Prodigy and Prodigy Plus Flaked and Nugget

Modular Ice Machines

and Prior

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Quick Review: What is a flaker?

- A continuous flow ice machine
  - Vertical, water filled, refrigerated cylinder
    - With internal CCW 11 RPM auger driven by a gear reducer
  - Constant water in and ice flow out
  - Soft ice crystals continuously form in the evaporator between the auger and freezer wall
    - Forced up by the auger
  - Makes flaked or nugget ice by a compression process
    - Flaked ice: Soft ice squeezed against barrier or thru slots to make it useable
    - Nugget ice: Soft ice extruded thru 16 holes

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Flaked and Nugget - Refrigeration

- Steady state operation
- Two refrigerants
  - R-134a
    - AFE424, MDT2, MDT3, MDT4, NU130
    - Most operate at 12-13 PSIG suction
  - R-404A – all others since 1995 changeover
    - Suction pressure varies by model, condenser and ambient, smaller machines have higher pressure
      - Overall 22 to 46 PSIG
    - Remote low side EPR is set per unit size
    - Superheat on TXV models:
      - 6-8 degrees up to Prodigy
      - 12 degrees for Prodigy

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Flaked and Nugget - Refrigeration

- Low Pressure Cut Out Open (12 – 18 PSIG)
  - Many prior models cut out at 0 - 4
  - No refrigerant in system
  - Restriction
  - Auger not turning, compressor on
- High Pressure Cut Out Open (400 PSIG)
  - Fan motor failure
  - Water supply lost to water cooled model

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Flaked and Nugget – Remote Refrigeration

- Head pressure control valve (headmaster)
  - Maintains minimum discharge pressure
    - 180 PSIG prior
    - 220 PSIG current
  - Was in ice head, now part of condenser
- Liquid line solenoid
  - Powered by controller
- Receiver
- Pump down pressure switch
  - Operates compressor contactor

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Prodigy Remote Flaker / Nugget

- Use condensers
  - ERC111 – N0622 and F0822
  - ERC311 – all others
- Head change only: re-use prior condenser
  - Must be same refrigerant
  - Add headmaster kit KPFHM

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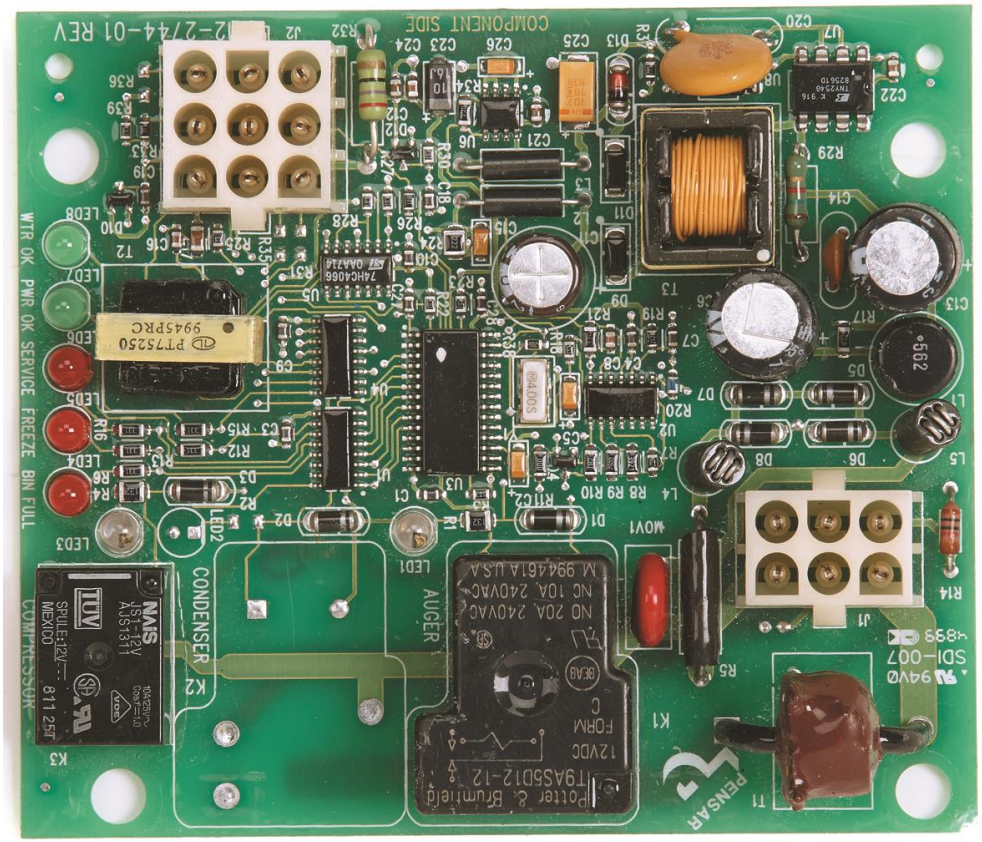
AutoSentry Controller

- Seven Lights
  - Water OK
  - Power OK
  - Service
  - Freeze
  - Bin Full
  - Compressor (LED3)
  - Gear Reducer (LED1)



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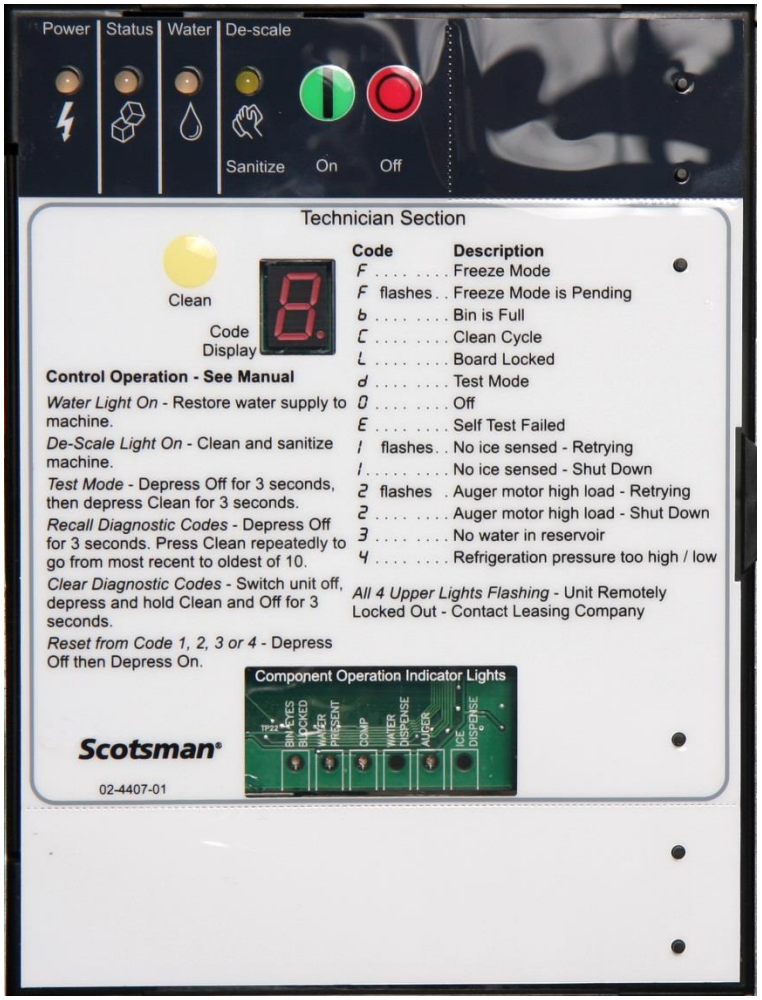
Prodigy Controller

- Eight Lights
  - Power
  - Status
  - Water
  - De-scale / Sanitize
  - Bin Eyes Blocked
  - Water Present
  - Comp
  - Auger
- Code Display
- Three switches



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Prodigy Controller - Update

- Prodigy Plus – D Series
  - Added one connector for lower light and switch panel
  - Backwards retrofitable to all Prodigy flaked and nugget ice machines

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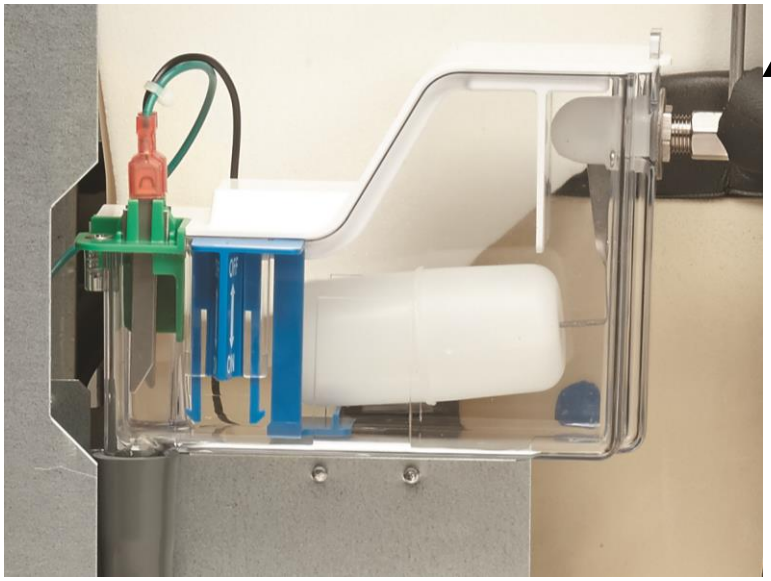
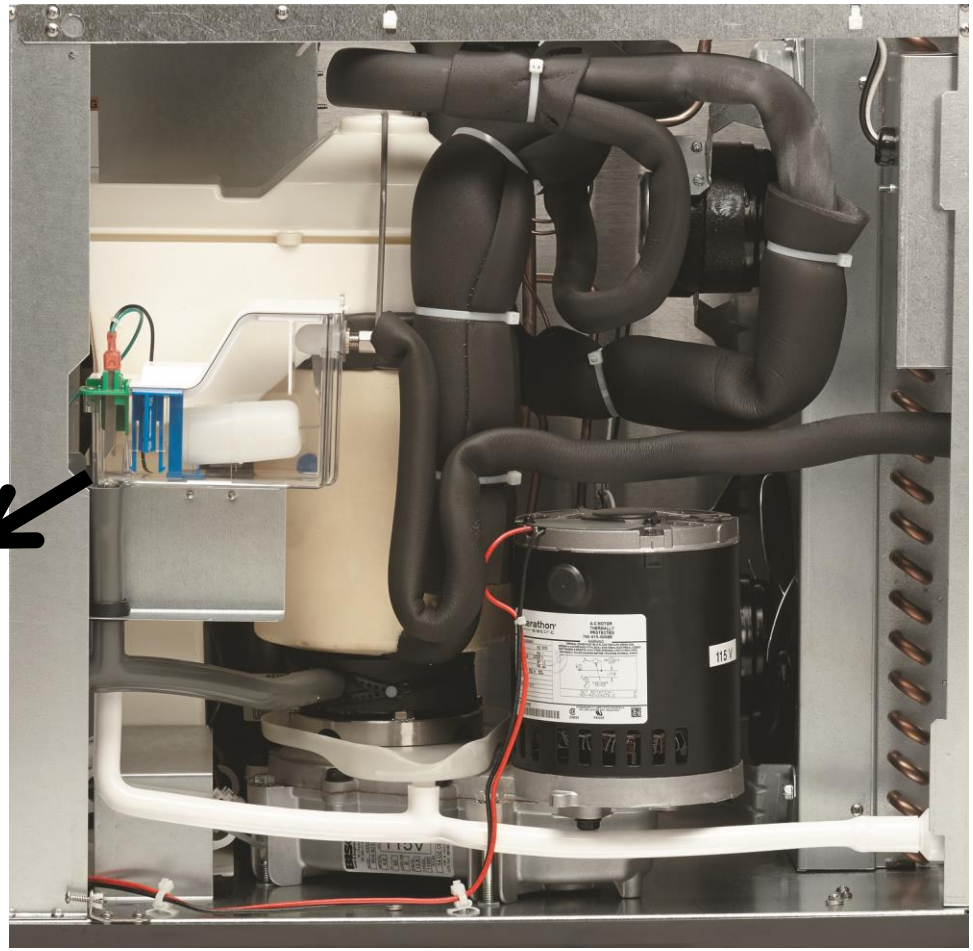
Update

- Changed Reservoir in 2012 and 2014
  - Sensor position
  - Float bulb lever
  - Outlet diameter





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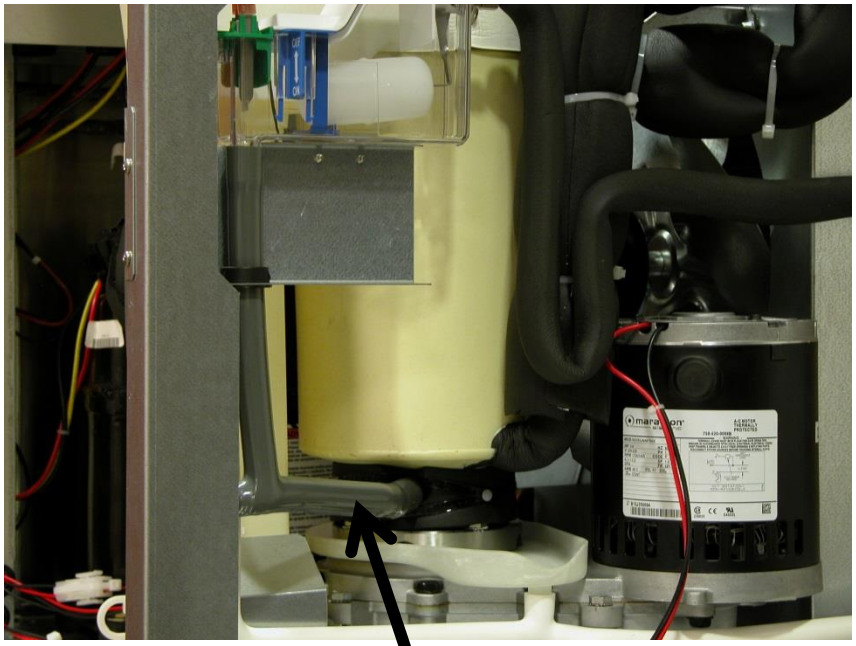
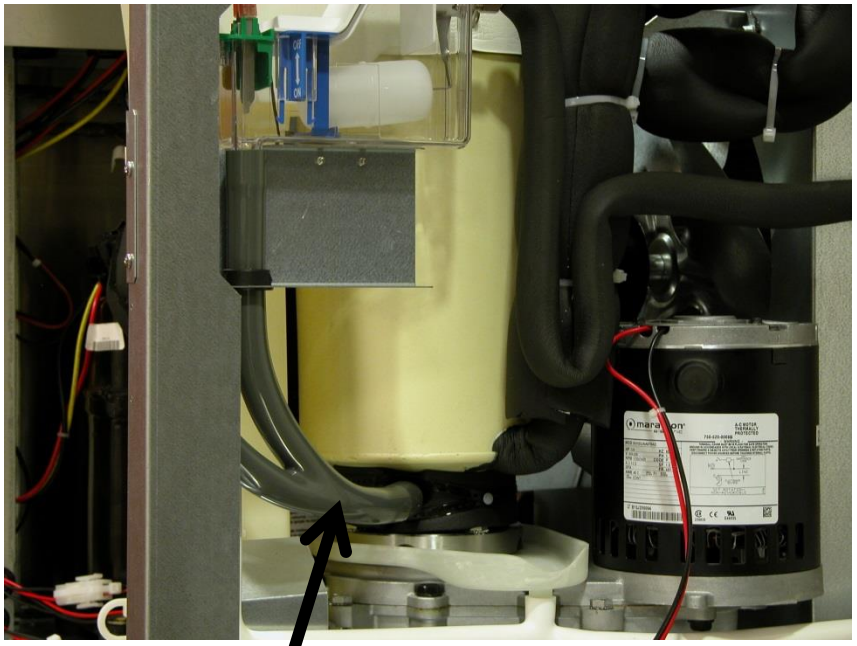
Related Update – August 2013



Hose Change From This



To This

Original hose can develop air bubble, restrict water flow and cause low capacity and low suction pressure.

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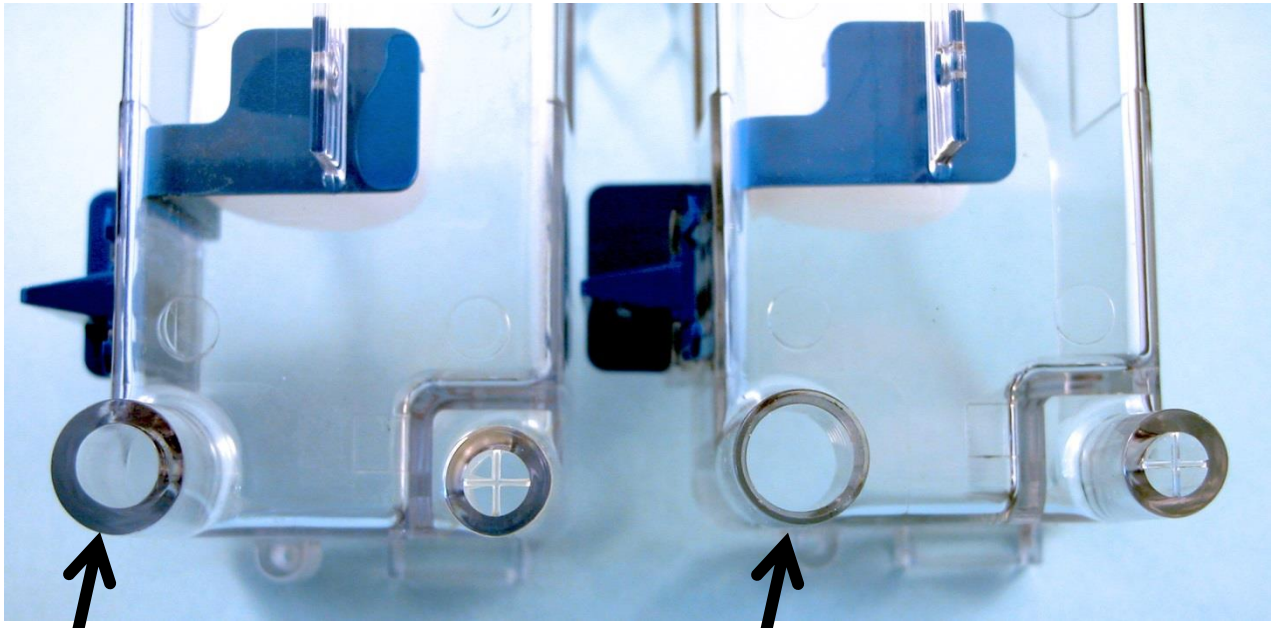
Related Update - 2014

- Reservoir outlet inside diameter increased
- Part number did not change, A39789-001.



Prior, 3/8 ID

Current, 1/2 ID

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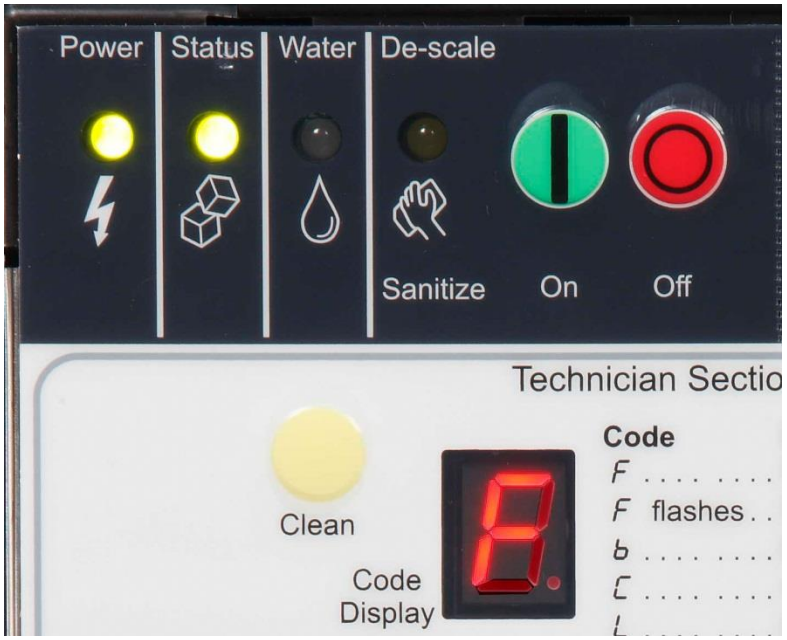
Flaker Operation

Start Up

- Push and release either On button
  - F code displayed
  - Status light ON
  - Auger drive motor will power up
  - Compressor will power up
    - Fan motor operates with compressor



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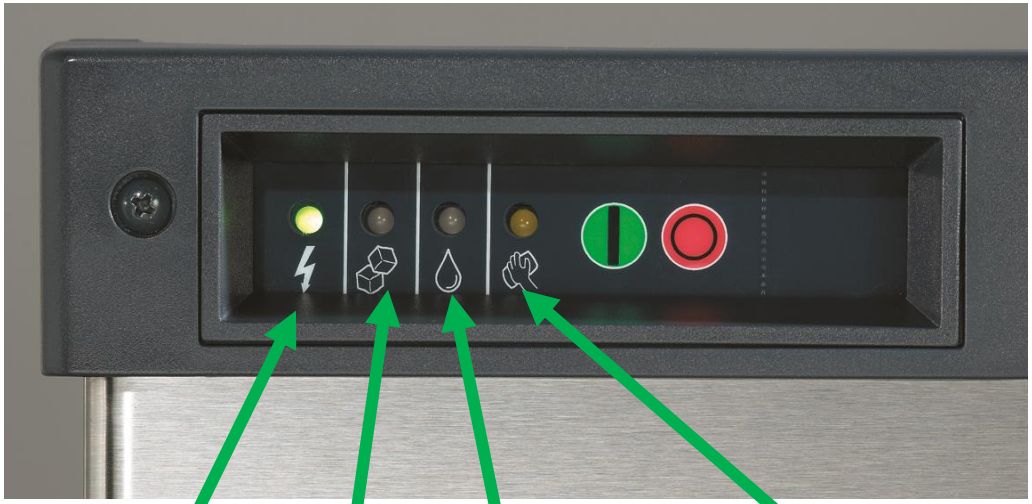
AutoAlert Light Panel – Duplicated in Prodigy Plus



Same Lights and Switches, different place

Status Light

Time to Clean Light

Power Light

Water Light

Prodigy Plus Lower Light and Switch Panel

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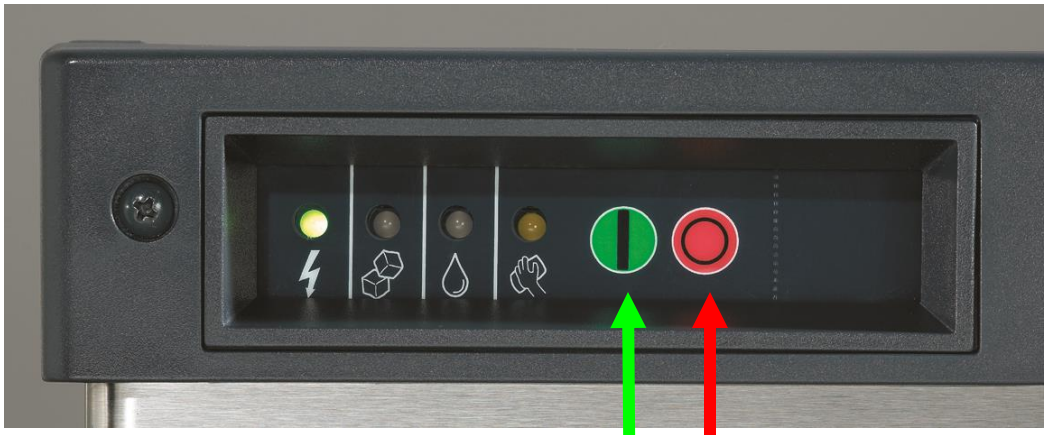
AutoAlert Light Panel



On Switch Button Off Switch Button

Prodigy Plus Lower
Light and Switch Panel

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Electrical Sequence – Start Up

- Pre-start
  - Ice sensor sees empty chute (call for ice)
  - Water sensor has conductivity at probes (water OK)
- On button push starts unit
  - Auger motor starts
  - Compressor and fan motor start
- Controller checks for ice falling
  - Check begins 6 minutes after a restart
  - Must sense ice in a 10 minute span or shuts unit down (Code 1)

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Electrical Sequence – Shut Down

- Infrared light to photo eye receiver blocked by ice in chute
  - Signals controller to shut down
  - Controller shuts off compressor (AC or WC) or liquid line valve (RC or RL)
  - Auger motor operates for 60 seconds to clear evaporator of ice
  - Remote will pump down until low side pressure drops below 15 PSIG.

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Bin Control Methods

- Standard: Photo eye set
  - Infrared emitter and receiver at base of chute
- Optional: KVS
  - Control and sensor
  - Sensor mounts in base of unit
  - Ice level is adjustable
- Optional: Bin stat (opens on temperature fall)
  - Mounts to control box strut
  - Connects to blue wires in control box

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Power or Water Interruptions

- Power supply lost and restored
  - Automatic restart
  - 4 minute delay to restart
  - F code blinks until unit starts
- Water supply lost and restored
  - Automatic restart
  - 4 minute delay to restart

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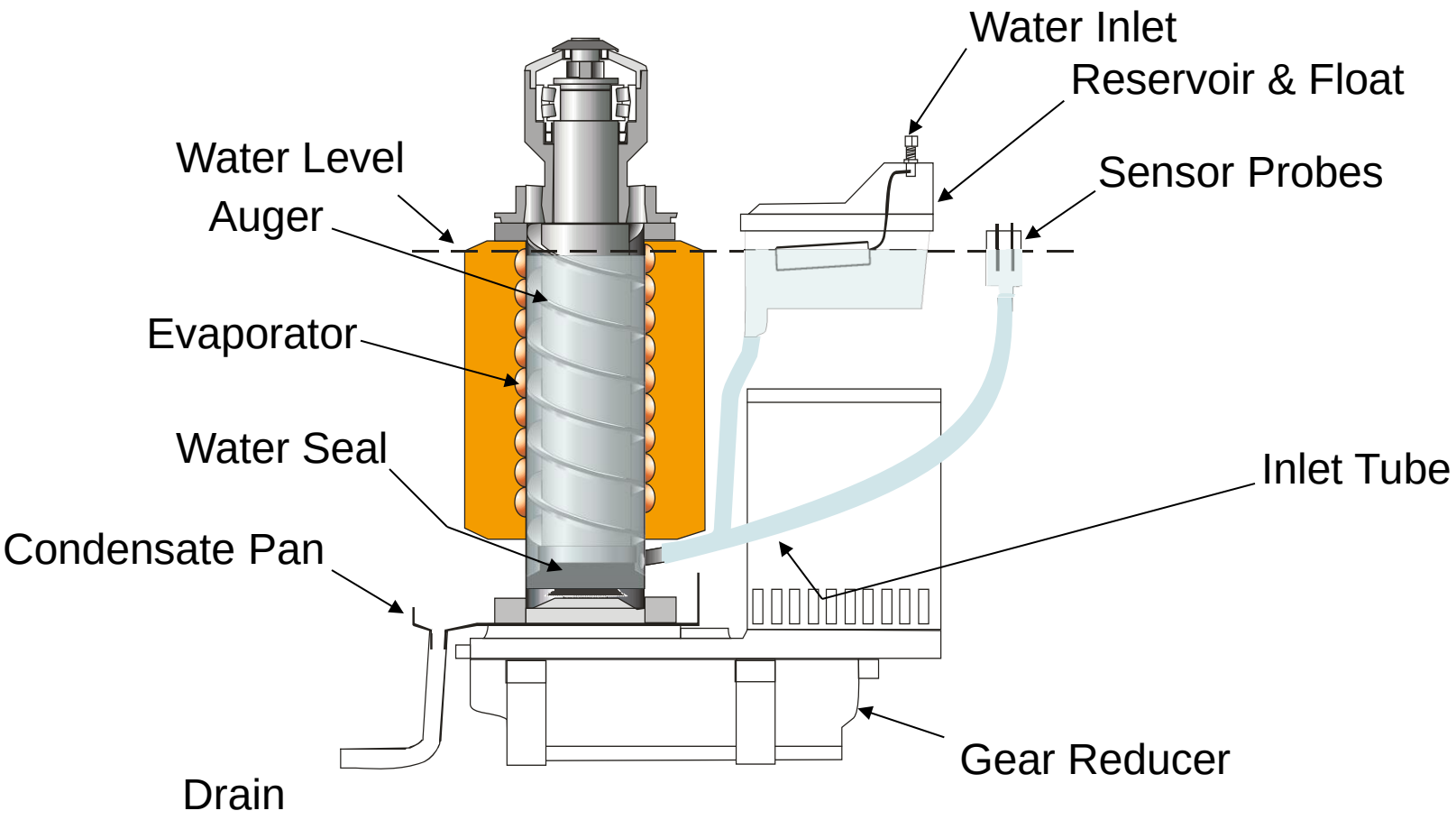
Water Schematic – Prior Reservoir



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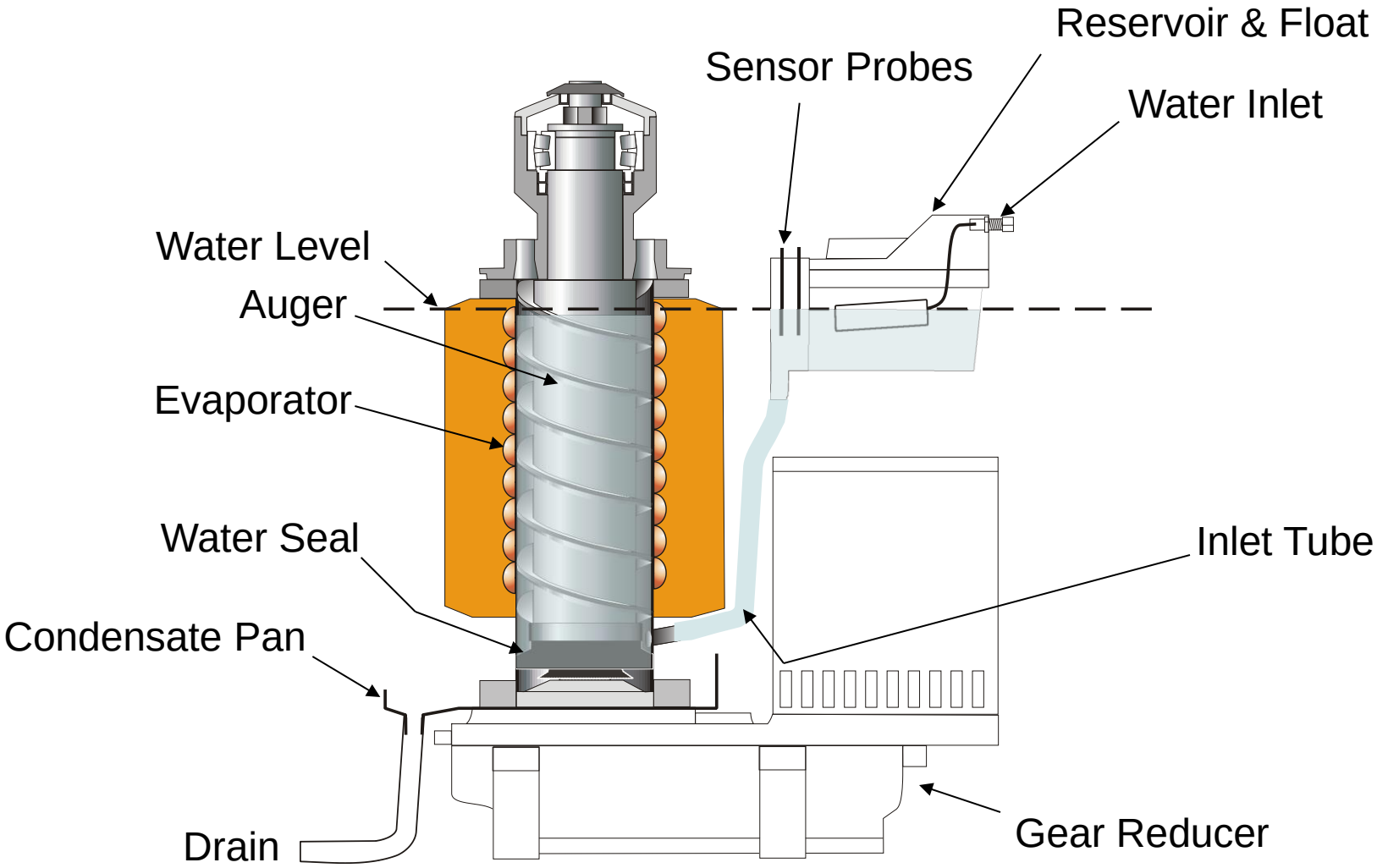
Water Schematic – Prodigy 2012



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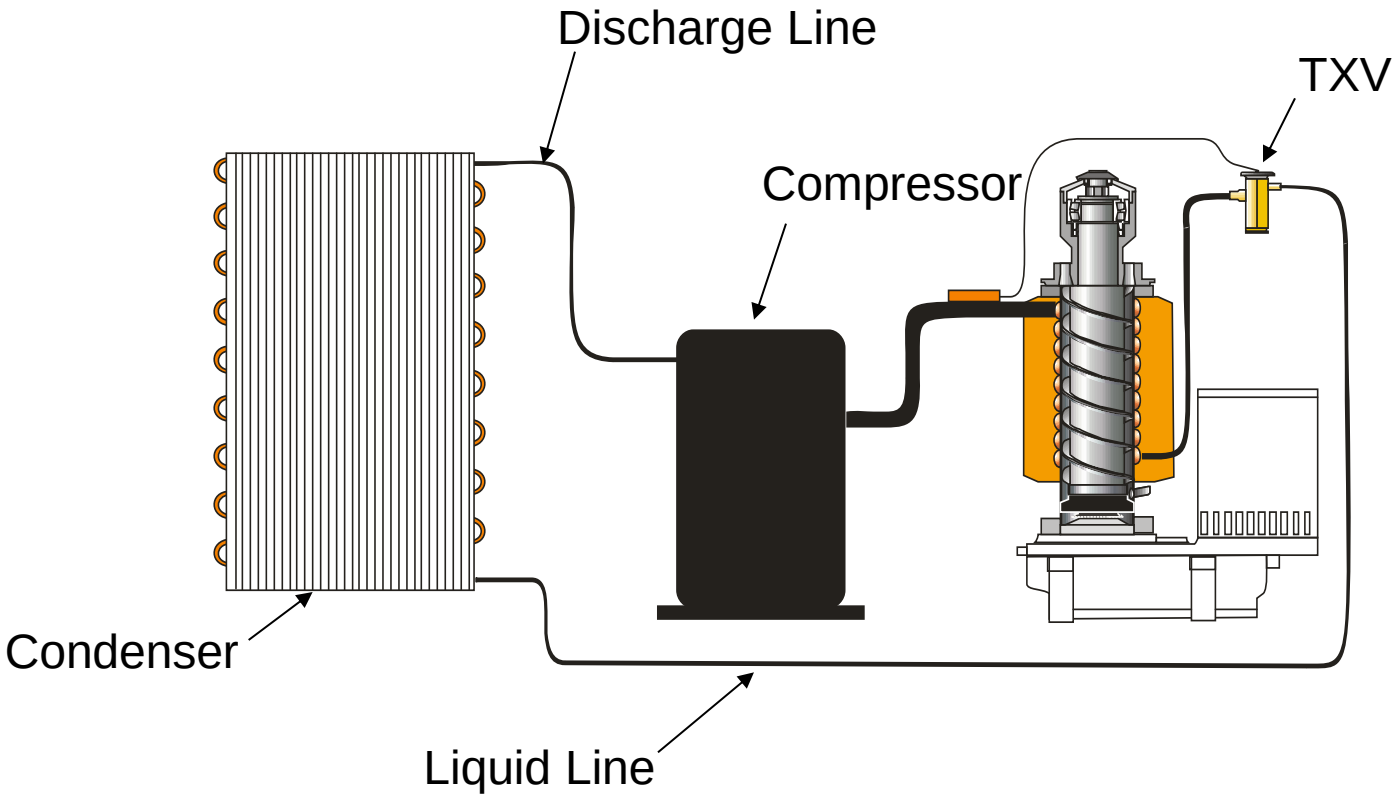
Refrigeration Schematic, Air Cooled



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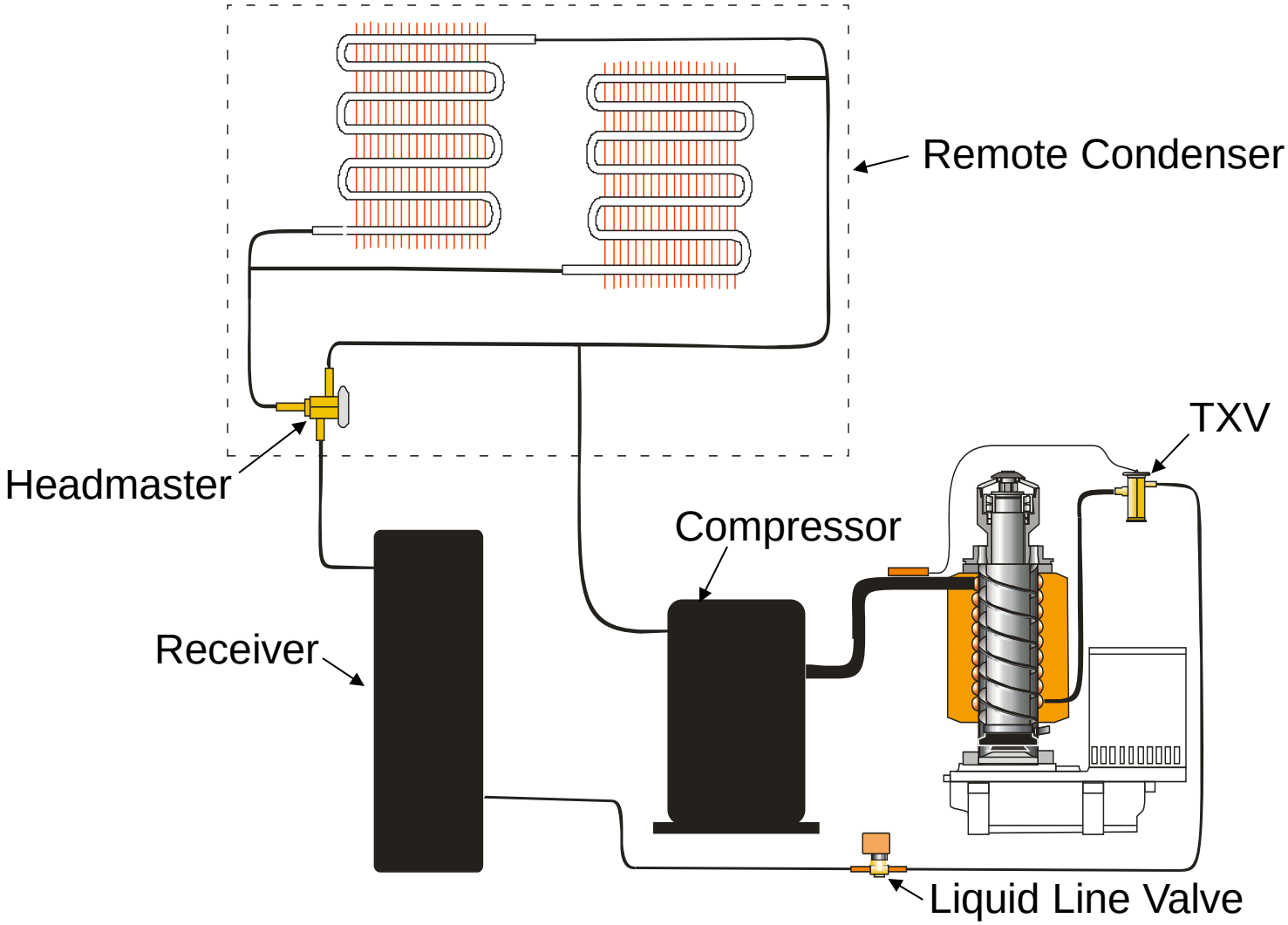
Refrigeration Schematic, Remote Air



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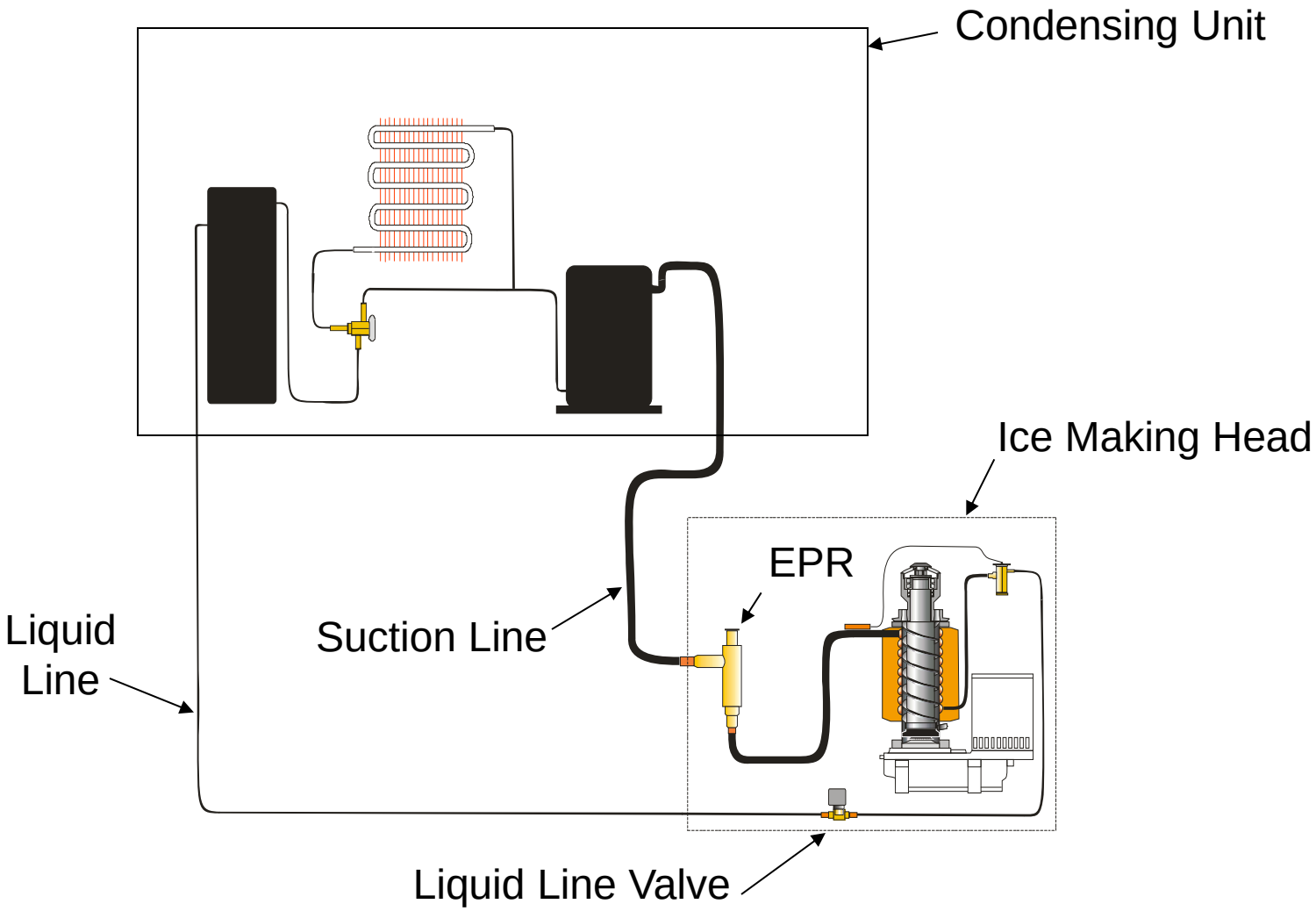
Refrigeration Schematic, Remote Low Side



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AutoSentry Plus

- AutoSentry monitors auger motor current
  - Overloaded motor draws more current
  - High current triggers shut down
  - Code 2 displayed
  - Retry in 4 minutes
  - 2 restart attempts to manual reset
- AutoSentry Plus adjusts the current cut out point based on the voltage supplied
  - Example, at 115 volts supply voltage, the cut out point is 6 amps; 230 volt cut out point is 3 amps

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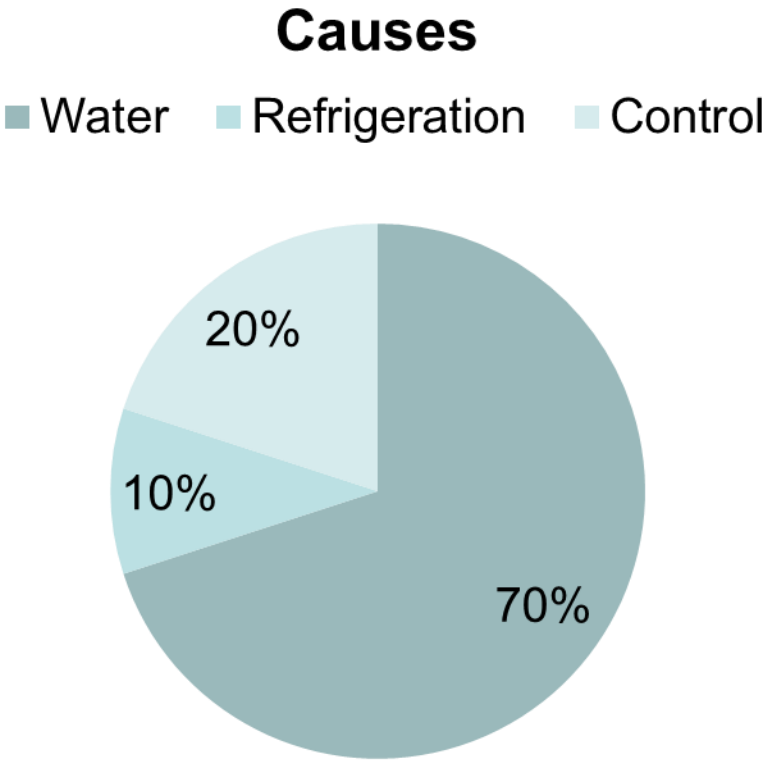
General Diagnostics

Recipe for Ice

- Same as a cuber
  - Water
  - Refrigeration
  - Control system



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ICE THE WORLD DEMANDS

Flaked and Nugget – No Ice

- Continuous flow machines **must have water at all times**
- All have water sensor to stop operation if water supply fails, methods include:
  - Water Pressure - AFE
  - Heated Thermistor – Prior NM/FM, MDT3 thru MDT6
  - Conductivity – Prodigy, NU130, MDT2 and AutoSentry
- All auto restart when water supply is restored

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Flaked and Nugget – No Ice

- Bin control stopping operation
  - Thermostat machines – AF & AFE
    - Open bin stat
  - Electronic models – all others
    - Scale on photo eye set
    - Optional KVS set too low

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Flaked and Nugget – No Ice

- Gear reducer motor overloaded
  - Stalled motor breaks circuit to compressor contactor with centrifugal switch
    - MDT3 thru MDT6, AF & AFE, Many prior
  - Over-amped motor triggers controller to shut system down
    - AutoSentry (NME/FME) cut out point
      - 5 amps with Emerson motor, 6 with GE or Marathon
    - Prodigy cut out point
      - 3 or 6 amps by voltage
  - MDT2 – controller senses motor rotation

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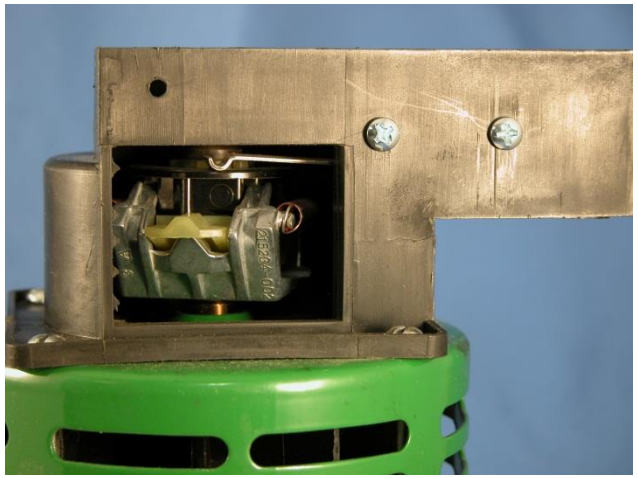
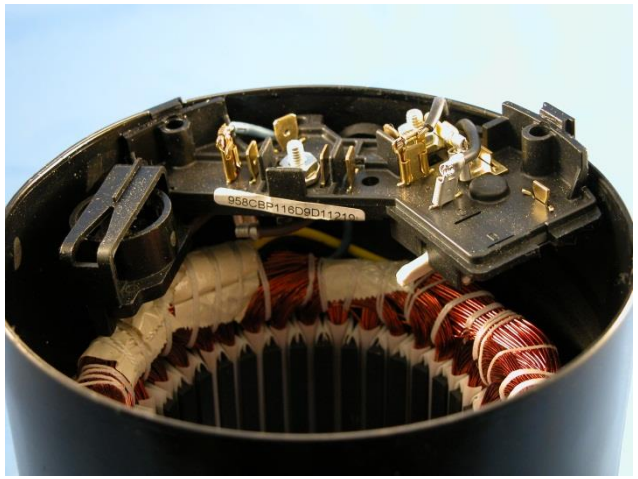
Centrifugal Switch

- In series with contactor coil or compressor, switches open when motor slows or stalls
- Two types
  - 1/10 HP motor, switch is on top of motor
  - ¼ HP motor, switch is inside motor





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Gear Reducer Overloaded

- Causes:
  - Low water level
  - Scale on evaporator
  - Scale on auger
  - Worn bearings
  - Damaged gear reducer

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Flaked and Nugget – No Ice

- Refrigeration – All Models
  - Low charge
  - TXV or cap tube restricted
  - High or low pressure control open
  - Contactor failure
  - Compressor failure
    - Will not start, Does not pump, failed valves

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Flaked and Nugget – No Ice

- Remote Refrigeration
  - Remote headmaster bypassing condenser
  - Remote liquid line valve not opening or leaks thru
  - Remote pump down switch open
    - Compressor does not operate
  - Remote line set restricted
    - Quick connect did not fully pierce

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Flaker Maintenance

Maintenance – Recommended Every 6 Months

- Water System
  - Scale removal
    - Shut off water
    - Drain reservoir
    - Cover photo eyes to protect from spills
    - Mix 3 quarts hot water to 8 ounces Clear 1 scale remover – **do not NOT pour in undiluted**!
    - Fill reservoir – and keep full until all solution is used, then turn water on

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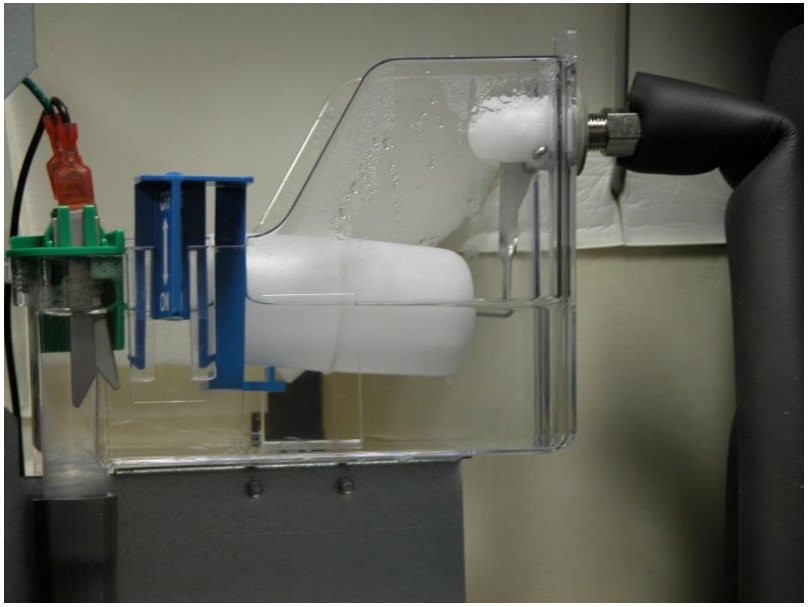
Flaker Maintenance: Scale Removal

- Shut Off Water



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Flaker Maintenance: Scale Removal

- Drain Reservoir

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Flaker Maintenance: Scale Removal

- Mix Scale Remover
  - 8 ounces to 3 quarts

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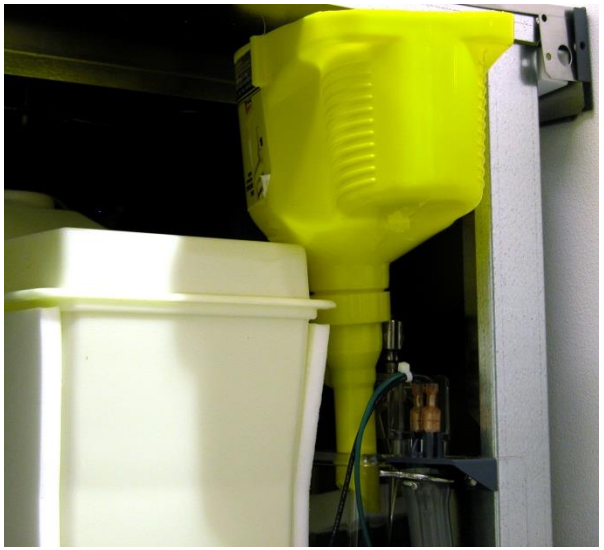
Flaker Maintenance: Scale Removal

- Cover Photo Eyes
- Add scale remover and water solution



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Flaker Maintenance – Scale Removal

- Clean mode
  - Push Clean button
  - Timed soak / auger in motion – 20 minutes
  - Timed run / ice making – 20 minutes keep reservoir full of solution
  - Resets clean light

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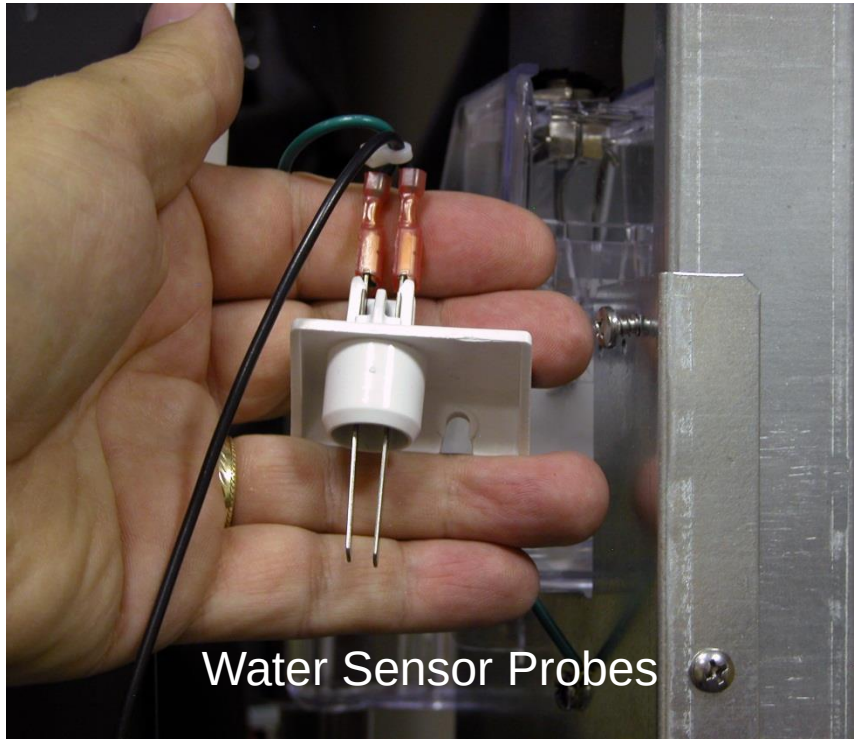
Maintenance - Other

- Check mechanicals
  - Clean air filter
  - Clean Water Sensor
  - Ice Sensor
    - Clean eyes
  - Top bearing
    - Check / Repack
  - Water seal
    - Check condensate pan
  - Gear reducer bolts
    - Check torque
      - 275 inch pounds



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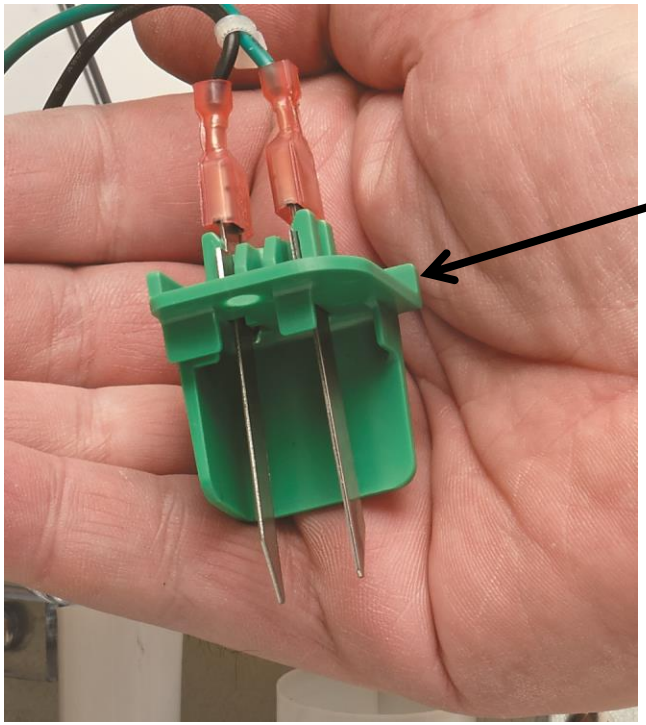
Maintenance – Current Version

- Check water level sensor
  - Probes clean and not shorted



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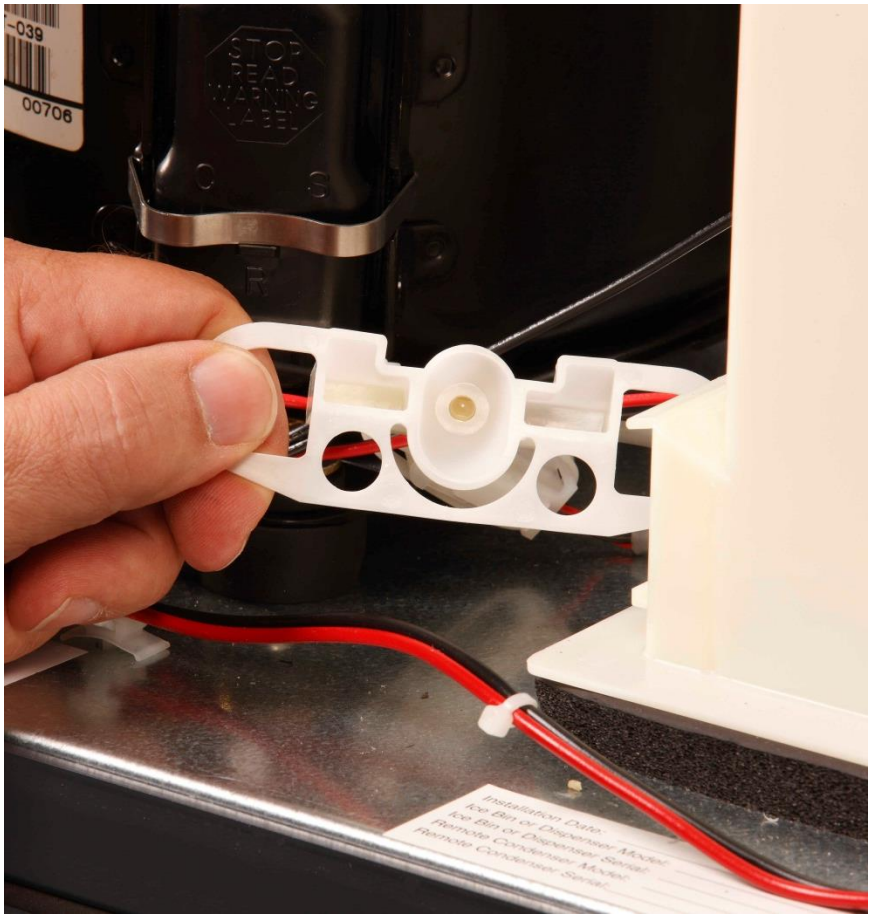
Maintenance - Other

- Clean ice sensors
  - Photo eye set
  - Slide out to remove
  - Wipe with diluted ice machine scale remover



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Bearing Access

- Push bail clamp back
- Remove chute cover
- Remove ice sweep
- Remove breaker cover
  - Left hand threads

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Maintenance

- Bearing service
  - Grease all white – OK
  - Grey streak – add grease to check
  - All grey - repack
    - Repack with grease needle
- Replacement
  - Use arbor press to remove and press in new bearing

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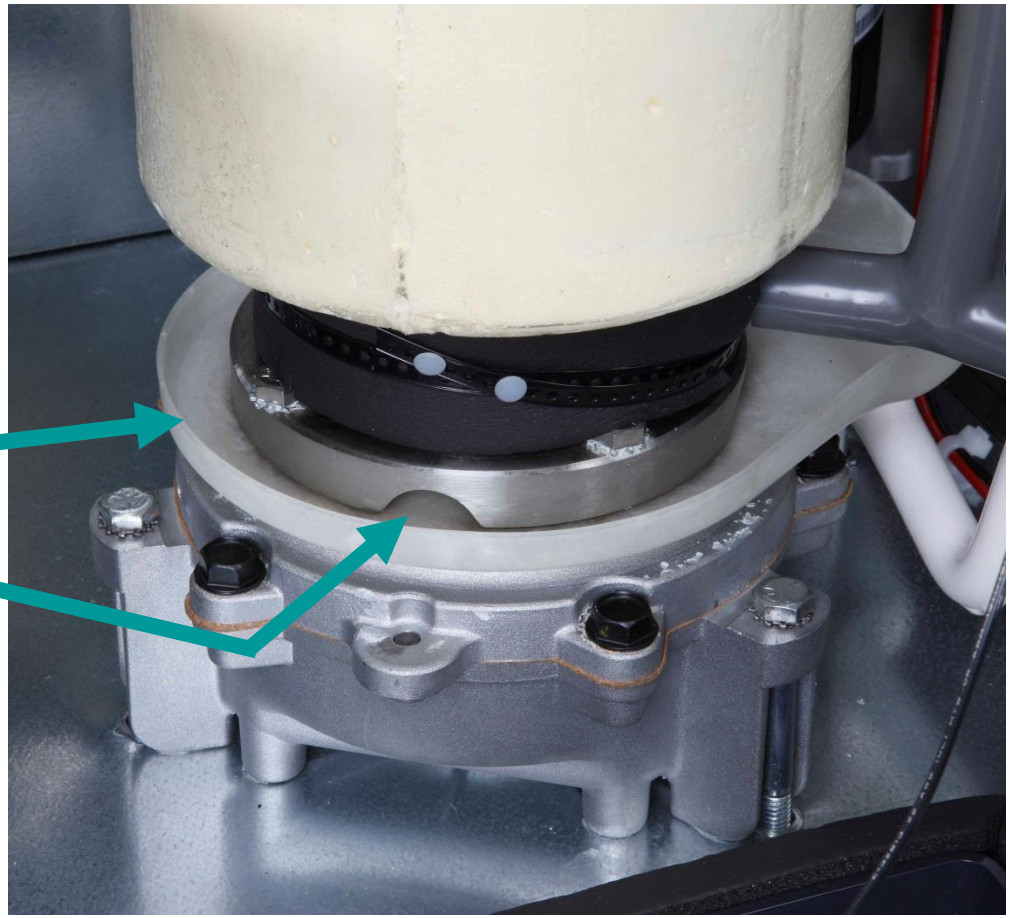
Maintenance

- Water Seal
  - Check condensate pan
  - Water seal leak drains into pan



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Flaker Diagnostics

Display Codes

- F = Freeze mode
- b = Bin full
- C = Clean cycle
- L = Locked
- d = test mode
- O = Off
- E = self test failed

- 1 = No ice sensed
- 2 = Auger motor over amp
- 3 = No water sensed
- 4 = Refrigeration system pressure too high / low

A blinking code means a mode change – will restart or has restarted

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Diagnostics

- Code 1: No ice sensed
  - Rule out: high or low pressure cut out (Code 4)
  - Rule out: no water (Code 3)
  - Auger motor over amp (Code 2)
  - Check:
    - Excessively hot conditions – restricted air flow
    - Dirty air filter or condenser
    - Lack of refrigeration – charge, expansion valve, fan motor, headmaster

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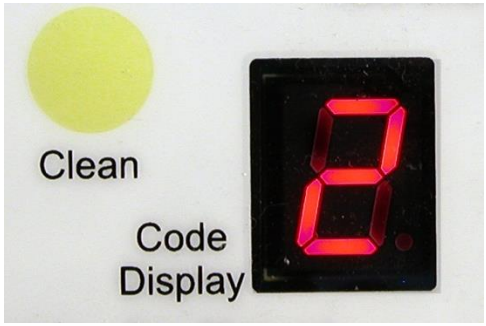
Diagnostics

- Code 2: Auger motor overloaded
- Auto restarts 2 times
- 4 minutes between restarts
  - Check
    - Motor condition
    - Liquid line valve for leak thru (remote low side)
    - Scale on evaporator & auger
    - Bearing condition
    - Gear reducer condition
    - Compressor contactor sticking
    - Low pressure control (remote pump down) not opening



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Diagnostics

- Code 3: No water in reservoir
  - Check filters
  - Check float valve
  - Check sensor
    - Two-Probe Sensor in leg of hose to evaporator
    - Test: short probes together
      - Turns indicator light on
      - Space between probes turns light off

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Diagnostics

- Code 4: High or Low Pressure Control Open
  - Pressure controls are automatic reset type
  - Code 4 indicates one of them opened
    - Unit off, Code 4 means one is still open
    - Unit on, Code 4 in recall code list – was open in past
  - Restart unit to check
    - High (Cut Out 450, Cut In 350):
      - Water cooled may be water interruption
      - Air cooled may be fan motor
    - Low (Cut Out 15, Cut In 30):
      - TXV restricted
      - Charge too low
      - Auger motor or auger not turning

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Controller Button Process

- Reset controller
  - Push Off, then On
- Recall Diagnostic Codes
  - Hold Off button in for 3 seconds
  - Push Clean button to cycle thru the stored codes
- Clear Diagnostic Codes
  - From Standby – Status Light OFF
  - Push and HOLD Clean and Off buttons for 3 seconds

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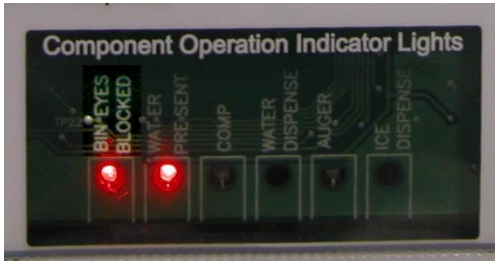
Diagnostics

- Unit off, b in code display, bin is not full

  - Check “Bin Eyes Blocked” indicator light
  - Scale on photo eyes, clean and recheck
    - If clean and Bin Eyes Blocked light is ON, replace eye set
  - Photo eyes out of mounting slot
  - Ambient light on photo eyes
  - Photo eye failure
  - Optional KVS set too low or sensor out of socket
  - Optional Bin Stat is open



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Diagnostics: Refrigeration

- Low charge symptoms
  - High superheat
    - Normal is 10 - 15 degrees F. but varies with ambient
  - Overheated compressor
    - Note: Normal Tecumseh dome temperature is hot
  - Low ice making capacity
  - Low suction pressure
    - 400 - 500 lb normal is 37 - 40 PSIG – higher at high ambient
    - 600 – 800 lb normal is 32 - 36 PSIG
    - 900 lb + normal is 25 - 30 PSIG

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Diagnostics – Low Capacity

- Clean machine first
  - Scale build up will cut capacity
- Check for air in water inlet hose
  - Bubbles in hose cause restriction, that causes low capacity and low suction pressure
  - Correct by changing water reservoir
- Test by catching ice
  - Operate unit for 10 minutes prior to test
  - 15 minutes weight x 96 = 24 hour capacity
  - Low capacity units will be very low

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Flaker Service

Service

- Remove the Auger
  - Shut off water
  - Drain reservoir & evaporator
  - Push bail clamp back
  - Remove cover
  - Remove ice sweep
  - Remove upper chute

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Service

- Loosen auger stud
- Remove 4 allen head bolts
- Lift Auger out, dry off
  - Works best clean & bright
  - Examine auger edges
    - Excessive bearing wear will cause auger damage
  - Check evaporator wall for scale
- Replace Water Seal

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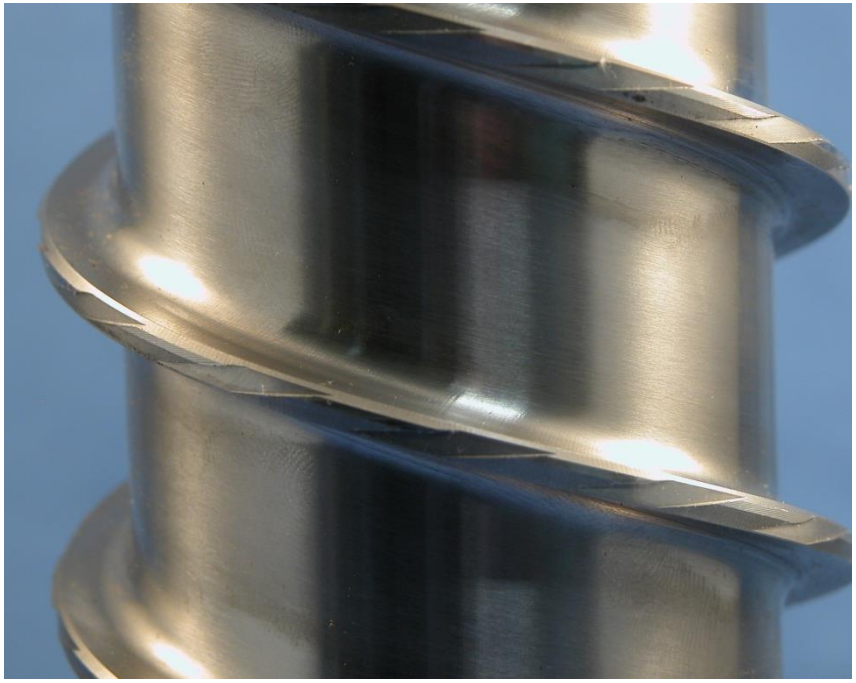
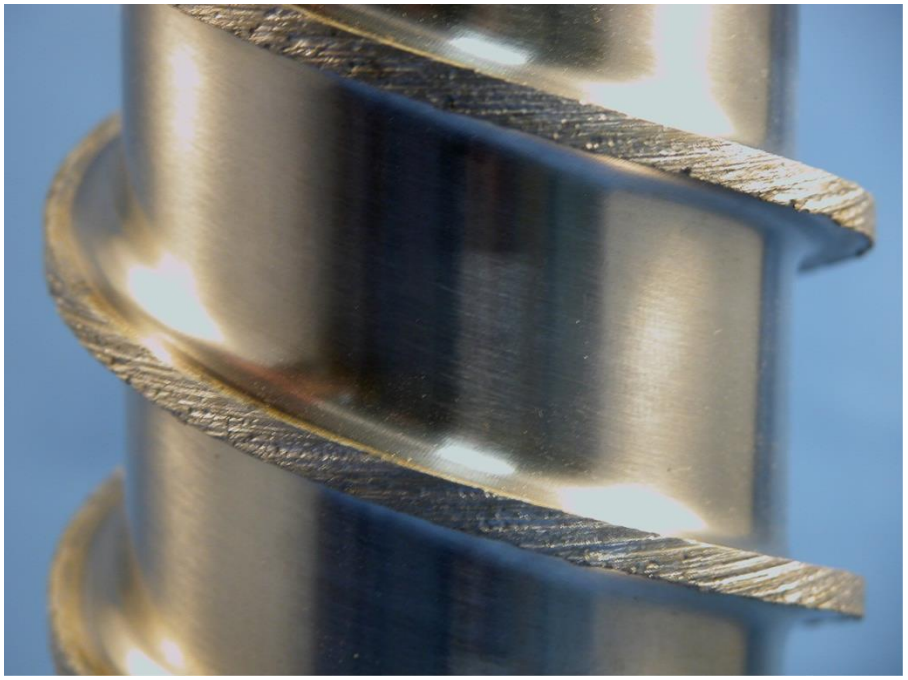
Auger



Auger as it should look,

clean and not damaged.



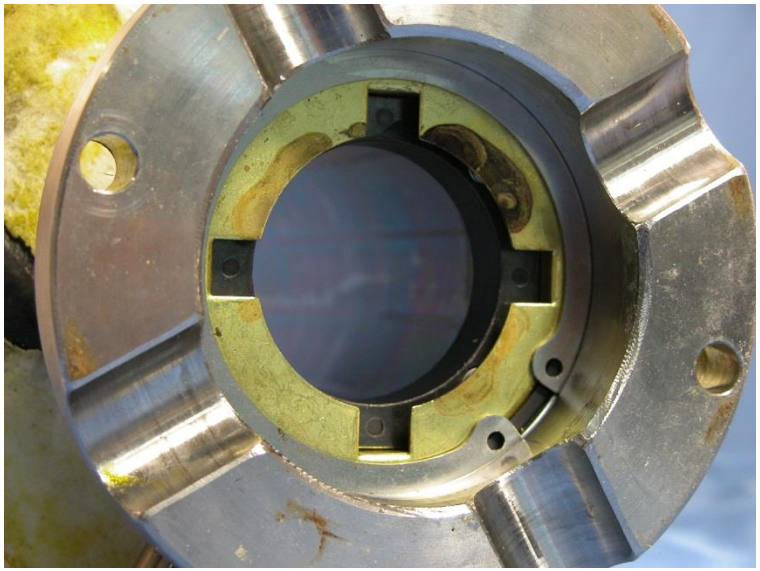
Damaged Auger –

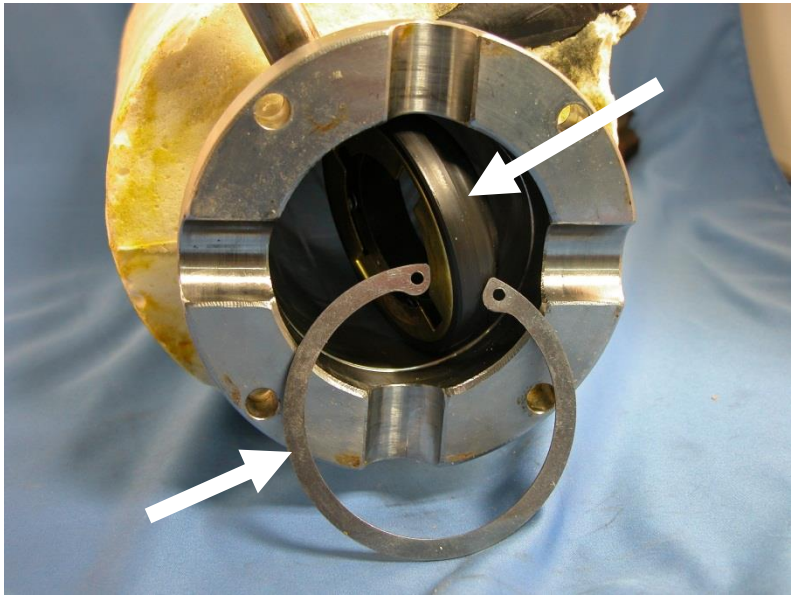
replace, do not use!

Scotsman
ICE THE WORLD DEMANDS

Water Seal Replacement

- Remove auger
- Separate from gear reducer
- Remove retainer and stationary half of seal



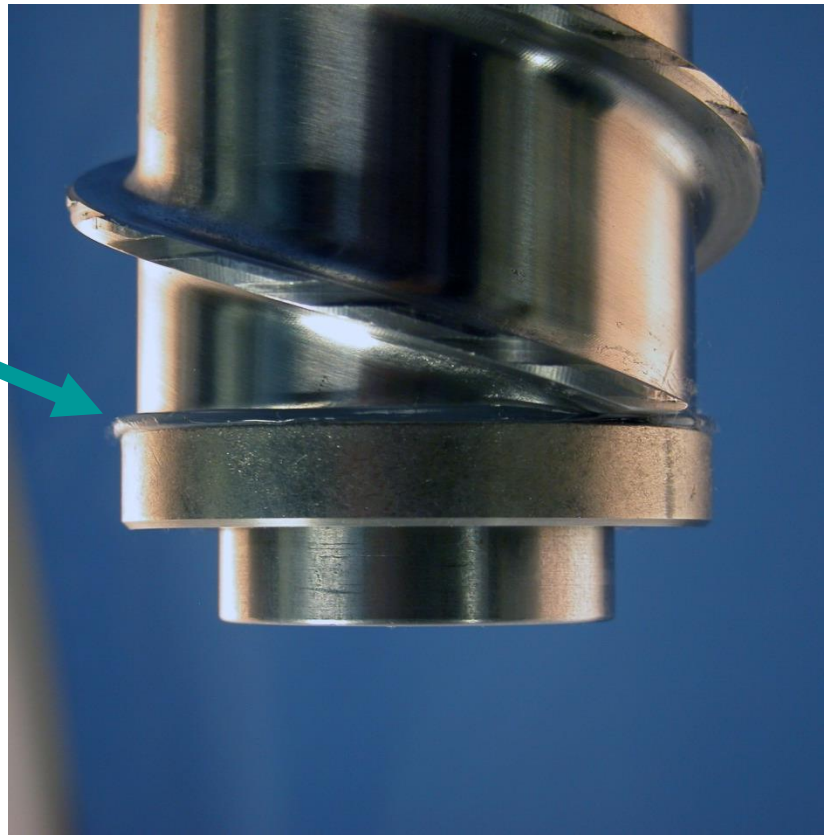


- Lubricate new seal half
- Insert seal into tube
- Install retainer
- Reposition seal onto retainer

Scotsman
ICE THE WORLD DEMANDS

Water Seal Replacement

- Rotating Half
  - Clean auger shoulder
  - Add bead of food grade sealant to shoulder
  - Lubricate rubber
  - Slide onto auger
  - Sealant fills gap



Scotsman
ICE THE WORLD DEMANDS

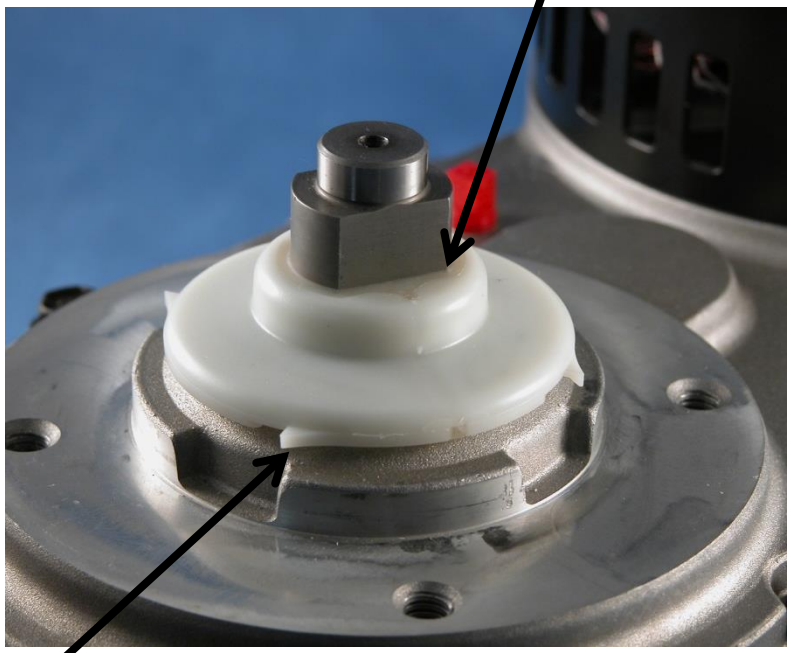
Service: Top Bearing

- Remove auger stud
- Separate breaker from auger, check bearing
  - Remove / Replace bearing using arbor press
  - Install new lip seals, cup side up
    - 2” PVC coupling install tool
    - Lube seals with food grade grease before installing bearing

Scotsman
ICE THE WORLD DEMANDS

Updates

- New Water Shed
  - Use began September 2011
  - Flexible area seals to output shaft
  - Rigid area remains flat
  - Part number 02-4663-01



Scotsman
ICE THE WORLD DEMANDS

Updates

- Water level change – F and N models only
  - Reservoir lowered by ¾ inch
  - Began in June 2011
  - Do not lower water level in machines manufactured after that
- Compressor change to Copeland RST
  - F0822 and N0622 change to B series
  - F1222 and N0922 change to B series

Scotsman
ICE THE WORLD DEMANDS

Nugget Ice Applications

for

Ice Beverage Dispensers

Nugget Ice Dispensing

- Manual Fill Dispenser Modifications
  - Must be set up for Nugget ice dispensing
    - Adapter
    - Kits
    - Adjustments

Scotsman
ICE THE WORLD DEMANDS

General Info

- N0422, N0622, N0922 or N1322
  - Scotsman
    - ID150
    - ID200, ID250
  - Cornelius
    - ED150, DF150
    - ED200, DF200
    - ED250, DF250
  - Lancer
    - Special 30” unit with N in the part number
      - Has special extended liner and different agitator
    - Sensation model – new product

Scotsman
ICE THE WORLD DEMANDS

Scotsman or Cornelius Dispensers

- ID150
  - Add adapter, kits KVS, KNUGDIV
- ED150
  - Add adapter, kit KDIL-PN-150
- ID200 or ID250
  - Add adapter, ktis KVS, KNUGDIV
- ED200 or ED250
  - Add adapter, kit KDIL-PN-200 or 250
- All - Change agitation time to 2 seconds on every 3 hours

Scotsman
ICE THE WORLD DEMANDS

Cornelius Dispensers

- ED300
  - Add Cornelius adapter
  - Add Cornelius agitator kit
  - Add Scotsman bin control kit
- Flavor Fusion (IDC215/255)
  - Add Cornelius adapter
  - Add Scotsman KVS
  - Add diverting plate for Flavor Fusion

Scotsman
ICE THE WORLD DEMANDS

Special Agitator

Standard 150 Agitator

Extra Tip

Special Agitator for ED150 & Nugget Ice

Scotsman
ICE THE WORLD DEMANDS

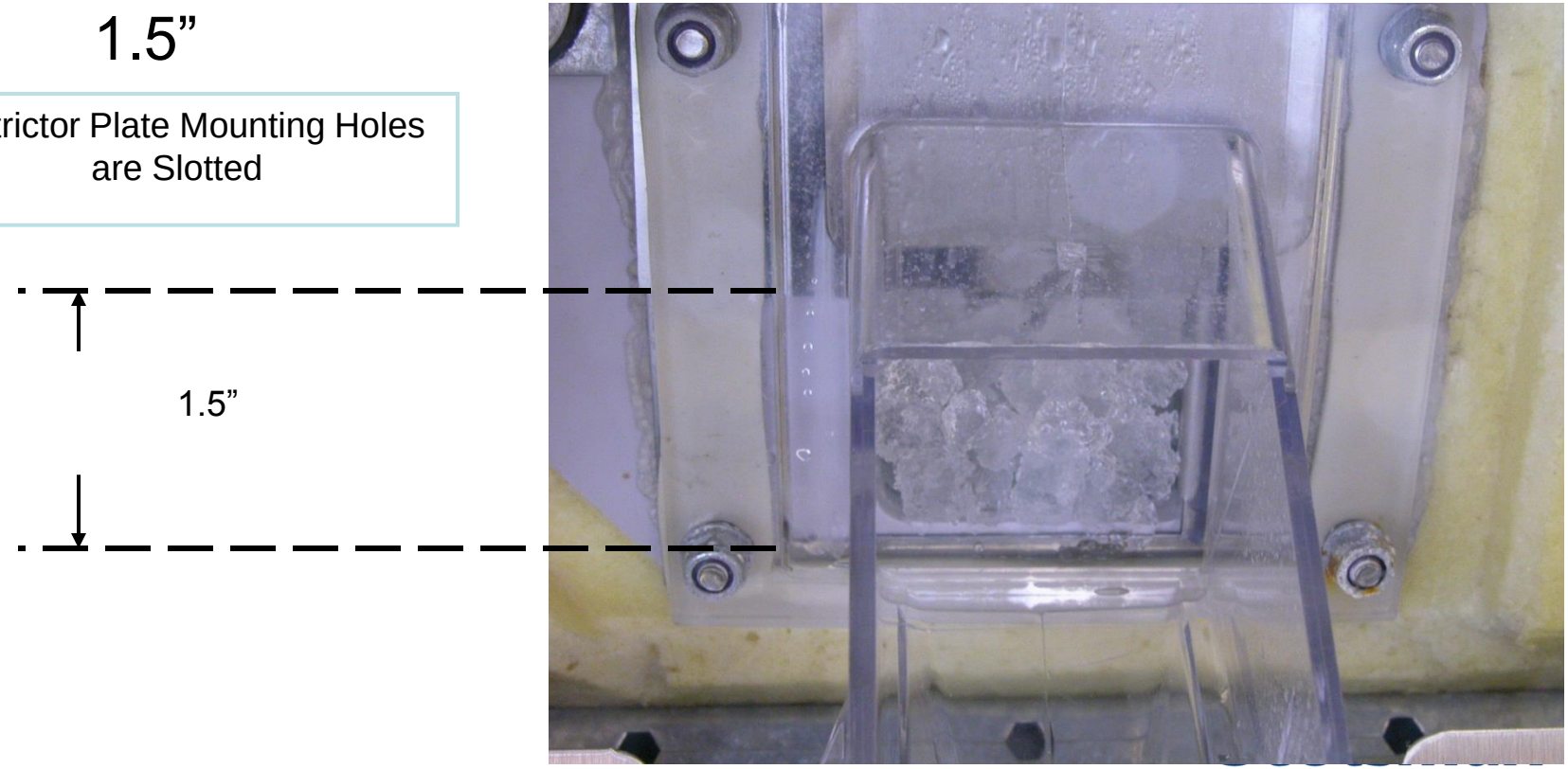
Diverter

- Required for Scotsman and Cornelius dispensers – will not dispense Nugget ice without it
- Installs in chute of dispenser
- Guides or diverts the ice int pushed past

Restrictor Plate

- Cornelius or Scotsman
  - Removal allows very rapid dispensing
  - Recommended: remove or keep and set opening to 1.5”

Restrictor Plate Mounting Holes are Slotted



All Brands and Models

- Agitation must be minimized when dispensing Nugget Ice
  - Scotsman has adjustment features for on time and interval
  - Cornelius has adjustments on their controller
  - Lancer has dip switches
  - SerVend can’t be adjusted but disconnecting the yellow wire to the agitation relay stops agitation

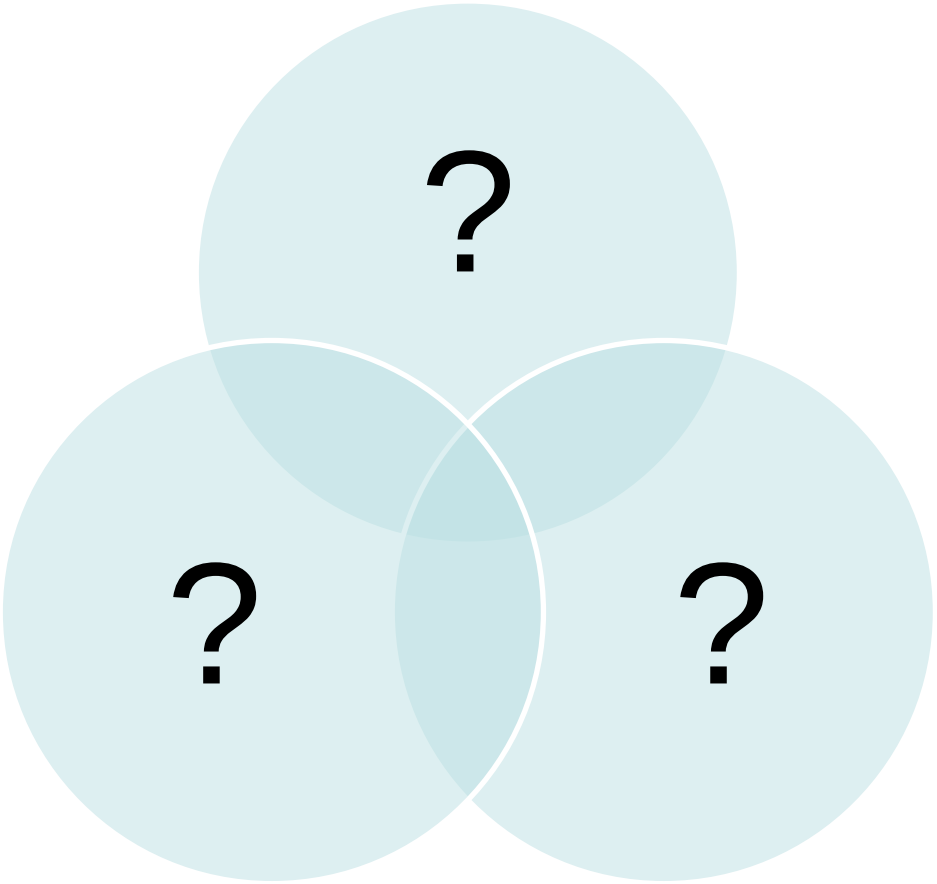
Scotsman
ICE THE WORLD DEMANDS

Ice Slide

- Slide is part of KDIL-PN-200 or 250 kits
- Inserts from above into slot in bottom of dispenser hopper
- Distributes ice evenly over the cold plate

Scotsman
ICE THE WORLD DEMANDS

Questions?



Scotsman
ICE THE WORLD DEMANDS