink when the machine is pushed into place
 - Recommended drain tube size is 5/8" ID, 7/8" OD plastic hose
 - Will connect to elbow on machine drain
 - Use 2-3 foot section of 5/8" OD copper to guide drain tube into cabinet while pushing unit back
 - Reach back to insert elbow into hose, secure with clamp

Installation – Built In Pump Drain

- Remove back panel
- Route water supply tubing to inlet water connection on solenoid valve
- Route drain hose to building drain



Water Supply

Route Water
Supply Tubing

(20 to 80 psi)

1/4" Compression
Fitting



Door Panel

- Units are shipped without door covers
 - Use White, Black or Stainless Scotsman panel kits
 - Hardware kits shipped in bin include hole covers
 - Make and attach a custom door panel



Operation – Initial Start Up

- Remove shipping materials
- Connect water
- Check for leaks
- Connect power
- 50 lb: Push and release the On / Off button
- 30 lb: Move rocker switch to ON



50 lb Sequence of Operation – Start Up

- Inlet water solenoid valve opens to fill the reservoir
- Hot gas valve opens to equalize the system
- Compressor, fan and pump start
- Hot gas valve closes, freeze cycle begins
- Freeze cycle continues until evaporator temperature reaches a preset point - 0, which triggers a 10 minute (default) timer
- In 10 minutes the Harvest cycle begins

30 lb Sequence of Operation – Start Up

- Inlet water solenoid valve opens to fill the reservoir and hot gas valve & Compressor energize to initiate harvest cycle
- After 170 seconds fan and pump start and water valve & hot gas valve shut off
- Freeze cycle continues until evaporator temperature reaches a preset point - 0, which triggers a 6 minute (default) solid state timer
- In 10 minutes the Harvest cycle begins

50 lb Sequence of Operation - Harvest

- Hot gas valve opens
- Pump and Fan motor stop
- Inlet water valve opens and refills the reservoir
 - Fill time varies with evaporator temperature
 - Timed during a power restart or in clean cycle
- Harvest continues
 - When the evaporator temperature warms to a preset point – 50, a 20 second (default) timer starts
 - When the time expires, harvest ends

30 lb Sequence of Operation - Harvest

- Hot gas valve opens
- Pump and Fan motor stop
- Inlet water valve opens and refills the reservoir
 - Fill time and Harvest time controlled by timer
 - When the time expires (approx 3 min), harvest ends

Harvest Details

- SCC50: 24 individual cubes per cycle
- SCC30: 12 individual cubes per cycle
- DCE33: 8 individual cubes per cycle
- Hot gas defrost with a water assist
- Water flows onto top of evaporator platen to
 - Warm up the platen & obtain a faster harvest
 - Remove heat from the water for the next cycle which increases efficiency

50 lb Control System

- Electronic controller
 - 12 volt power supply
 - Evaporator thermistor
 - Water quality sensor
 - Bin thermostat
- Operates
 - Compressor
 - Pump
 - Fan motor
 - Hot gas valve coil
 - Inlet water solenoid valve coil
 - Bin light

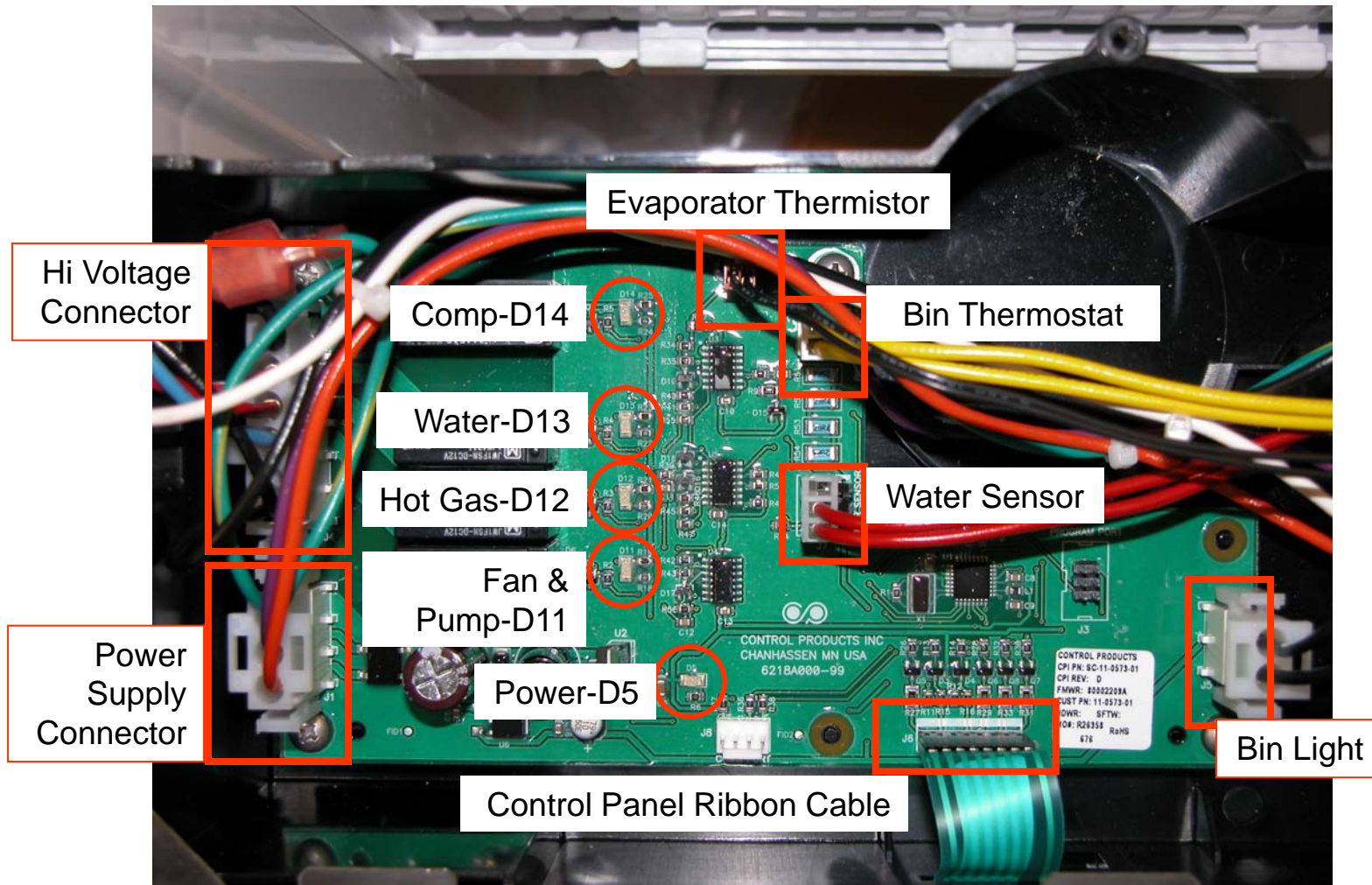
30 lb Control System

- Electro-mechanical components
 - On-Off switch
 - Bin thermostat
 - Cube size thermostat
- Electronic timer
 - Solid state
- Operates
 - Compressor
 - Pump
 - Fan motor
 - Hot gas valve coil
 - Inlet water solenoid valve coil

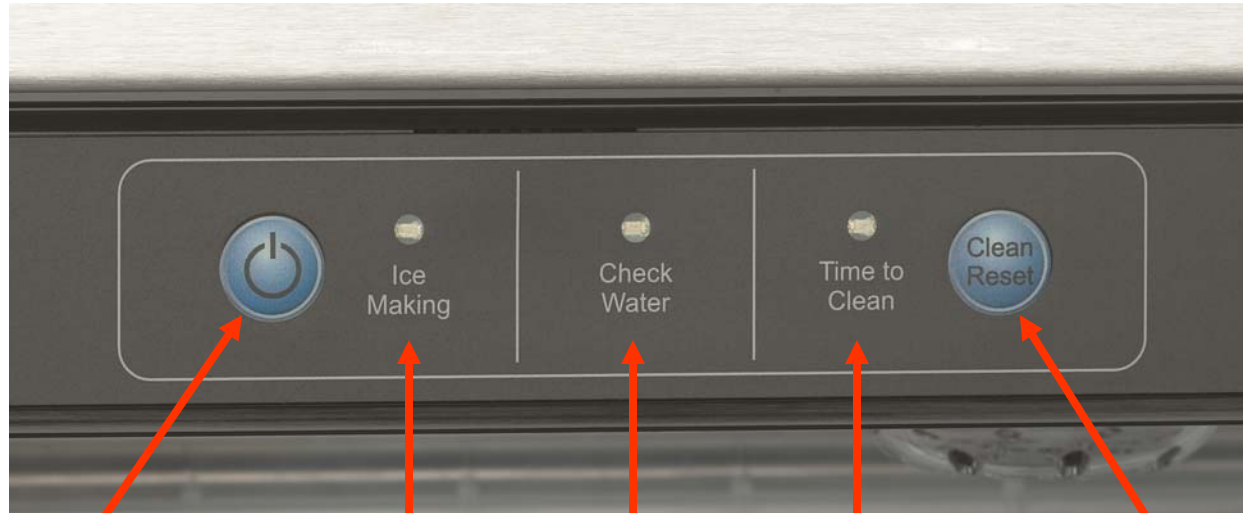
Mechanicals



50 lb Controller



50 lb Controls



On – Off Button

Green when set to ice making

Blinks **Red** if out of water

Yellow if its been 6 months since it was cleaned

Used in cleaning process

50 lb Control Operation – Check



- Red blinking light indicates a lack of water
- Water must fill reservoir within 2 minutes
- Unit automatically re-tries filling the reservoir every 20 minutes

50 lb Control Defaults

- Maximum freeze time: 60 minutes
 - Automatically harvests after 60 minutes of freeze
- Maximum harvest time: 6 Minutes
- Time between restarts: 4 minutes
- Power interruption restart:
 - Timed harvest cycle to clear ice

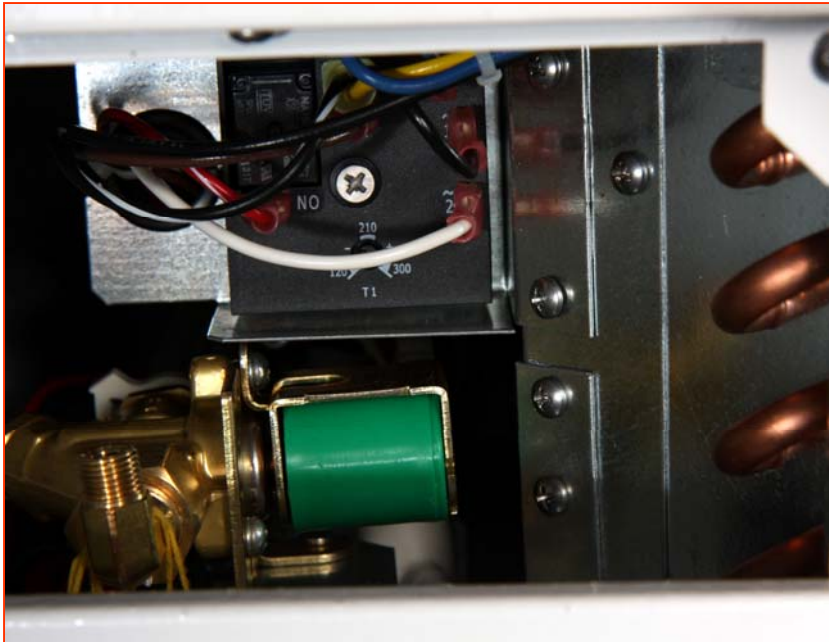
50 lb Control Details – Water Sense

- Water conductivity varies by mineral content
 - More minerals = more conductivity
- Control system senses conductivity, varies water use to rinse more water if there is high conductivity, reducing mineral build up potential
- System is able to sense very clean water, such as RO water to 10 microSiemens/cm of conductivity

50 lb Control Details – Ice Level

- Controlled by bin thermostat in cap tube / scoop holder
- When bin thermostat senses ice, contacts open, signaling controller to shut down
 - If suction line temperature is above preset point, unit shuts off
 - If suction line temperature is below preset point, unit operates until the end of the next harvest cycle, when it shuts off

30 lb Control System



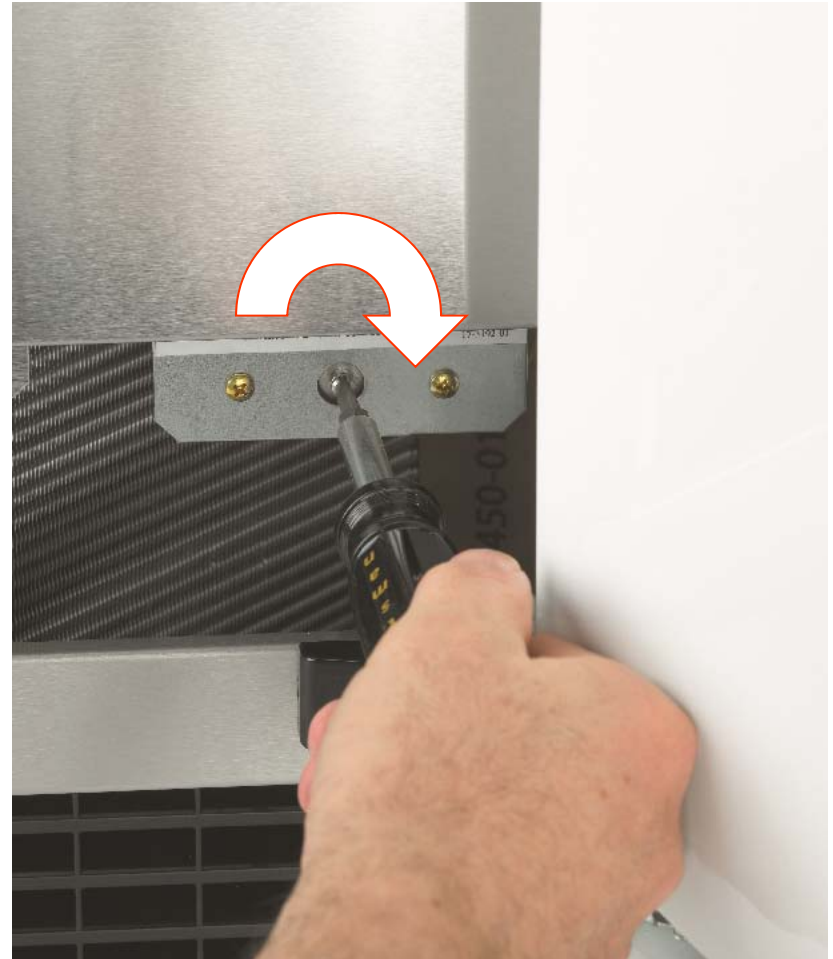
Harvest Timer



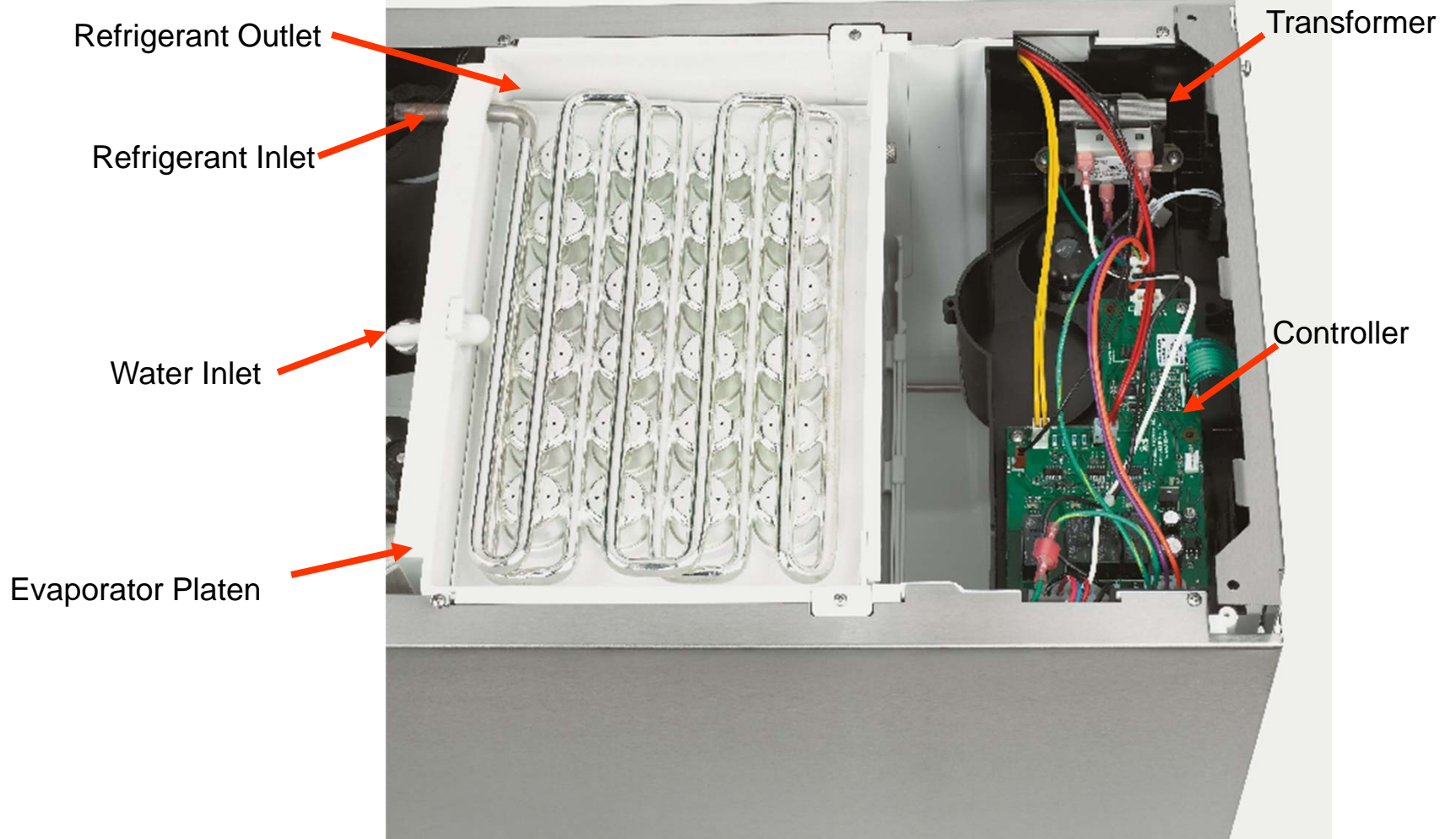
Bin Thermostat and Cube Size Thermostat

Bin Thermostat Adjustment - 50 lb

- Adjustment screw located behind cover
- Ambient compensation adjustment:
 - Rotate CW to raise ice level
 - Rotate CCW to lower ice level



50 lb Top View

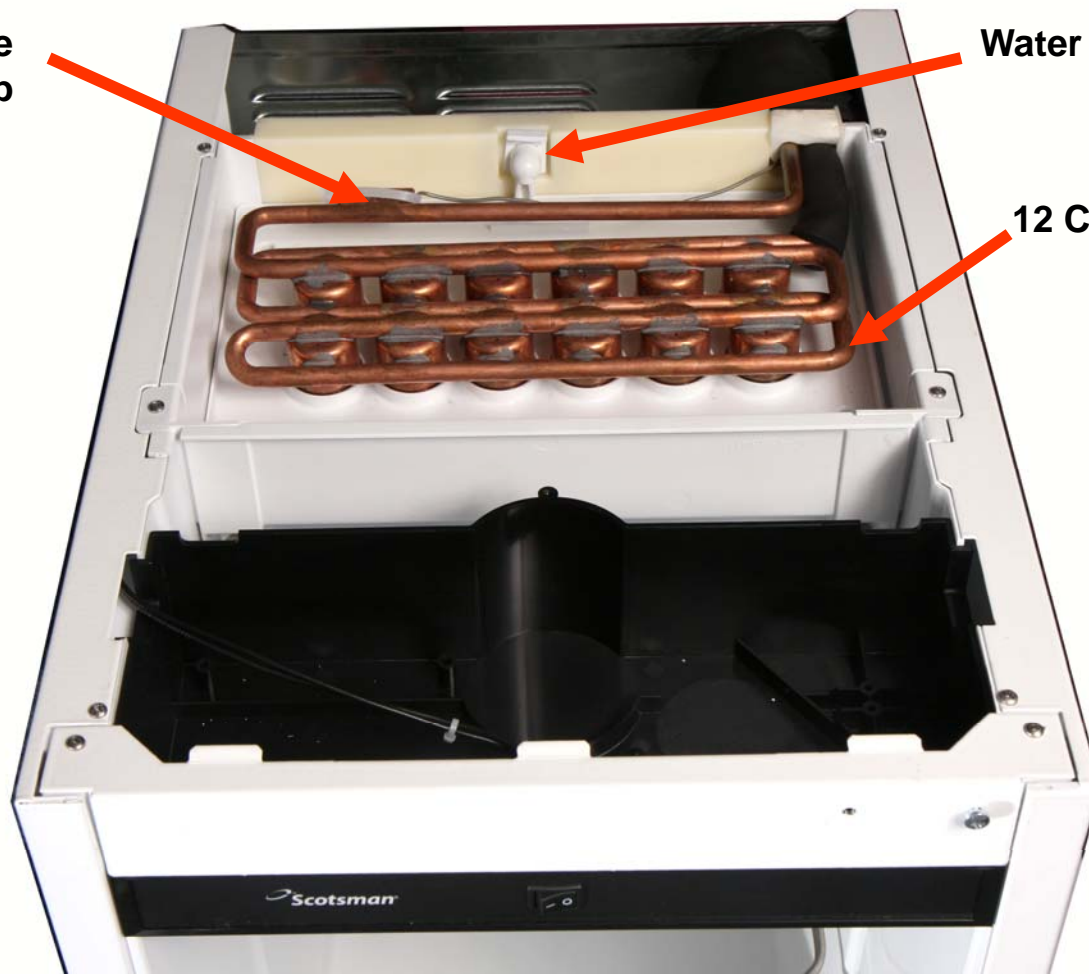


30 lb Top View

Cube Size
Thermostat Bulb

Water Inlet

12 Cup Platen



50 lb Mechanicals – Evaporator



- 24 copper cups

30 lb Mechanicals – Evaporator

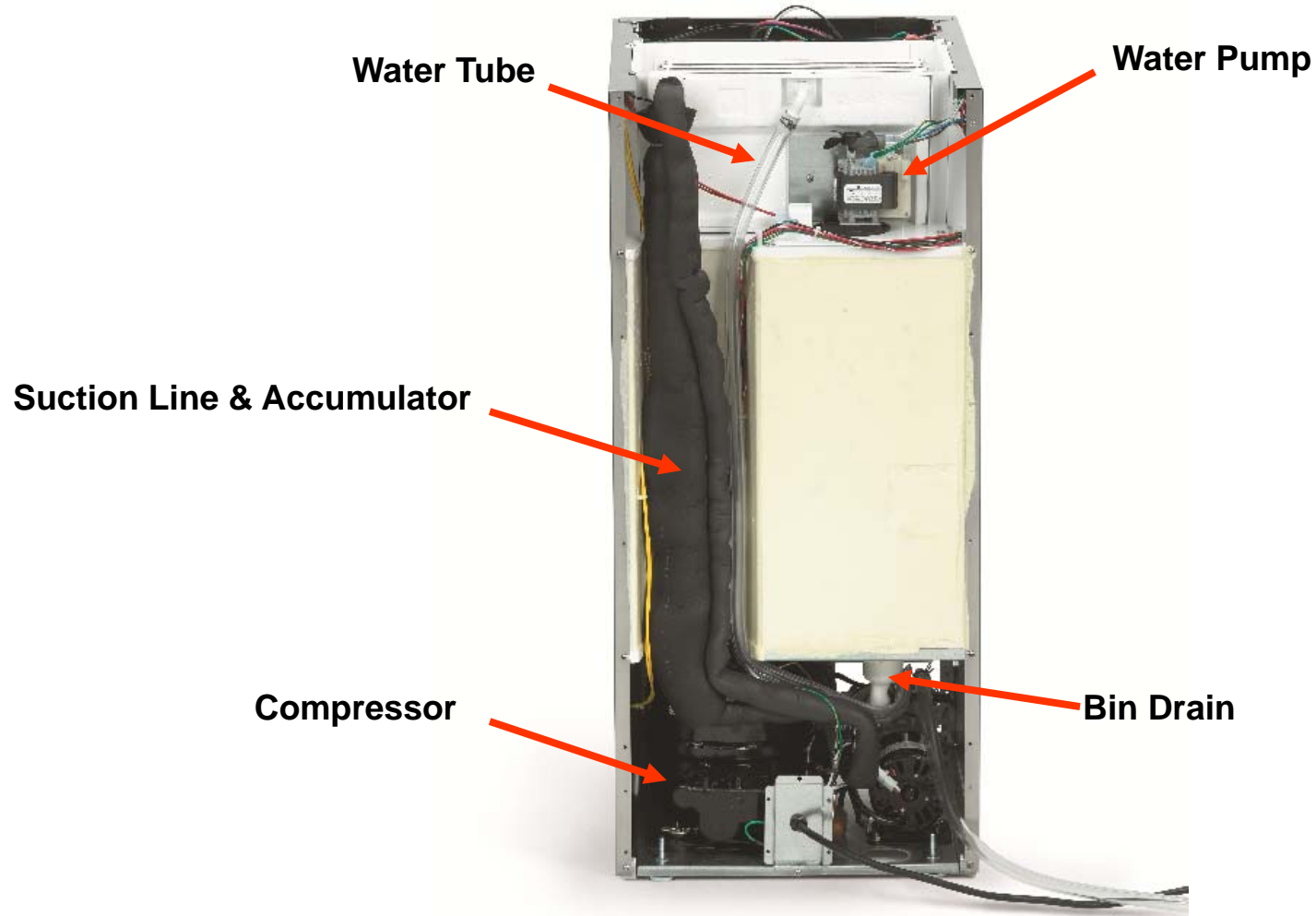


- 12 copper cups

Water Spray – 6 Jets



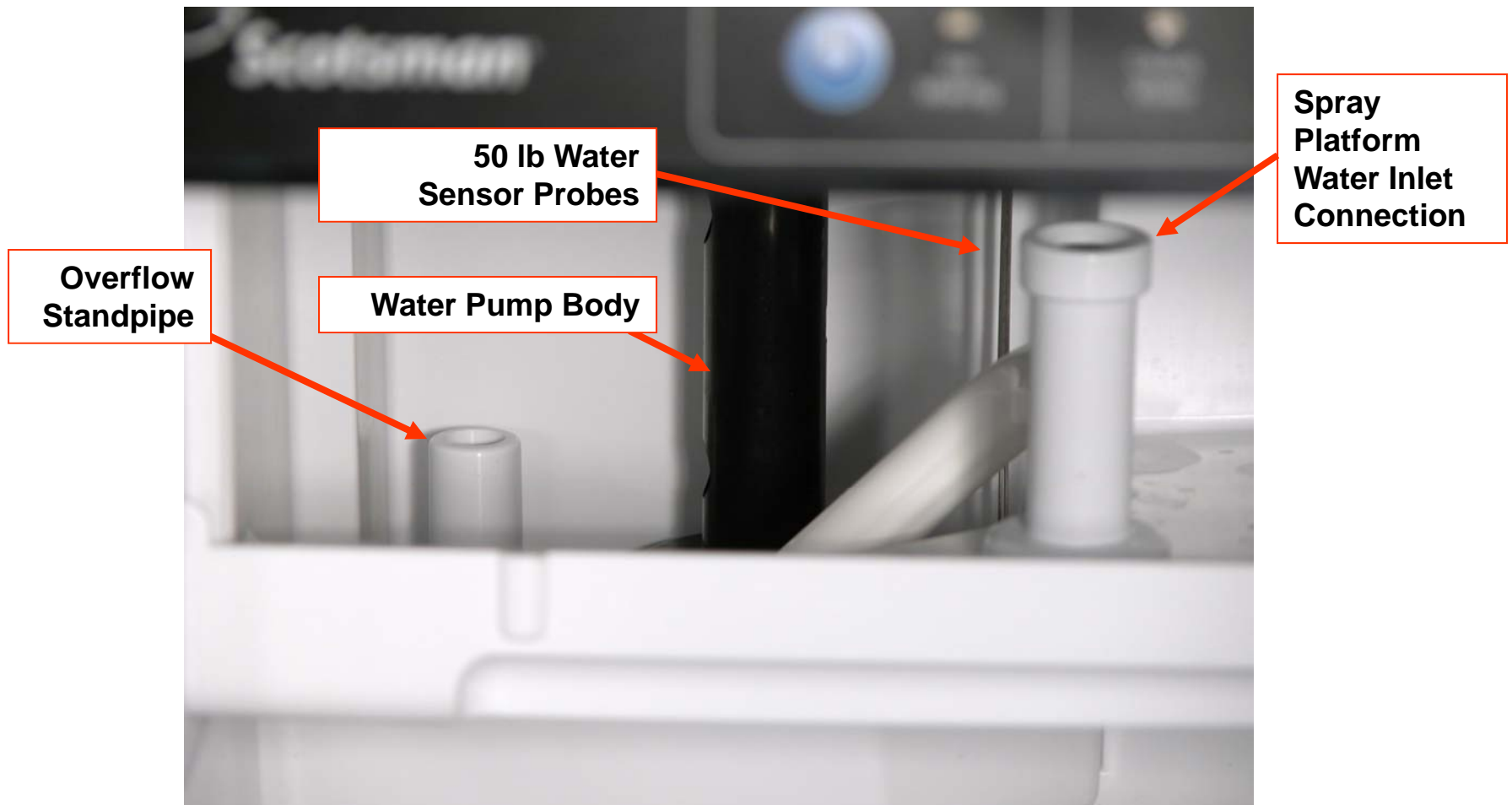
50 lb Back view



Mechanicals



Mechanicals – In Reservoir



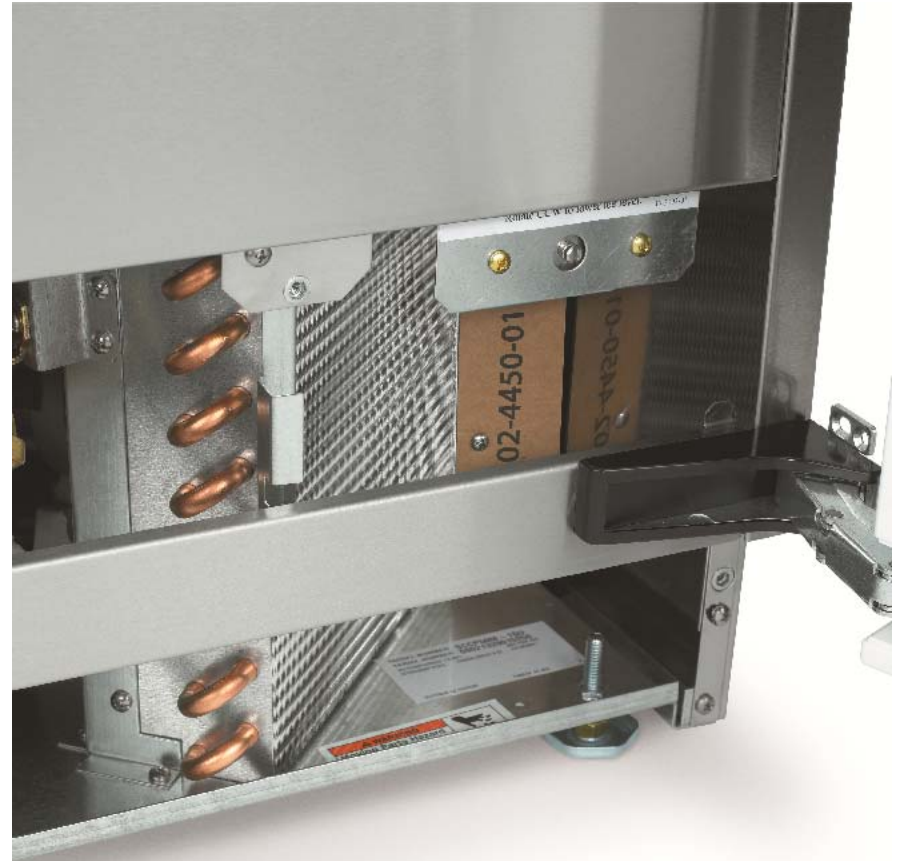
50 lb Control Operation – Time to Clean



- Glowing yellow light comes on after 6 months of power up time
- Cleared by going through the cleaning process or by pressing the clean reset button
 - Press and Hold the Clean button for 3 to 5 seconds

Maintenance

- Air cooled condenser
 - service frequently when pets are in the house
 - Remove service panel
 - Remove kickplate
 - Vacuum condenser



Maintenance

- Water System
 - Clean with scale remover
 - Check curtain
 - Check spray jet pattern
 - 6 jets
 - Platform lifts out



50 lb Maintenance – Scale Remover

- Remove all ice
- Push and hold the On/Off button in for 3 seconds until the green light goes out
- Press and HOLD the both the Clean-Reset and On/Off buttons for 5 seconds. The Time to Clean light will blink on and off.
- Pour in 8 ounces of Scotsman Scale Remover.
- Operate the machine for a half hour.
- Push and release the ON/OFF switch to start the rinsing process.
- Operate the machine for another half hour.
- Push and release ON/OFF to stop rinsing. Push ON/OFF to restart ice making.

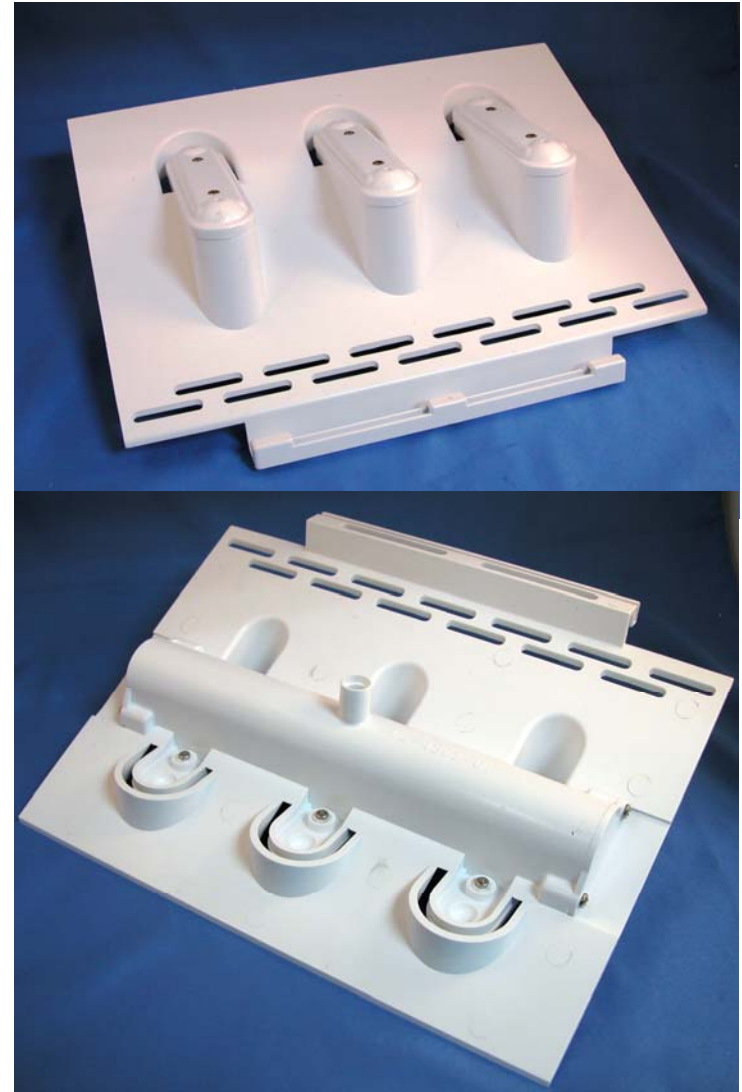
Maintenance

- Spray platform removable
 - Lift up to release platform from water inlet connection
 - Pull out



Maintenance

- Spray jet caps are removable – clean separately if needed
 - Remove spray platform
 - Remove nuts (7/32")
 - Pull jet caps off



Maintenance

- Clear nozzle of debris
- O-ring must be in correct position and undamaged



Maintenance

- Optional: drain reservoir
 - Remove cap on bottom of reservoir
 - Clean cap of debris
 - 30# & 50# caps ARE different!



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 when its needed
 - If an ingredient is missing or out of balance, performance will suffer – and you will be called!

50 lb Service Diagnosis – No Ice

- No ice, check:
 - Power to unit – open door, bin light on?
 - Switched off – push & release ON/OFF button
 - Bin thermostat – contacts open?
 - Water in reservoir – water light blinking?
 - If reservoir is empty, check water supply
 - If there is water to the unit, check inlet water solenoid valve

30 lb Service Diagnosis – No Ice

- No ice, check:
 - Power to unit – plugged in?
 - Switched off – check ON/OFF switch
 - Bin thermostat – contacts open?
 - Pump model – pressure switch safety contacts open?

50 lb Service Diagnosis – No Ice

- No ice, water in reservoir, but no spray
 - Check water pump
- No ice, water in reservoir, sprays, ice forms but harvest cycle does not start
 - Check evaporator thermistor
 - Use ohmmeter, check resistance for the sensor's temperature
 - Measure suction line temperature closest to sensor
 - Check chart for proper Ohm reading at that temp
 - Example 1° F = 82661 ohms – or use ice bath. 30 to 32K ohms at 32 degrees F.

30 lb Service Diagnosis – No Ice

- No ice, water in reservoir, but no spray
 - Check water pump
- No ice, water in reservoir, sprays, ice forms but harvest cycle does not start
 - Check cube size thermostat
 - Thermostat contacts close on temperature fall

Service Diagnosis – Poor Cubes

- Makes ice, but cubes are mal-formed
 - Check for clogged / restricted spray jets
 - Check if running out of water before the end of the freeze cycle
 - Check for water leak
 - Clean as required

Service Diagnosis – Low Capacity

- Makes ice, but customer indicates low capacity
 - Check cycle time – 50 lb times:
 - 70 air, 50 water cycle time is about 20 minutes
 - 90 air, 70 water cycle time is about 28 minutes
 - 100 air, 100 water cycle time is about 45 minutes
 - If cycle time is long look for problem getting rid of the heat or too much heat load
 - Check drain
 - Restricted drain will cause water to back up into the storage bin and rapidly melt ice

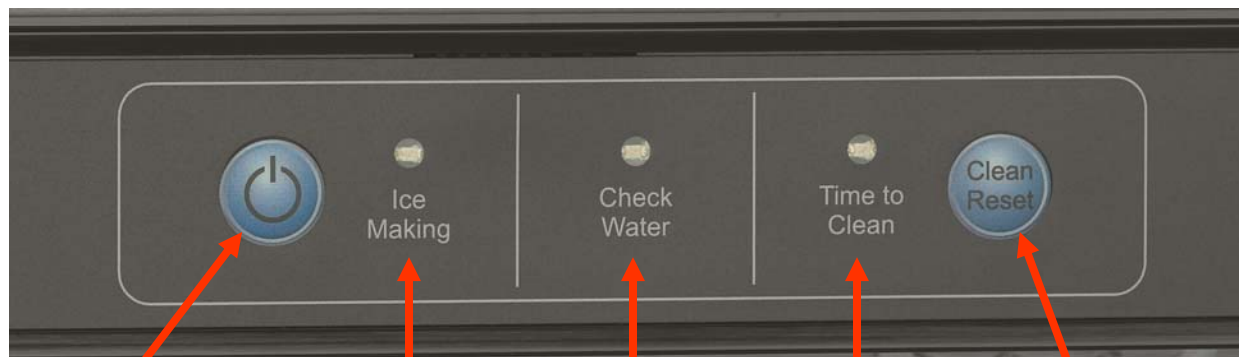
50 lb Service Diagnosis – Low Capacity

- Makes ice, some cubes are malformed
 - Check cycle time
 - 21+ minute freeze
 - 4-5 minute harvest
 - Cubes fully formed in evaporator, but are malformed when harvested
 - All the above indicates a low refrigerant charge

Service Diagnosis – Cube Size

- Makes ice, but cubes are shells
 - Check for shortage of water
 - If water supply is adequate, adjust cube size by changing freeze time
- Makes ice, but cubes are too large
 - Freeze cycle is too long
 - Adjust cube size
 - 50 lb: Change the freeze time
 - 30 lb: Adjust cube size control cut in

50 lb Control Adjustments – Cube Size



1. Shut unit off

3. Push and release to change to next level repeat as needed

5. Push and release to resume ice making. Be sure restart is occurring.

Minutes	Ice making	Check water	Time to clean
Default	off	off	Off
+1	on	off	Off
+2	off	on	Off
+3	off	off	On
+4	on	on	On
-1	flash	off	Off
-2	off	flash	Off
-3	off	off	Flash
-4	flash	flash	flash

2. Hold in 5 sec or until Yellow light goes out

4. Push and release to confirm the displayed setting

30 lb Control Adjustments – Cube Size



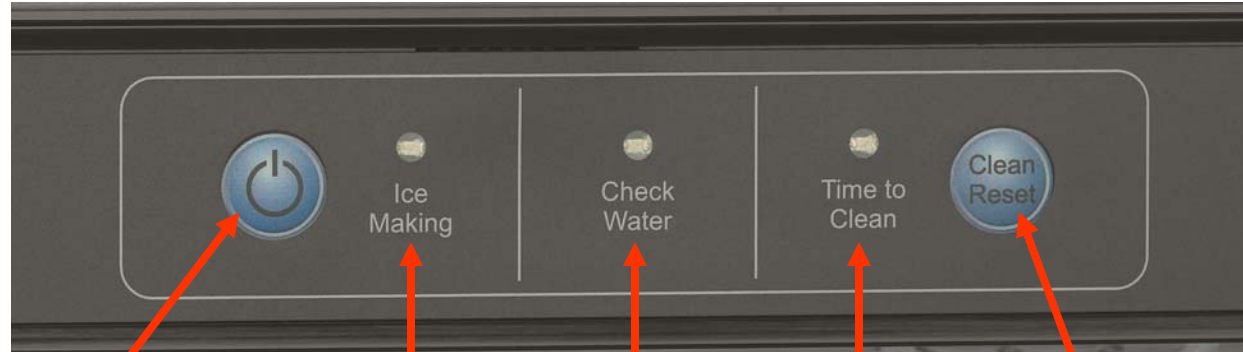
Service Diagnosis – Freeze Up

- No ice, freezes, harvest begins but evaporator does not defrost
 - Hot gas valve not opening
 - Check coil, replace if open
 - Check voltage to coil, if 115 volts, and coil is not open, hot gas valve is stuck and must be replaced.

Service Diagnosis – Freeze Up

- Freezes ice, harvest begins, fan motor stops, pump stops, water valve opens, hot gas valve opens but will not harvest all cubes
 - Connected to very cold water
 - Harvest time set too short
 - Adjust harvest time

50 lb Control Adjustments – Harvest Time

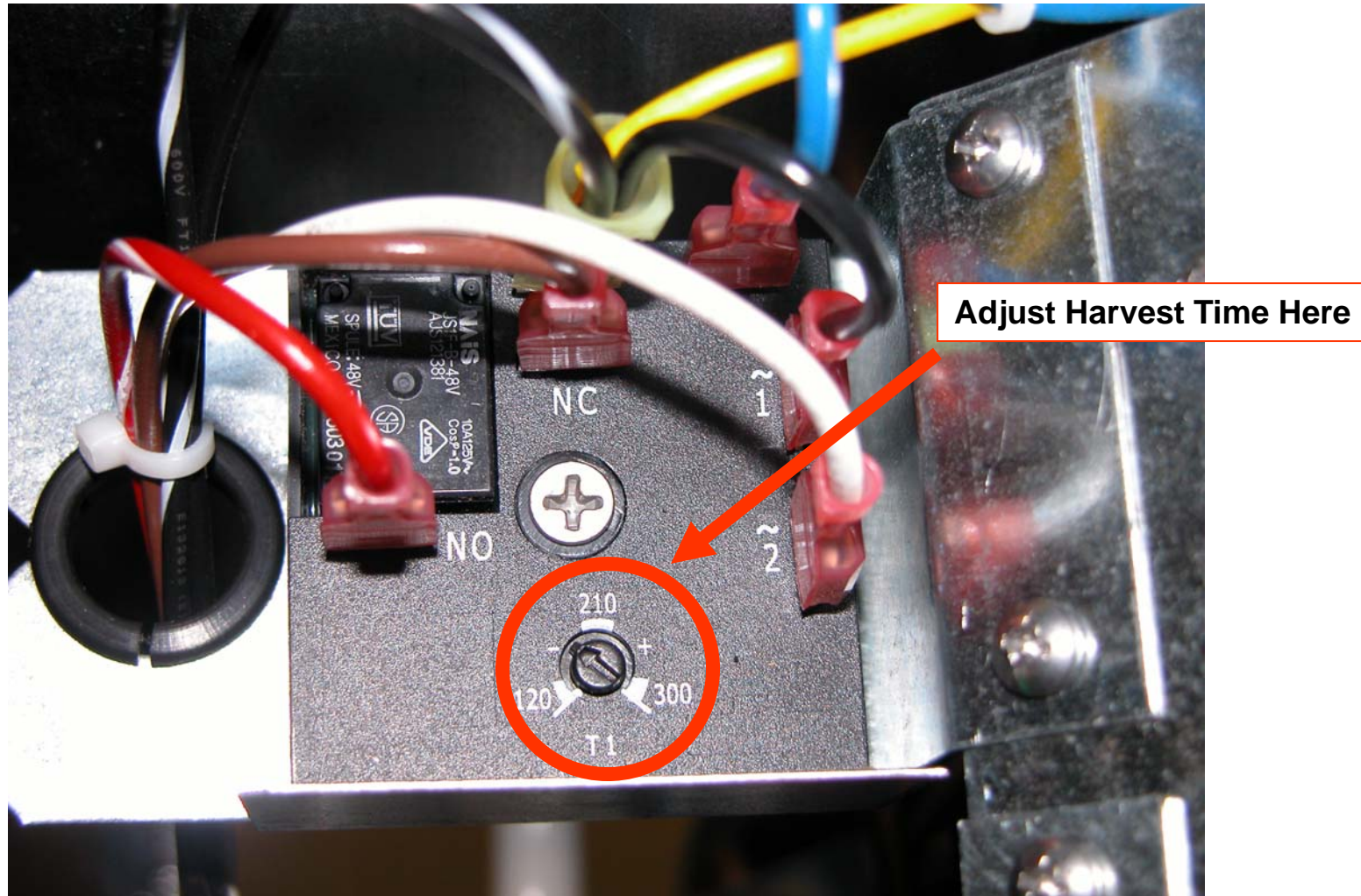


1. Shut unit off
2. Hold in until blue light goes out
4. Push and release to confirm the displayed setting
5. Push and release to resume ice making

Seconds	Ice making	Check water	Time to clean
Default	Off	Off	Off
+10	On	Off	Off
+20	Off	On	Off
+30	Off	Off	On
+40	On	On	On
-10	Flash	Off	Off
-20	Off	Flash	Off
-30	Off	Off	Flash
-40	Flash	Flash	Flash

3. Push and release to change to next level

30 lb Control Adjustments – Harvest Time



50 lb Service Diagnosis – Clean Light

- Yellow Clean light is on
 - It's been a long time since it was cleaned
 - Clean the machine per the published method, the light will go out
 - Or
 - Advise user to press and hold the clean button for 3 seconds

50 lb Control Operation – Manual Harvest



1. Shut unit off

2. Push and Hold in for 5 seconds, then release.

3. Wait 5 - 20 seconds

4. Push and Hold in for 5 seconds, then release.

- All lights flash once.
- Ice Making Light switches ON
- The inlet water valve, hot gas valve and compressor will be on until harvest times out – 3 minutes.
- Machine shuts Off

Refrigeration System

- Normal Operating System
 - Suction pressure
 - Beginning freeze rapid pull down to: 20 PSIG
 - End of freeze: 1 - 2 PSIG
 - Harvest: increases from 30 to 55 PSIG
- Low charge
 - Suction pressure
 - Beginning freeze rapid pull down to: 10 PSIG
 - End of freeze – 2 – 3 PSIG
 - Harvest – slow increase from 25 to 40 PSIG

Service Access - Remove Cabinet

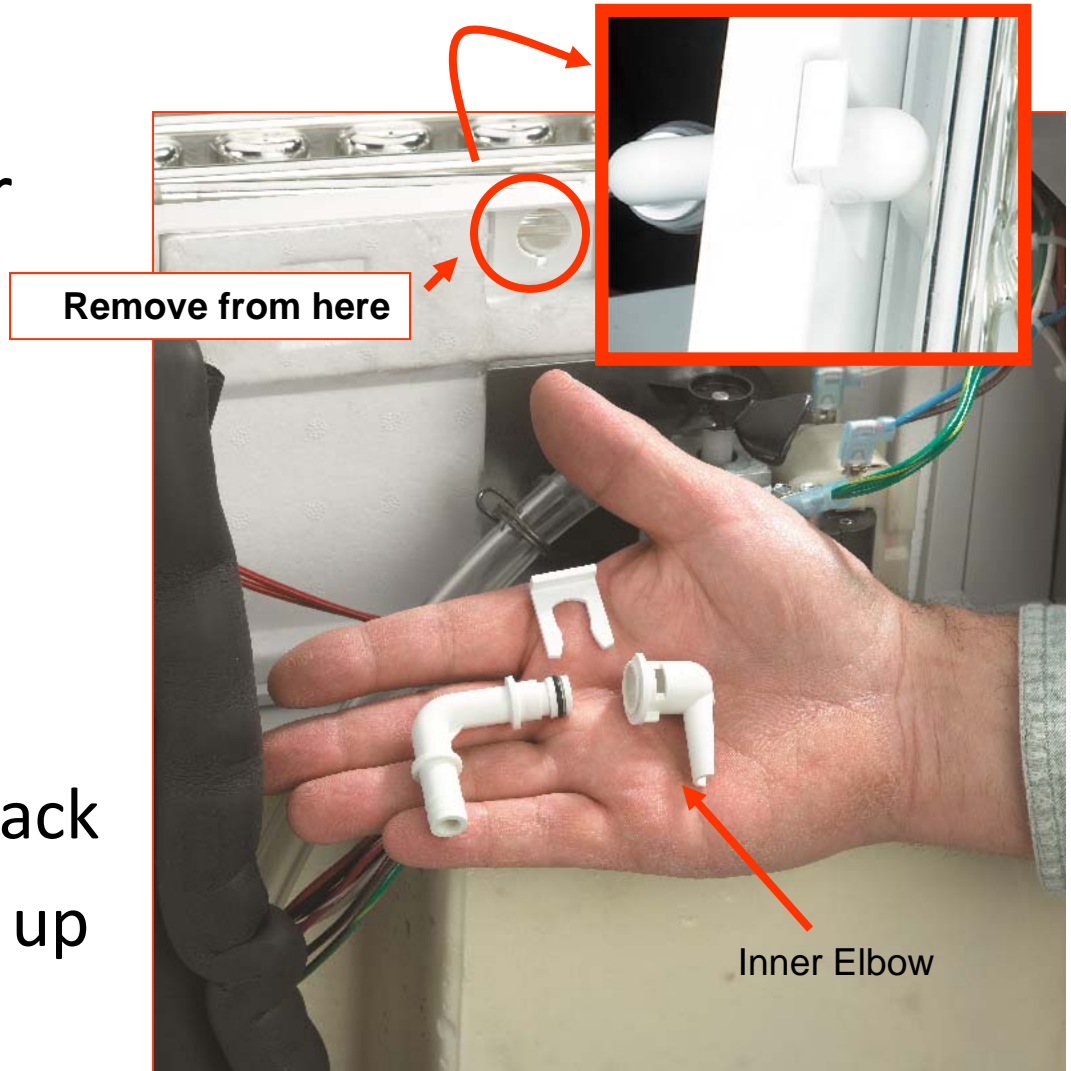
- Drain reservoir
- Disconnect water, power and drain
- Remove door-(if preferred)
- Remove back panel
- Remove top panel
- Remove control box cover
- 50 # only-Disconnect thermistor at controller, pull wire to back of unit
- Remove curtain and hanger

Thermistor
Connection



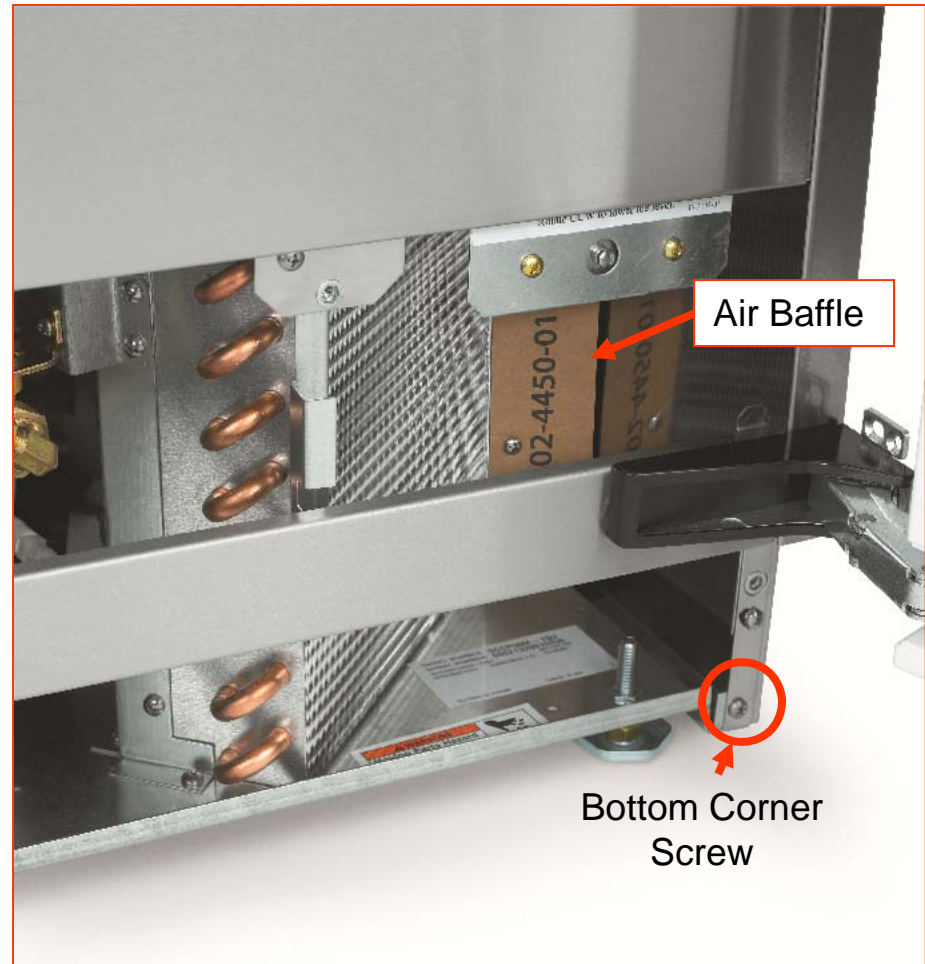
Service Access – Remove Cabinet

- Remove evaporator water inlet connection
 - Remove clip
 - Pull hose & elbow from inner elbow
 - Push inner elbow back
 - Rotate inner elbow up
 - Push out of wall



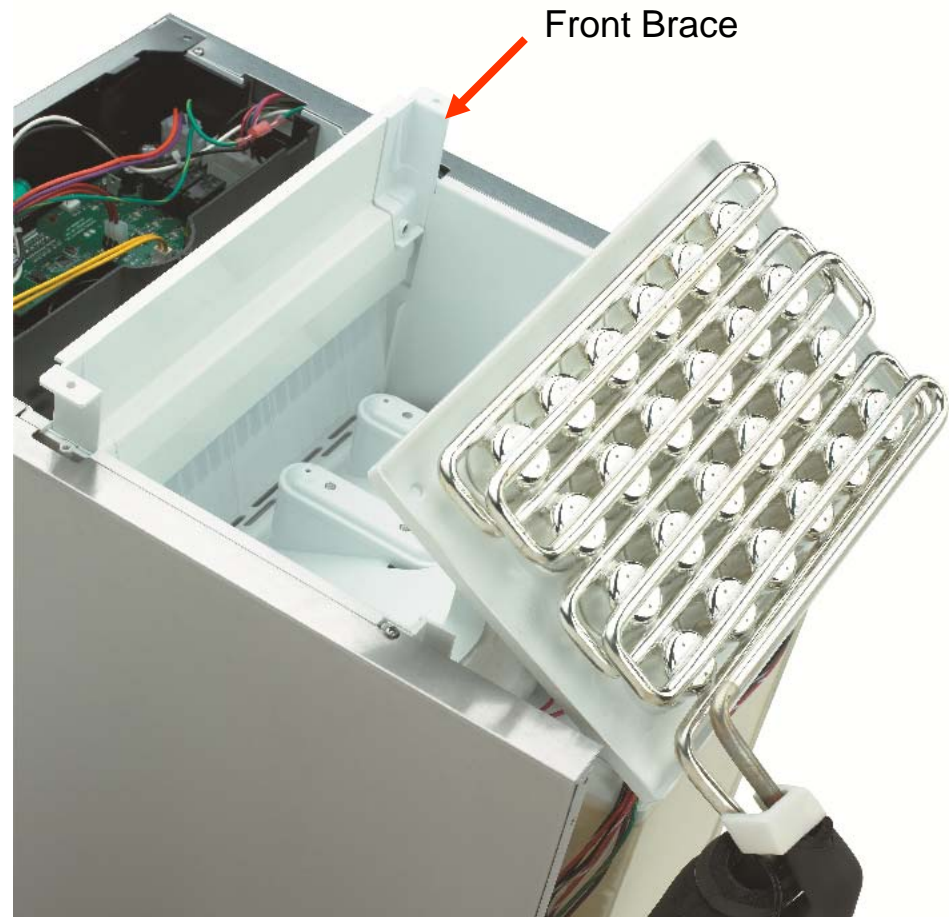
Service Access – Remove Cabinet

- Remove service panel
- Remove kickplate
- Remove 4 bottom corner screws



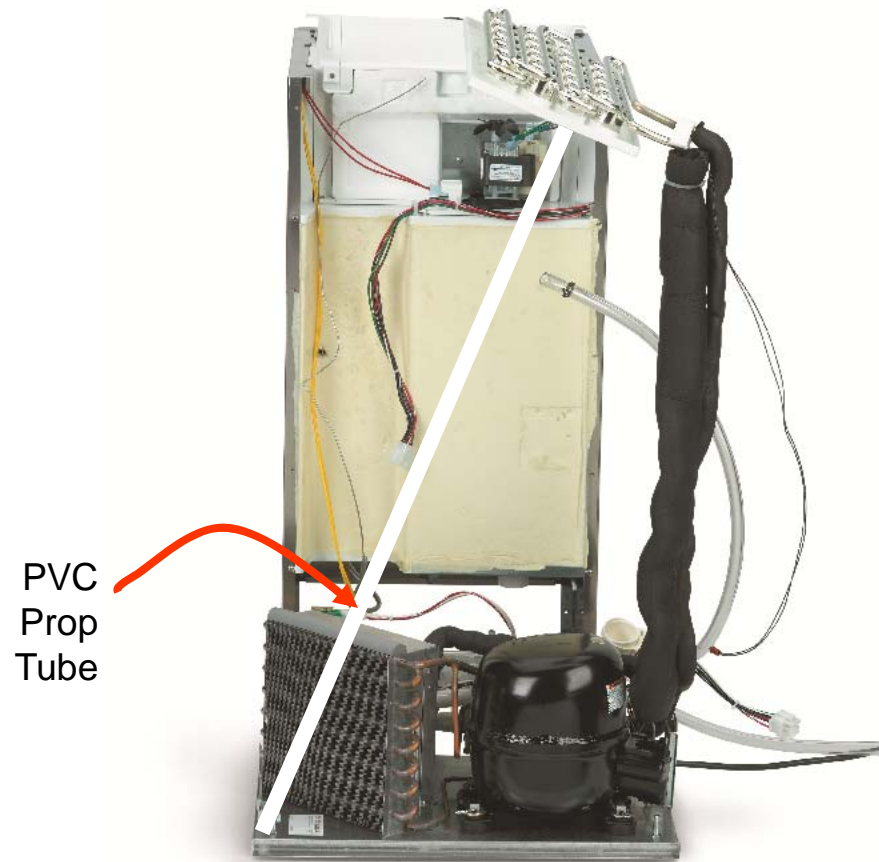
Service Access – Remove Cabinet

- Remove screws holding front braces
- Separate the high voltage wire harness connectors – located by suction line
- Tip evaporator & suction line assembly back enough to clear the cabinet-Be Careful!



Service – Remove Cabinet

- Lift cabinet off of base
 - Pump, bin stat and controller go with cabinet
 - Support evaporator while cabinet is off
 - Use 3 foot $\frac{3}{4}$ " PVC tube from evaporator cube cell to base



Thank you for your time and
continued support of Scotsman!

Let's take a 15 min break