

Technical Service Training

15" and 20" Undercounter Flaker and
Nugget Machines

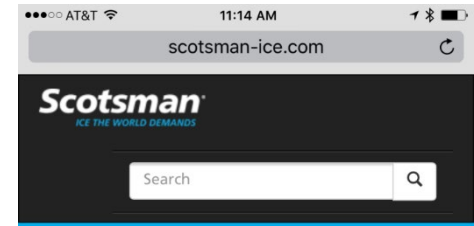
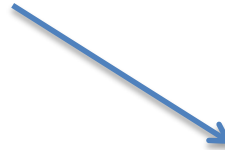
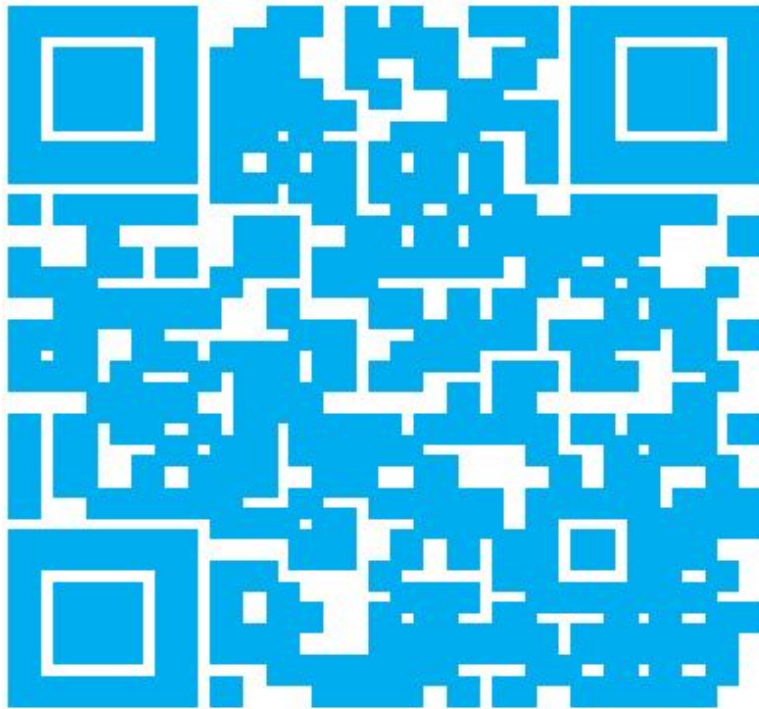
The Scotsman logo is a dark blue circle containing the word "Scotsman" in white, italicized, sans-serif font. The logo is positioned at the bottom center of the slide, overlapping a decorative border of blue ice cube outlines.

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Service Support

Technical Service 1-800-533-6006

Check out our mobile ready website



Service Information Menu

PARTS BREAKDOWN

SERVICE MANUALS

USER MANUALS

CLEANING & MAINTENANCE

TECHNICAL & DIAGNOSTIC TOOLS

INSTRUCTIONS

BULLETINS



www.scotsman-ice.com/service

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Training Agenda

- Introduction
- Installation
- Operation
- Maintenance
- Diagnostics
- Taking the unit apart

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Introduction

- Undercounter type, Flake or Nugget ice forms
- Three capacities each
 - First two numbers
 - Second two numbers are cabinet widths, 15 or 20 inches

Flaked Ice	Nugget Ice
UF0915	UN0815
UF1415	UN1215
UF2020	UN1520

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Introduction

- Air cooled only
- R-134a
- Front air in and out
- Stainless steel evaporator
- Solid grease top bearing
- Auger load monitoring
- Cleaning indicator
- Cleaning mode
- Water sensor
- Photo eye ice level control



QR code behind front panel. Connects to warranty registration and unit specific service resources.

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Components

- Controller's lights and switches



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Components

- Condenser



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Components

- Fan motor and blade



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Components

- Electrical Box
 - Metal cover
 - Open at the back
- Caution: Disconnect electrical power if working in this area.



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Components

- Controller, Fuse Holder and Transformer
- Caution: Disconnect electrical power if working in this area.



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Components

- Chute Cover



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Components

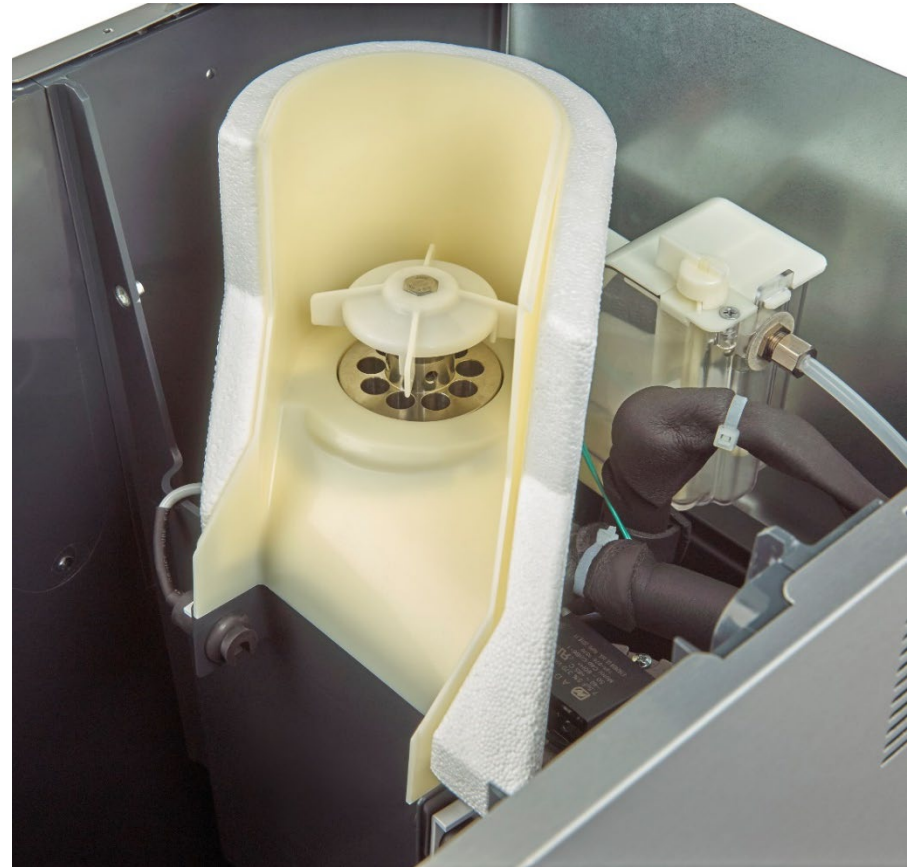
- Chute and Photo Eyes
- Caution: The moving ice sweep could pose a rotation hazard.
- Disconnect electrical power when working in this area.



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Components

- Ice Sweep
- Breaker
- Float Valve and Reservoir



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Components

- Water, Drain and Power Cord



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Components

- Reservoir
- Water Sensor
- Compressor



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Components

- Connect Potable Water
 - Water Conductivity Rating
 - A minimum of 10 micro Siemens/CM
 - Ultra pure water will not work
 - Such as DI
 - ¼ inch tubing
 - Flush before connecting
- Connect Drain
 - Slope to building drain
 - Maintain air gap per codes
 - Vent when needed
- Connect Power Supply
 - NEMA 15P plug



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Start Up

- Remove front panel
- Switch on water supply
 - Confirm water level is correct, and not overflowing or underfilling reservoir
- Switch on power supply
- If not operating, push On to start
- Add water to bin, check for drain leaks
- It may take several minutes for ice to begin falling into the bin

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Start Up

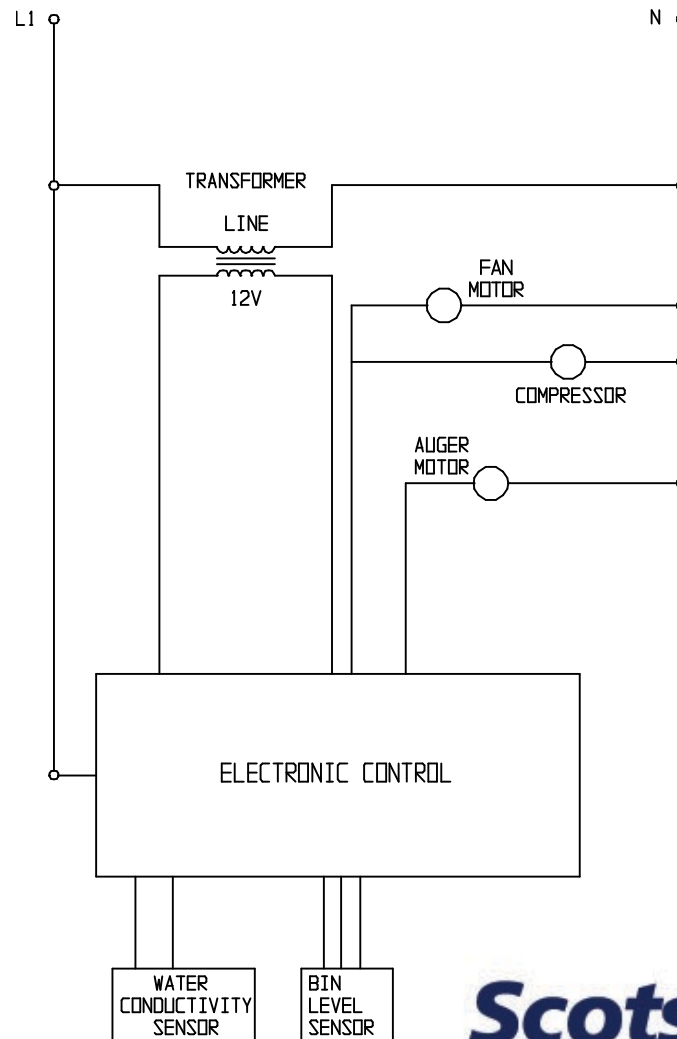
- Check ice level sensor function
 - Temporarily block light between sensors
 - Status light should blink green
- A full bin may take a full day



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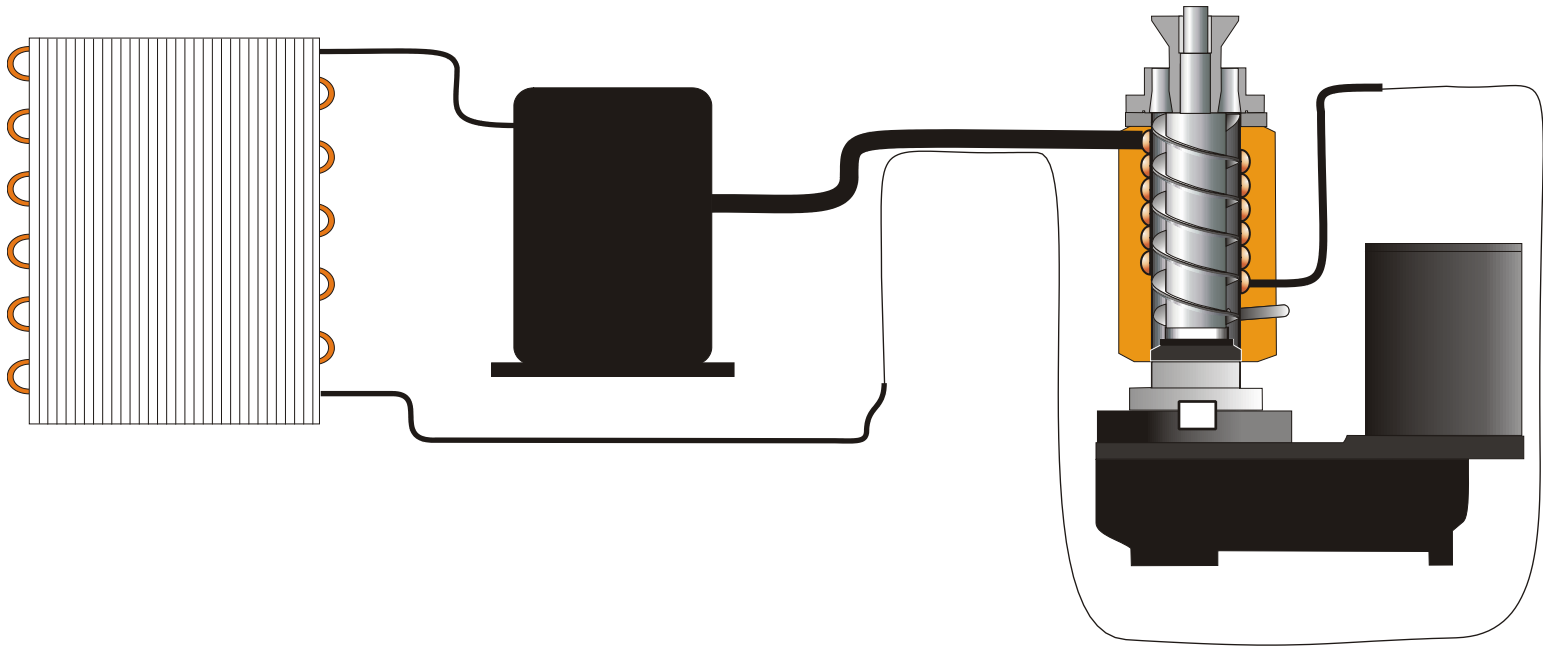
Electrical

- Controller operates
 - Compressor
 - Fan motor
 - Auger motor
- Two sensors
 - Water
 - Bin level
- Auger motor independent of compressor and fan
 - On during shut down to clear evaporator of ice



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Refrigeration



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Refrigeration

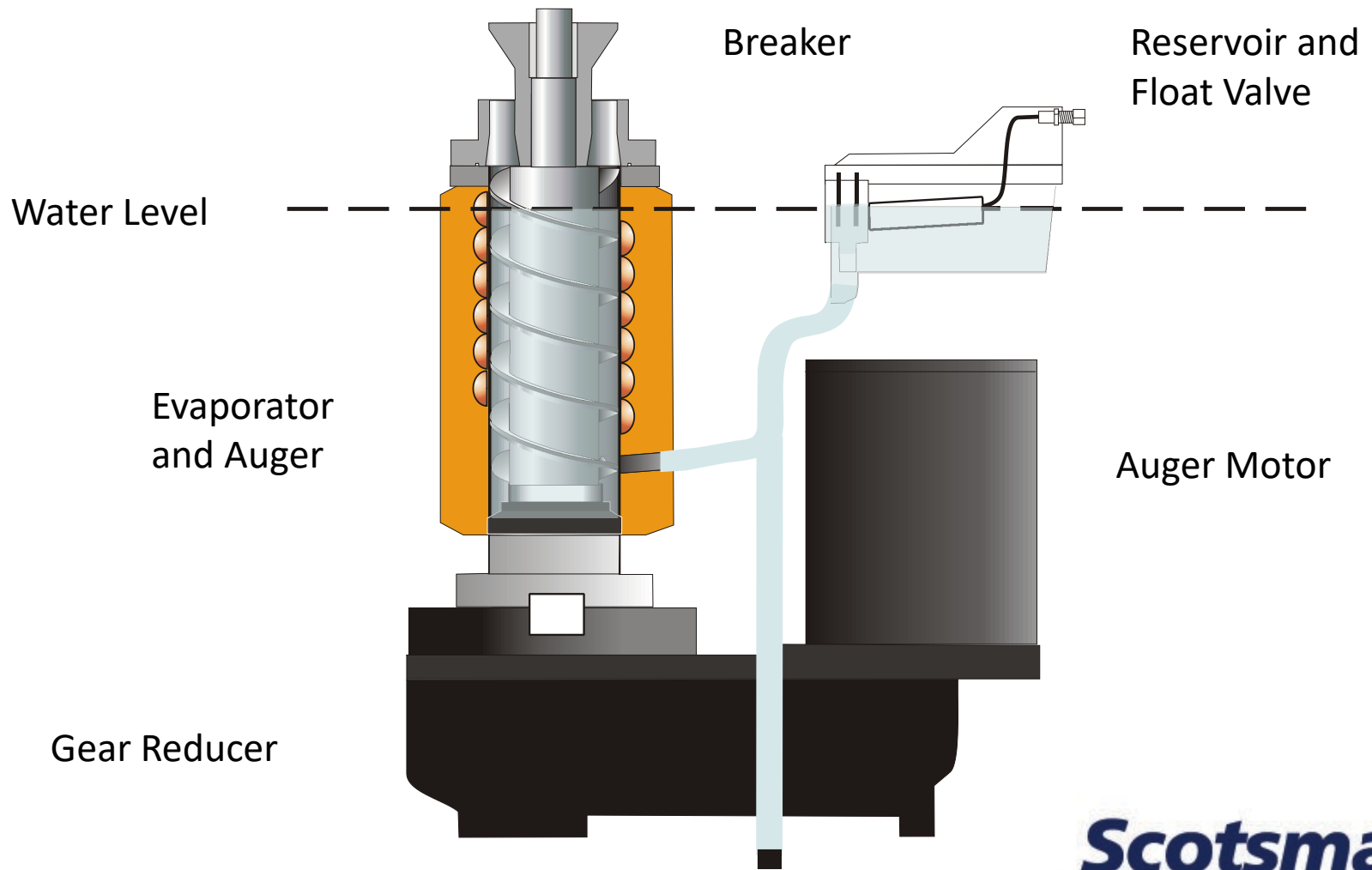
- No access valves
 - Pressures sometimes needed
 - Normal pressures for new, clean machine with full charge and making ice normally

Model	Discharge PSIG	Suction PSIG	Discharge PSIG	Suction PSIG
	70/50	70/50	90/70	90/70
UN0815 or UF0915	106-110	10-11	143-148	13
UN1215 or UF1415	189-191	8-9	225-230	11
UN1520 or UF2020	108-114	1-4	151-159	4-6

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Ice Making System



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Continuous Flow Ice Making

- Flaked or Nugget ice
 - Evaporator tube contains auger and water
 - Heat removed from the water until ice crystals form
 - Slowly rotating auger forces compressed ice up and thru the breaker
 - Extruded thru the breaker's restrictive holes or slots
 - Water flows in at the bottom of the evaporator tube to keep the heat load in balance
 - Continuous flow of water in and ice out

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Water and Mineral Scale

- Water supplies can have suspended solids and dissolved solids.
 - Suspended solids can be filtered out
 - Dissolved solids are part of the water, but ice machines separate them by the ice making process
 - Cube ice machines do that by freezing the pure water first, leaving the mineralized water behind.
 - Flaked and nugget machines are different, as the water going in is discharged as ice. But they get coated by minerals from ice making too.
- Ice machines need to be treated with scale remover
 - Food grade acid dissolves the scale

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Water and Mineral Scale



Extreme Scale Build Up on Evaporator Wall

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Water and Mineral Scale

- Scale on the evaporator wall and auger increases the load on the gear reducer
 - Normally, ice slides straight up the wall and is extruded.
 - When the wall is covered with scale, ice may not slide up the evaporator, instead it revolves with the auger and stays too long under refrigeration, becoming a solid that is hard to extrude.
 - That increases auger motor amp draw.
 - A possible symptom is a loud noise during ice making
 - Known as a rotating freeze.

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Auger Load

- Auger motor current is monitored by the controller
 - Will shut the unit down if too high or too low
- High amps can be caused by
 - Very significant scale on auger and evaporator
 - Component wear, possibly gear reducer or bearing
- Low amps can be caused by
 - Open motor winding
 - Open motor overload
 - No power to motor

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Cleaning and Maintenance

- Three areas:
 - Air cooled condenser
 - Evaporator and water system
 - Photo eyes
- Air intake is on the right
- Brush lint and dirt from fin surface
 - Use care, do not damage fins
 - Vacuum and / or blow out
- Imbedded grease must be removed with coil cleaner

Sanitize Indicator light switches on after 6 months of power up time



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Cleaning and Maintenance

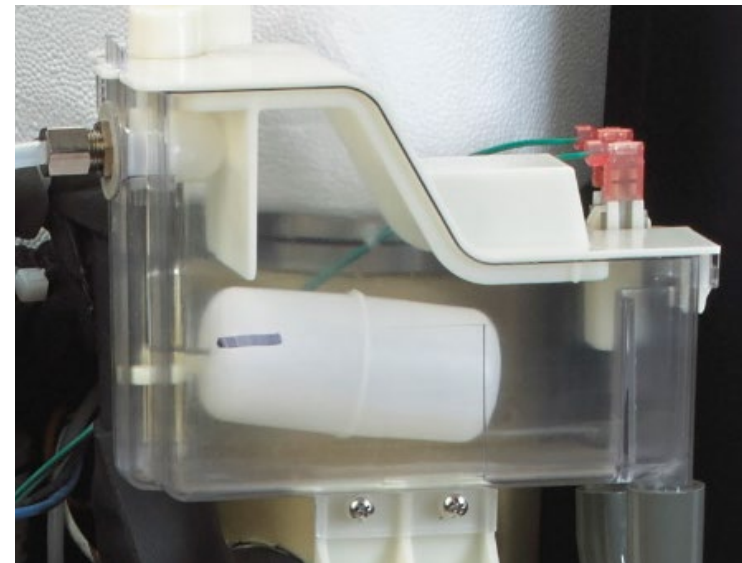
- Evaporator and Water System
 - Minerals in the water supply flow thru the system
 - Over time, they begin to coat the ice making and water surfaces
 - This mineral scale must be removed using scale remover



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Scale Removal Step by Step

- Shut unit off
- Discard ice
- Remove top, front and back panels
- Shut water supply off
 - At source or use the reservoir lever to raise the float
- Drain evaporator and reservoir
 - Disconnect outlet hose, water will drain into condensate pan and then out of the unit.
 - Note: If the unit was pulled out, there must be a drain tube connected to the building drain.
- Reconnect outlet hose



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Reservoir Outlet Hose

- Hose must be connected to plug molded into base or water / cleaning solution will leak out
 - Located to right of evaporator



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Scale Removal Step by Step

- Mix 2.5 ounces of Scotsman Clear 1 scale remover and one quart of water.
 - Only mix correct ratio.
 - MORE is NOT better!!!!
- Pour that solution into the water reservoir.
- Push both On and Off buttons in until the unit starts
 - The clean light will blink
 - The auger motor will start



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Scale Removal Step by Step

- When the compressor starts, add cleaning solution to the reservoir as ice is made. When all of the solution is used, turn the water supply back on.
- The unit will stay on during the cleaning mode and then shut off.
- Shut water off again and drain evaporator and reservoir again.
- Wash out the bin and rinse with water to flush out the drain.
- Reconnect reservoir outlet and either switch water supply on and restart ice making or sanitize the unit.

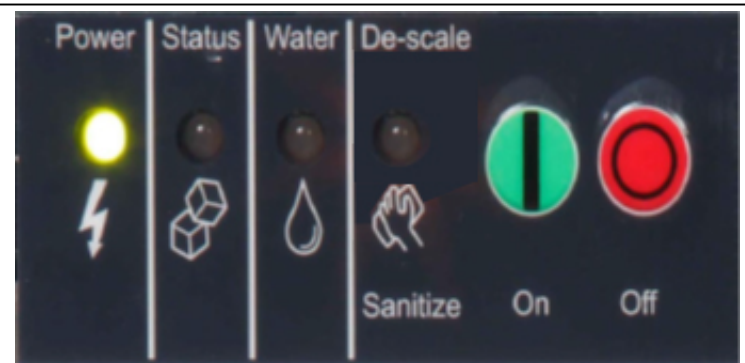
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Sanitization

- The ice making system and the ice storage area must be sanitized on a regular schedule.
- Use potable water and approved sanitizer.
- Follow the same procedure as used for scale removal.
 - Substitute approved sanitizer solution for scale remover.
- Wash out the ice storage bin area and the ice chute area with sanitizer before restarting ice making.

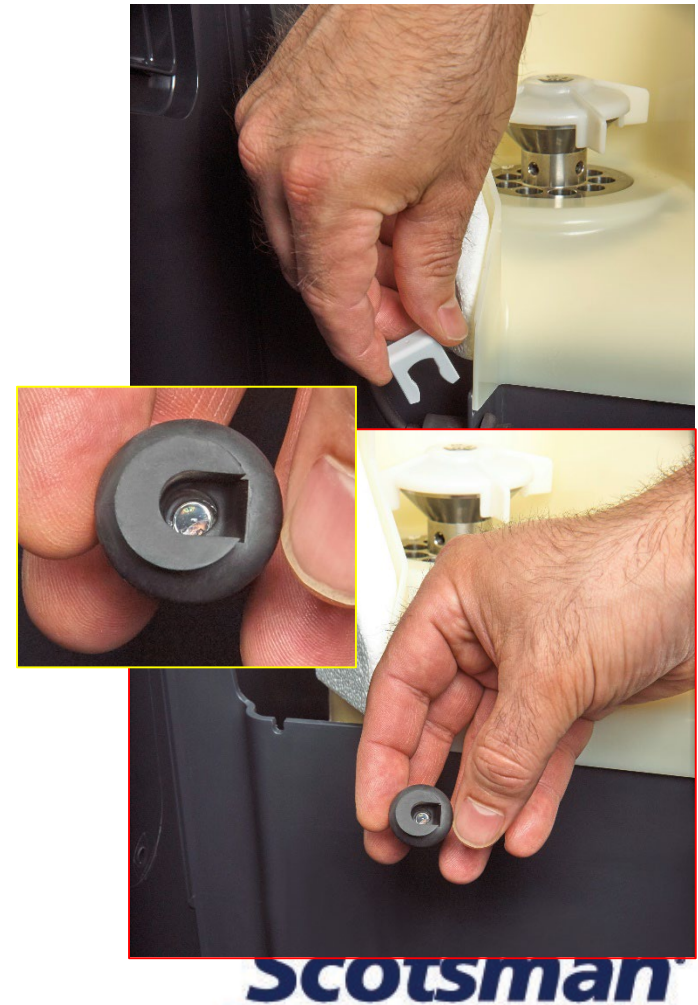
Using the cleaning mode resets the De-Scale indicator light.



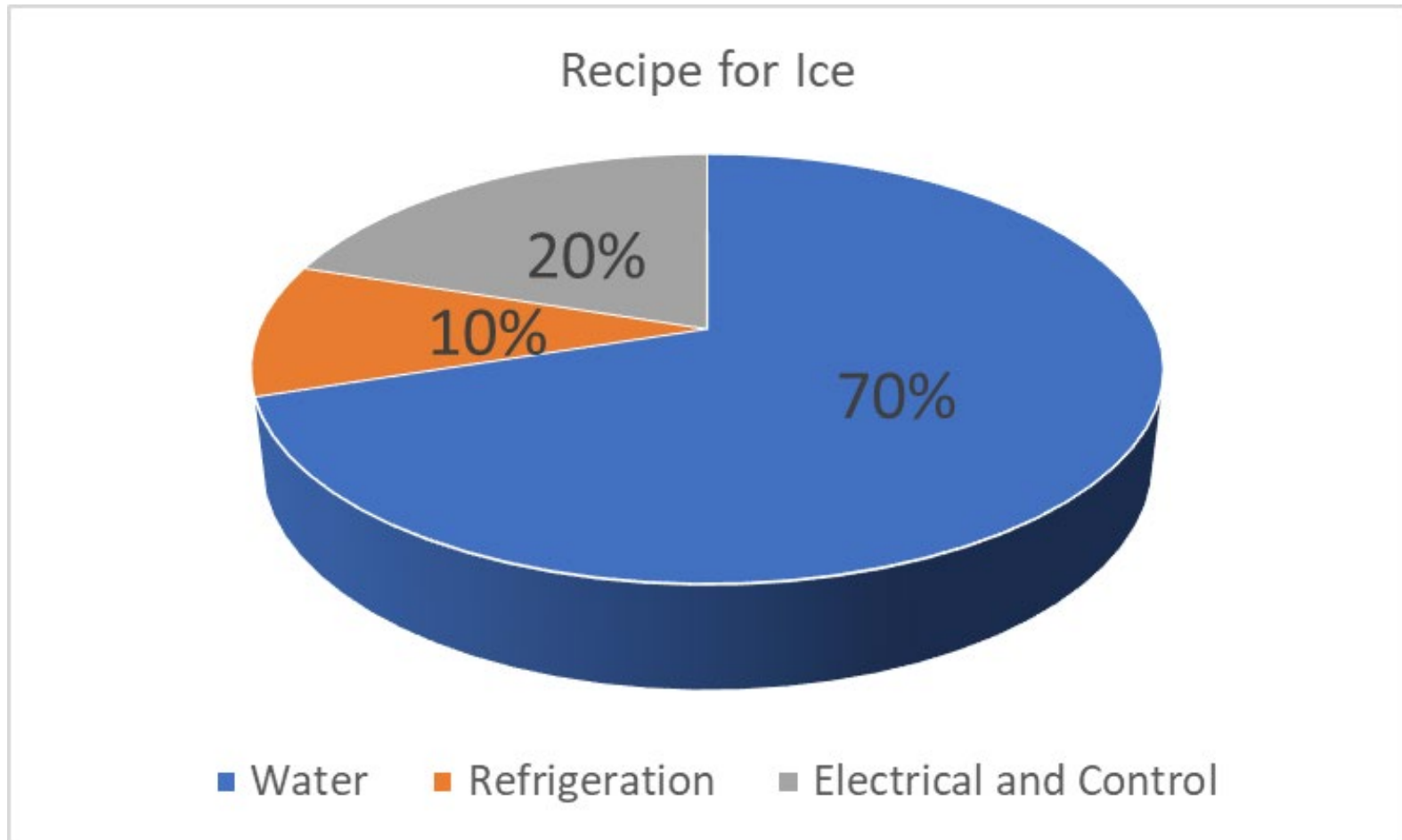
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Photo Eyes

- Access them by removing the chute cover at the back of the bin.
- Pull the white clip up to release the rubber holder.
- Carefully wipe clean the clear lens inside the rubber holder.
 - Use a soft cloth, not a screwdriver!



Diagnostics and Service



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Indicator Lights

Code or Light Action	Condition	Suggested Action
Power light is ON	Normal	None
Status light is ON	Making ice	Normal when bin is not full
Water light is OFF	Normal	None
Water light is blinking ON and OFF	No water sensed	Check water supply to unit, possibly restricted by clogged filter
Status light blinking red	Auger motor current draw out of spec	Reset controller and check auger motor amps. If out of spec but operational, clean water system and recheck. Replace motor or complete gear motor if auger motor amps are still out of spec.
De-Scale light is ON	Unit has not been cleaned for at least 6 months	Clean unit per manufacturer's instructions



Status Light: Codes

Light Code	Meaning
Off	Not in ice making mode
On Steady	Making ice
Blinking green	Shutting down or bin full
Blinking red, one long, one short, every 5 seconds	Auger motor overcurrent, first notice
Blinking red, one long, two short, every 5 seconds	Auger motor overcurrent, second notice
Blinking red, one long, three short, every 5 seconds	Auger motor overcurrent, third notice
Blinking red, two long, one short, every 5 seconds	Auger motor under current, first notice
Blinking red, two long, two short, every 5 seconds	Auger motor under current, second notice
Blinking red, two long, three short, every 5 seconds	Auger motor under current, third notice

Diagnostics

- No ice, unit condition:
 - Power light is off
 - Check for power to unit
 - Check for open fuse
 - 2 amp, 250 volt
 - Check for open transformer



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Diagnostics

- No ice, unit condition:
 - Power light on
 - Water light off
 - Status light blinking green
 - Compressor and Auger motor are OFF
- Cause: Controller has sensed bin full, but the bin is not full
 - Infrared sensors may have scale on the lens
 - Infrared sensors may have failed. Clean first, if no improvement, replace sensor set

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Diagnostics

- No ice, unit condition:
 - Power light on
 - Water light blinking red
 - Auger motor and compressor are OFF
- Cause: Controller has sensed no water in the reservoir
 - Check for water supply turned off
 - Check for water supply restricted by plugged filter
 - Check for water in reservoir



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Diagnostics

- No ice, unit condition:
 - Unit off
 - Status light is blinking red
- Cause: Auger motor either over or under amp draw spec
- Normal amps are about .4 (four tenths)
 - One blink, and then one, two or three is an over amp failure
 - Two blinks, and then one, two or three is a very low or no amp failure
- Three blink code means the unit is locked out and must be manually reset
 - Cycle power off and on to reset



Diagnostics

- No ice, unit condition:
 - Power and status lights are green and not blinking
 - Auger motor is operating
 - Compressor is off
- Check for
 - Power to compressor, if none, controller relay may not be working
 - Overheated compressor, due to dirty condenser or fan not working, or low refrigerant charge
 - Open windings on compressor
 - Start relay failure
 - Start capacitor failure

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Taking the Unit Apart

- Panels to remove
 - Front
 - Top
 - Back
- Removing side panels does not improve access.



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Taking the Unit Apart

- Condenser Fan
 - Unplug from electrical power
 - Separate fan motor lead from harness
 - Four screws hold fan brackets to shroud



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Taking it Apart

- Fuse
 - Unplug from electrical power
 - Remove electrical box cover
 - Twist fuse holder to release and replace fuse
 - 2 Amp, 250 Volt



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Taking the Unit Apart

- Controller
 - Unplug from electrical power
 - Remove electrical box cover
 - From the condenser side, squeeze catches together and push the cover away
 - Disconnect from electrical harness and controller



Taking the Unit Apart

- Photo Eyes
 - Unscrew two thumbscrews and remove Chute Cover



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Taking the Unit Apart

- Photo Eyes
 - Unplug from electrical power
 - Pull up on white retaining clips



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Taking the Unit Apart

- Photo Eyes
 - Pull lens and cable from black rubber lens holder
 - Disconnect from electrical harness



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Water Reservoir and Float Valve

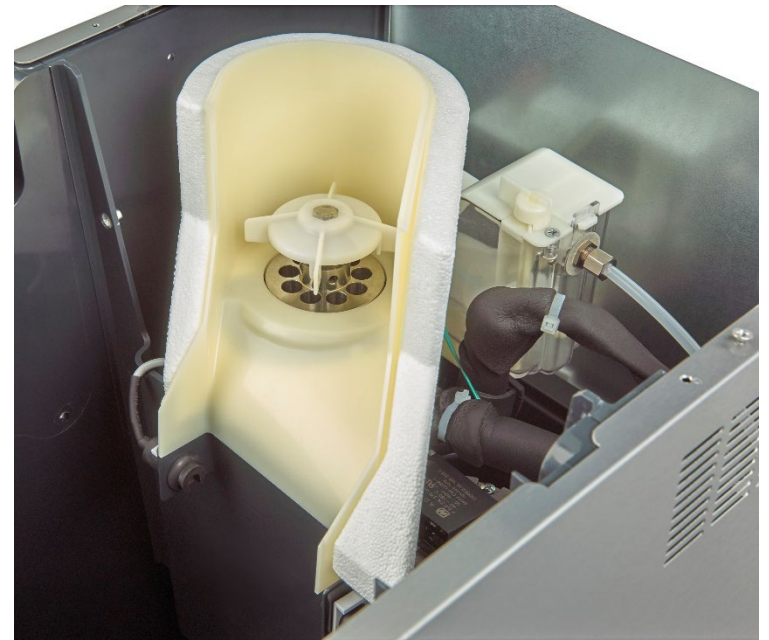
- Water Sensor
 - Remove screw holding sensor to reservoir
 - Lift sensor and probes out of reservoir



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Taking the Unit Apart

- Ice Sweep
 - Unplug from electrical power
 - Rotate CCW to remove



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Taking the Unit Apart

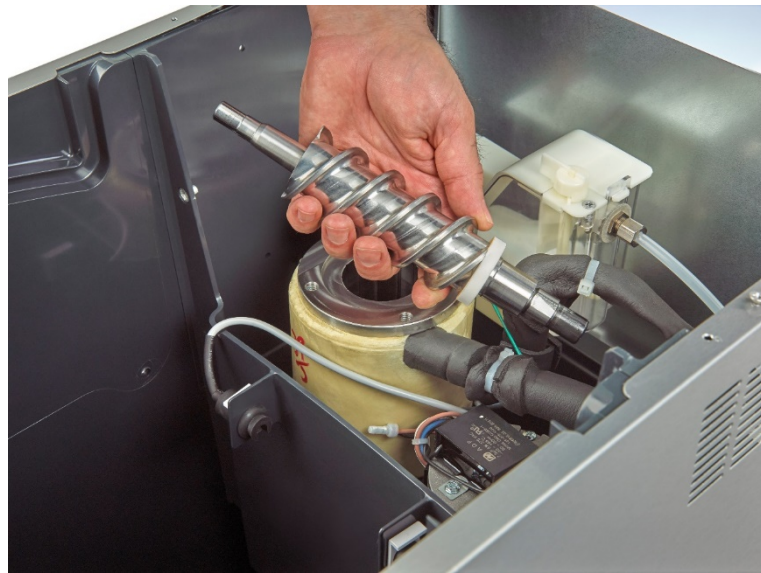
- Breaker
 - Unplug from electrical power
 - Remove four hex head screws
 - Lift off evaporator



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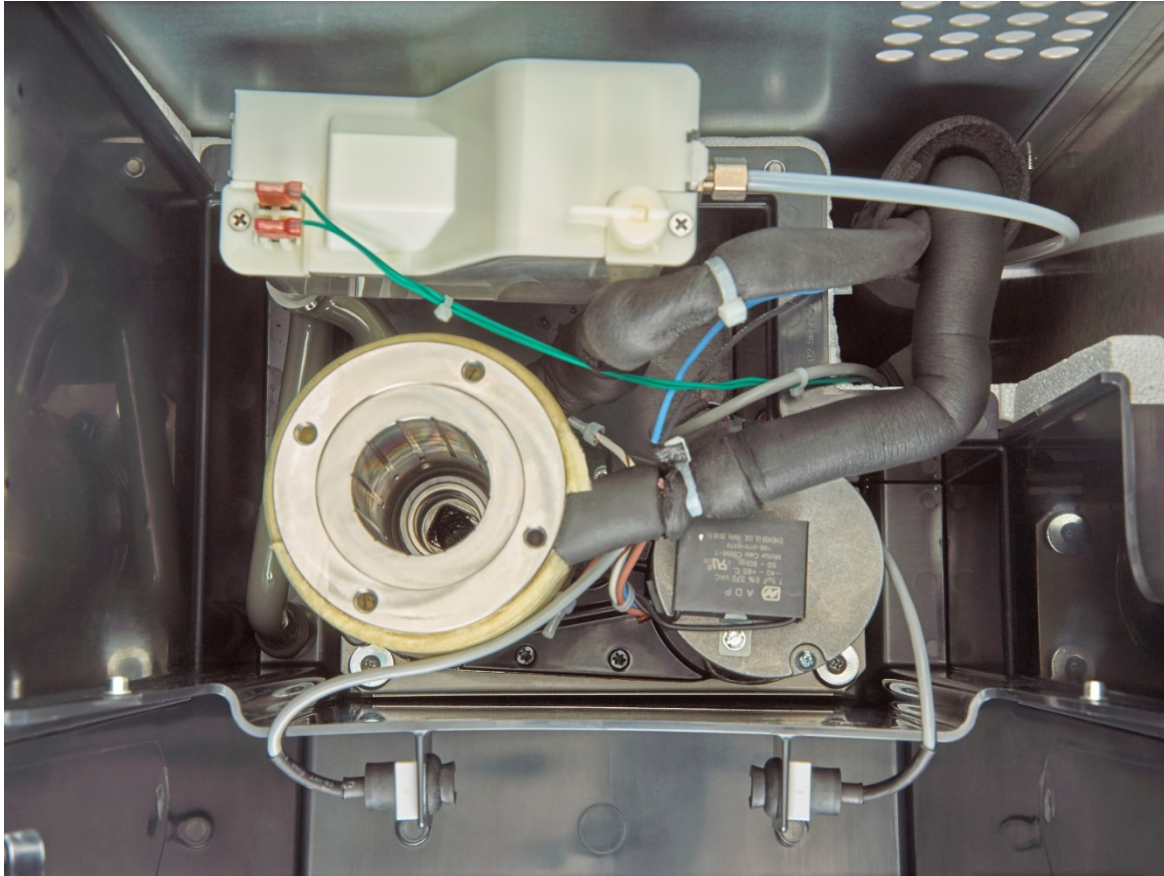
Taking the Unit Apart

- Auger
 - Be sure electrical power is off
 - Shut water off and drain reservoir and evaporator
 - Pull auger out of evaporator



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Evaporator



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Taking the Unit Apart

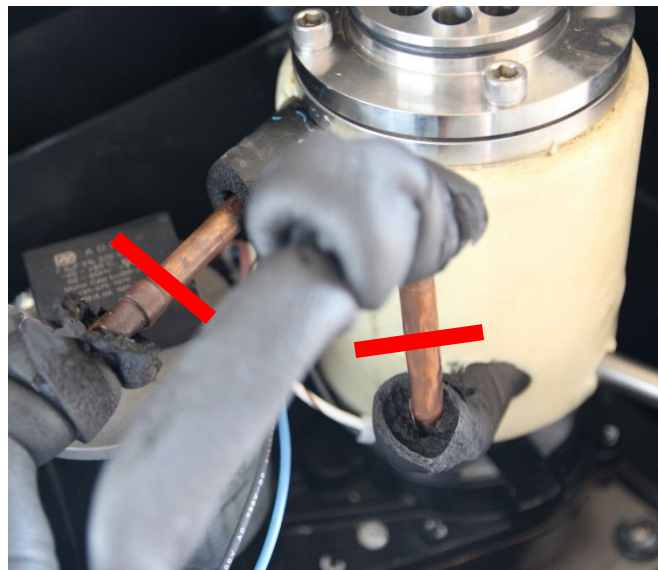
- Evaporator or Gear Reducer
 - Unplug from electrical power
 - Remove back panel
 - Shut water off and drain reservoir
 - Attach access valves and recover the refrigerant charge
 - Disconnect auger motor from electrical harness
 - Remove screws holding gear reducer base to pan



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Taking the Unit Apart

- Pull back suction line and evaporator inlet line insulation
- Cut or unbraid at locations marked
- Lift assembly out of unit



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Taking the Unit Apart

- Remove four socket head screws on the side of the evaporator bottom



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Taking the Unit Apart

- Lift evaporator off gear reducer's adapter
- Stationary half of water seal remains in evaporator



Water Seal

- Two-part seal
 - Stationary part in evaporator
 - Rotating part on auger
- Pull stationary half out of evaporator
- Remove rotating half from auger



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Water Seal

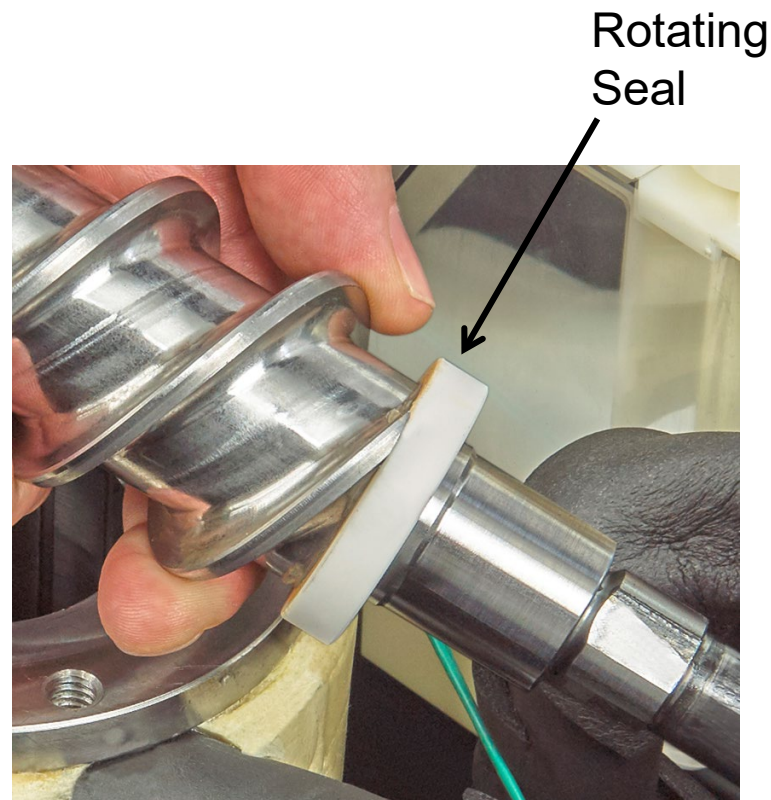
- Assembly
 - Wet stationary half
 - Insert $1 \frac{1}{4}$ to $1 \frac{3}{8}$ into bottom of evaporator tube
 - Adapter will push seal to correct height
 - About an inch and a half



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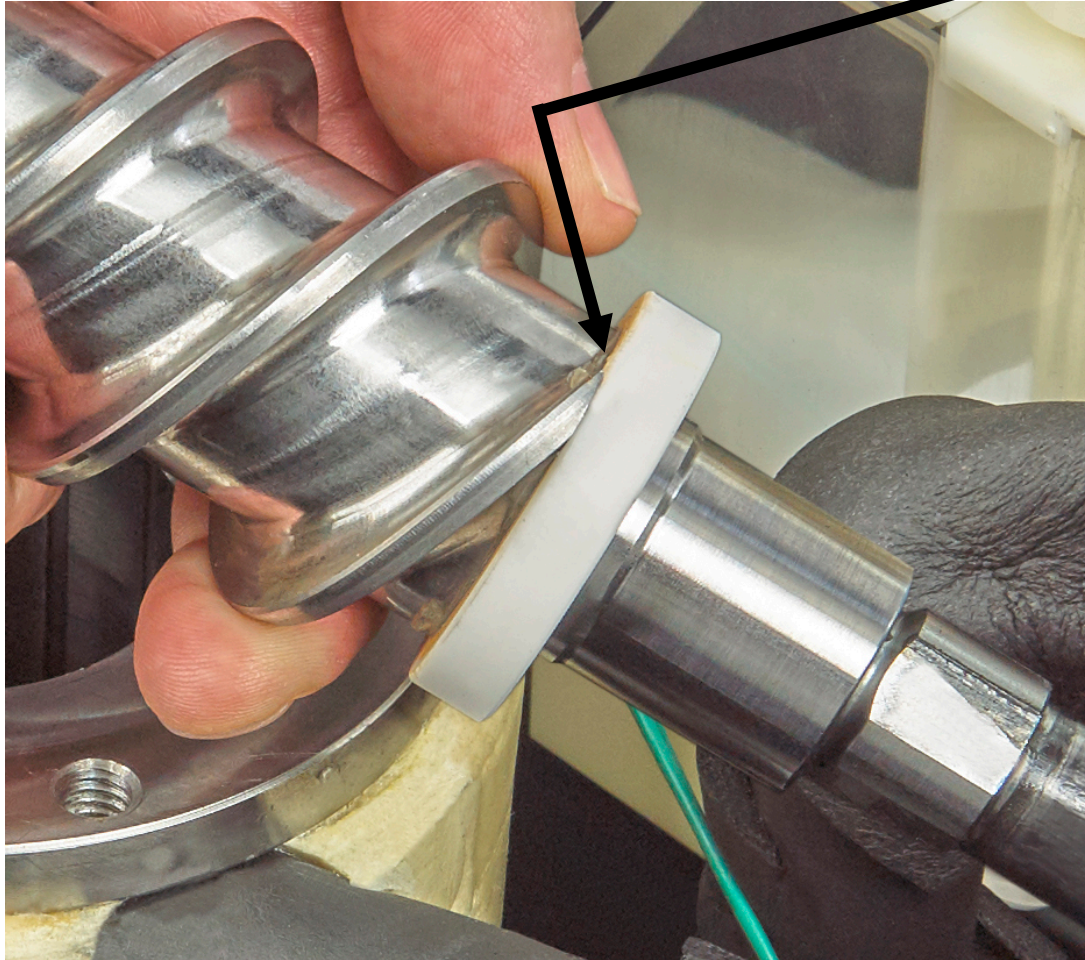
Water Seal

- Assembly
 - Clean auger shoulder
 - Add small bead of food grade RTV sealant to shoulder
 - Push rotating half of seal onto auger
 - Do NOT touch sealing surface
 - Push on outside of ring
 - OK to wet inside of rubber ring to aid in sliding onto auger



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Sealant on Auger



Sealant on Auger to
Fills in Between Water
Seal and Auger
Shoulder

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Summary

- This ice system has
 - Two ice forms, flake and nugget
 - Three ice capacities in each form
 - Two cabinet sizes
- Ice making is by continuous flow
- Ice on and off by photo eye
- Water sensor in reservoir
- Air cooled only
- R-134a, No service ports
- Auger motor current monitor

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Questions?

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