UF424 and UN324

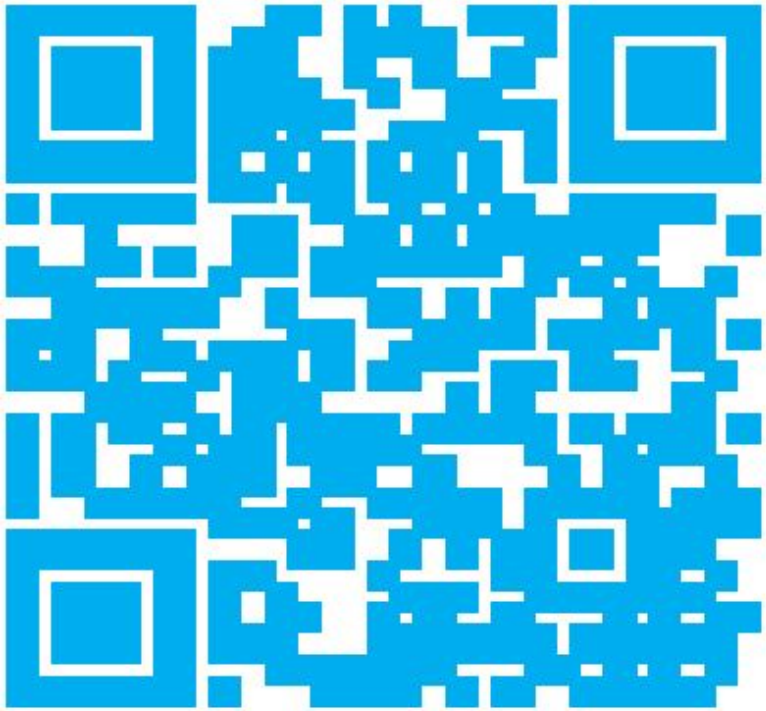
- Technical Service

Scotsman
ICE THE WORLD DEMANDS

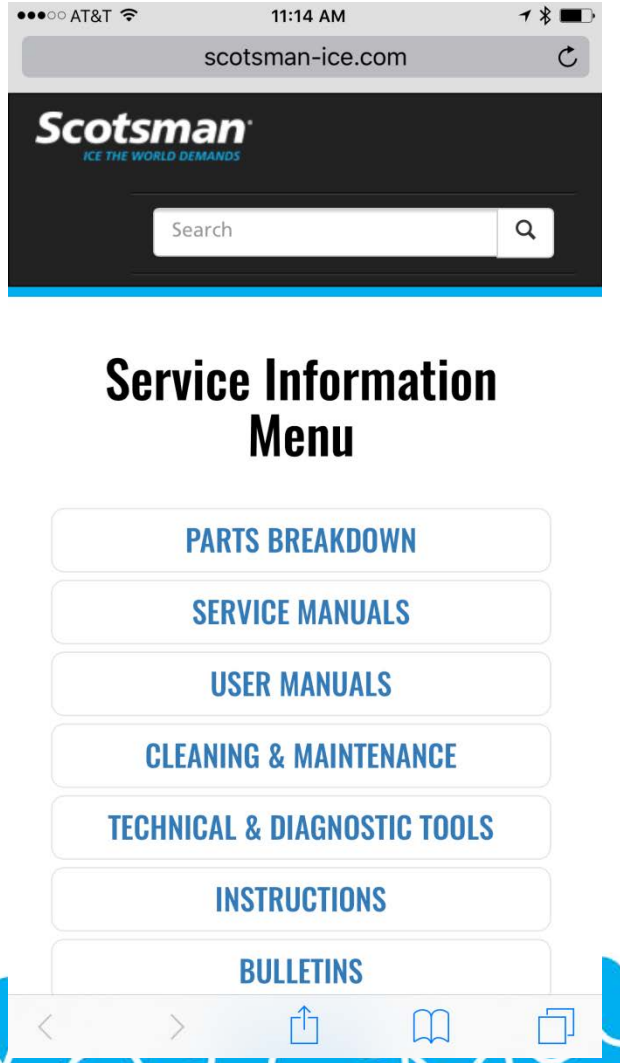
SERVICE SUPPORT

Technical Service 1-800-533-6006

Check out the new mobile ready website



www.scotsman-ice.com/service



Technical Service Virtual Business Card

Scotsman
ICE THE WORLD DEMANDS

What you will learn

- Introduction
- Installation
- Operation
- Maintenance
- Diagnostics
- Take It Apart

Scotsman
ICE THE WORLD DEMANDS

UF424 – Flaked Ice or UN324 – H2 Nugget Ice

- Continuous Flow Ice Making
  - 24 inches wide
  - 39 inches high, with legs
  - Air or Water Cooled
  - Airflow in and out the front

Scotsman
ICE THE WORLD DEMANDS

Common Parts to Models – Excluding Voltage

- Same:
  - Gear reducer
  - Auger
  - Evaporator
  - Bearings
  - Water seal
  - Controller
  - Sensors
- Same
  - Compressor
  - Construction
  - Operation
- Different
  - Breaker
  - Ice sweep

Scotsman
ICE THE WORLD DEMANDS

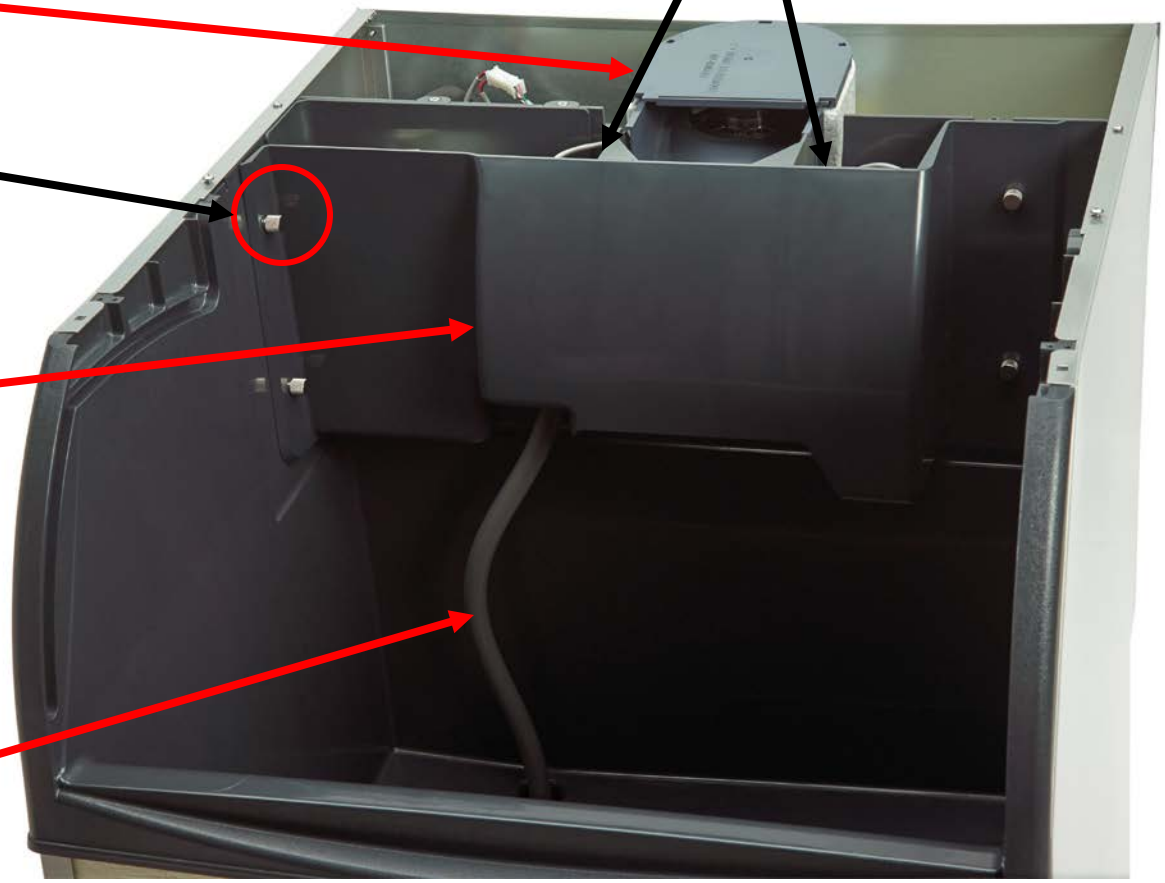
Component Location

Scotsman
ICE THE WORLD DEMANDS

Component Location

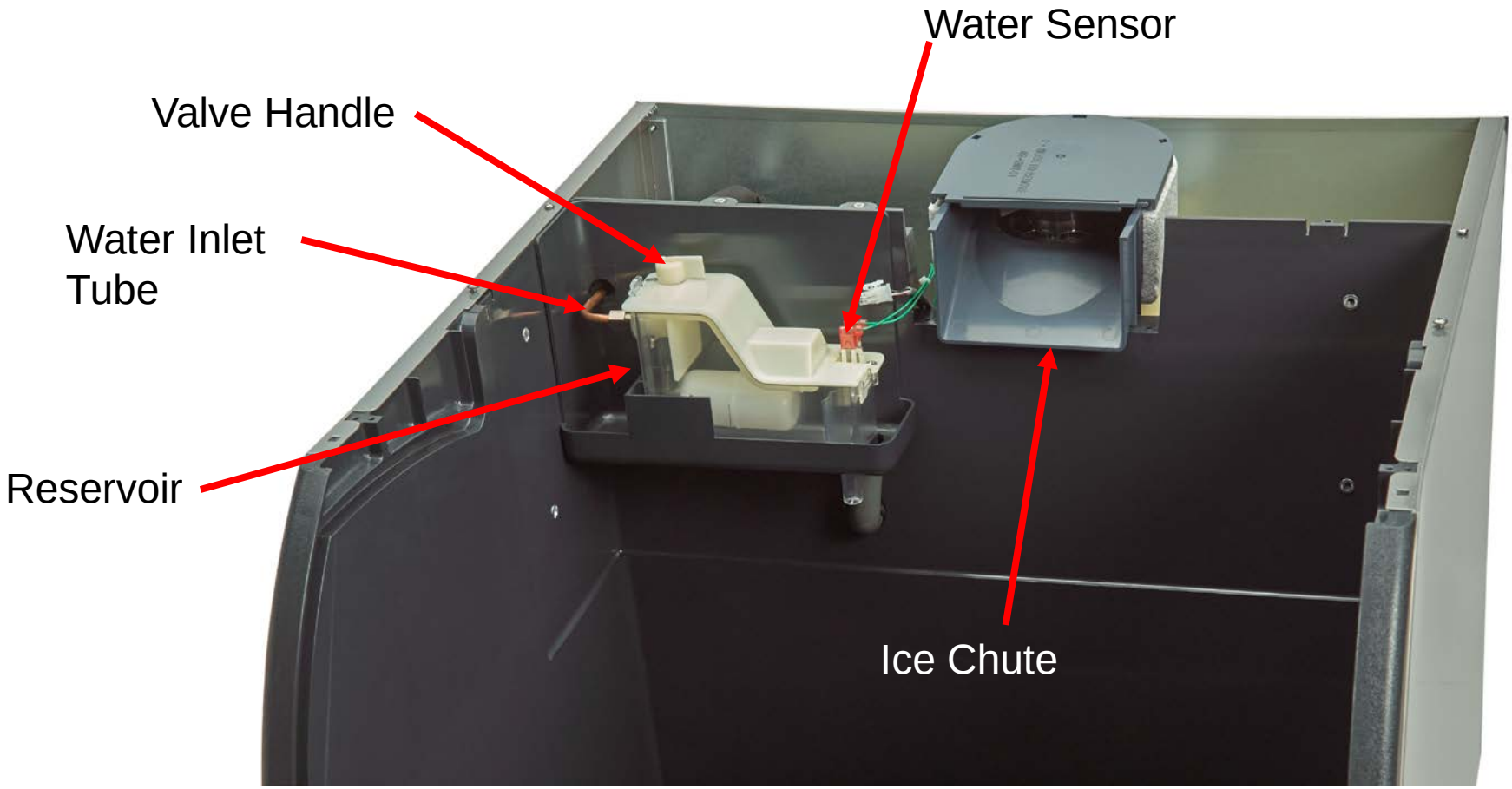
Scotsman
ICE THE WORLD DEMANDS

Component Location



Scotsman
ICE THE WORLD DEMANDS

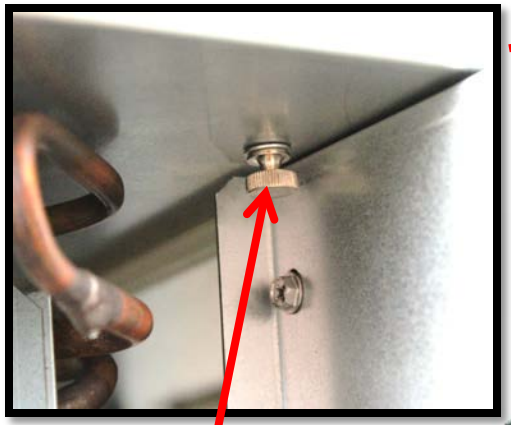
Component Location



Scotsman
ICE THE WORLD DEMANDS

Control Box Details

- Slides Out



Stop Screw – Remove to pull control box out all the way.

Controller

Contactor and Starting Components

Scotsman
ICE THE WORLD DEMANDS

Back Panel Area

Scotsman
ICE THE WORLD DEMANDS

Component Location

Evaporator

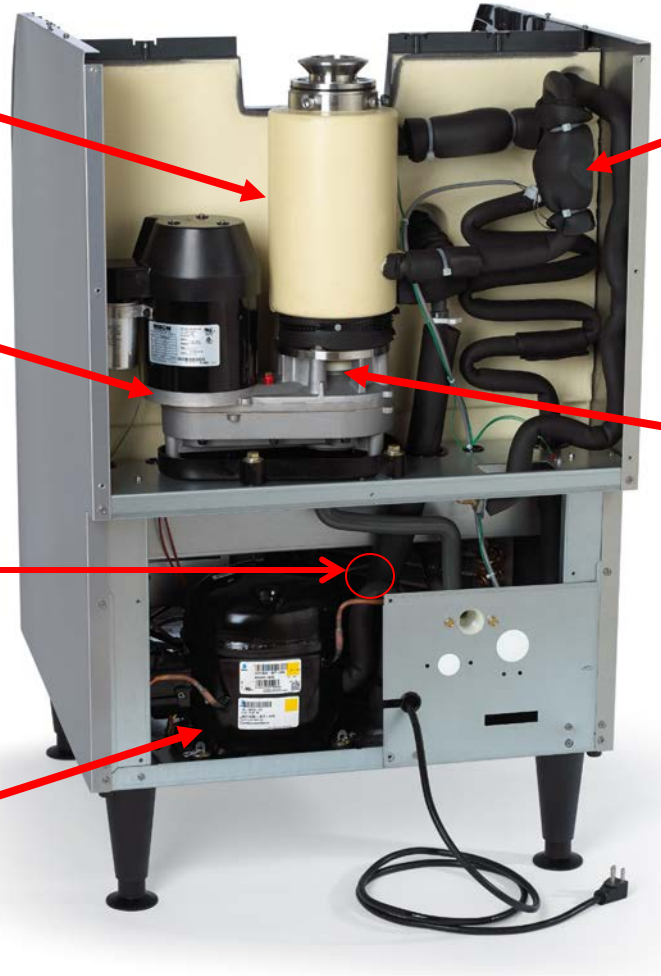
TXV

Gear Reducer

High Pressure Cut Out

Warning: Moving Parts Hazard. Do not touch rotating water shed.

Compressor



Scotsman
ICE THE WORLD DEMANDS

Installation - Utilities

- Recessed area
  - Power cord
    - 5-15P plug
  - Water fitting
    - 3/8 male flare
    - Remember to flush the line!
  - Drain fitting
    - ¾ FPT
    - Vent horizontal runs

Scotsman
ICE THE WORLD DEMANDS

Water Filtration and Treatment

- Water conductivity limit: 10 microSiemens/cm
- Taste and Odor Filters
  - Use if water has objectionable taste
  - This type contains activated carbon
  - T & O Filters remove chlorine
    - Chlorine frequently added by water treatment plant to kill bacteria
- Risk of increased bacteria growth by using a Taste and Odor filter
  - Other types available

Scotsman
ICE THE WORLD DEMANDS

Installation

- Place in planned location
  - Must have water, drain and power nearby
- Level the unit
  - Use the included legs
    - Leg thread is 5/8 - 11
  - Or seal the cabinet to the floor
    - Rubber bumpers on the bottom reduce floor damage

Scotsman
ICE THE WORLD DEMANDS

Pre – Start Check

- Remove front panel
- Open bin door, remove freezing compartment cover
  - Photo eyes are attached to the compartment cover
  - Reservoir overflow drain hose also routed thru compartment cover

Scotsman
ICE THE WORLD DEMANDS

Installation – Start Up

- Turn on water supply
  - Confirm no leaks
- Connect power
- Push On-Off button
  - F displayed
  - Auger motor starts
    - Auger light on
  - Compressor starts
    - Compressor light on

Scotsman
ICE THE WORLD DEMANDS

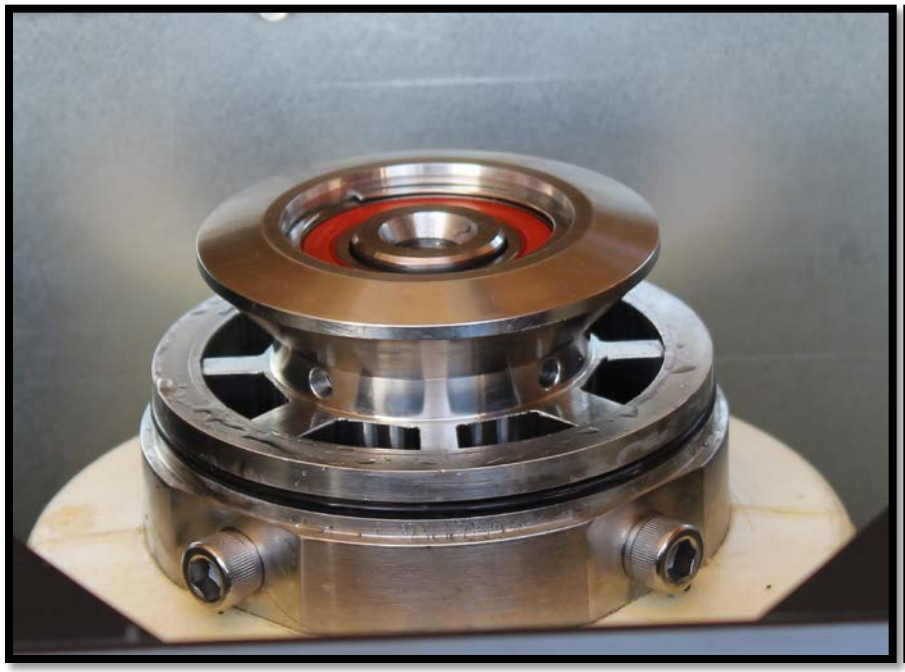
Start Up

- Check bin control for shut off
  - Open bin door, block eyes in chute
  - Observe 6 in display
- Attach compartment cover
- Pour water in bin, check draining
- Return front panel to unit

Scotsman
ICE THE WORLD DEMANDS

Ice Forms

- Extruded Ice
  - UN makes H2 Nugget Ice



Warning: Moving Parts Hazard. Do not operate with sweep cover removed.

Scotsman
ICE THE WORLD DEMANDS

Ice Forms

- Extruded Ice
  - UF Flaked Ice – note non-interchangeable ice sweep

Warning: Moving Parts Hazard. Do not operate with sweep cover removed.

Scotsman
ICE THE WORLD DEMANDS

Ice Comparison

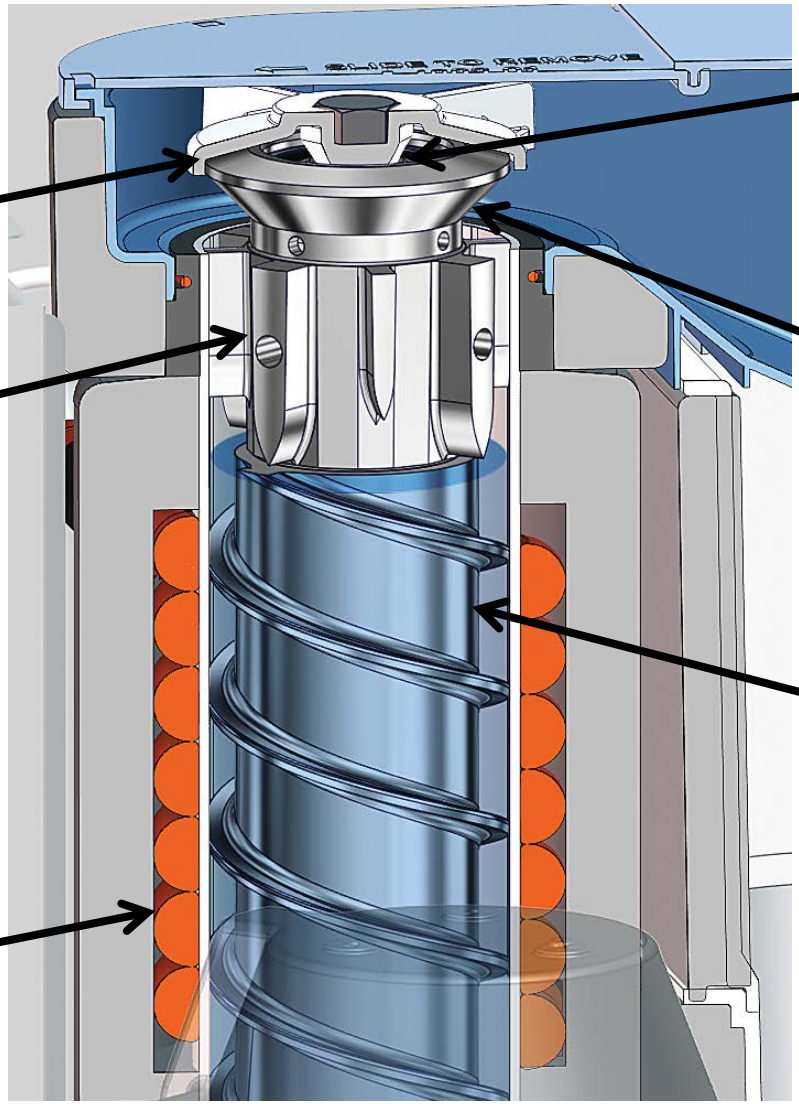
Warning: Moving Parts Hazard. Do not operate with sweep cover removed.
Images are for illustration of ice form and components only.

Nugget Ice

Flaked Ice

Scotsman
ICE THE WORLD DEMANDS

Ice Making Type: Continuous Flow



Scotsman
ICE THE WORLD DEMANDS

Controller

Switches - there are two switches:

On/Off - to switch the machine on or off. Holding it in to shut off will stop ice making immediately.

Clean - to engage the clean mode

Scotsman
ICE THE WORLD DEMANDS

Controller

Indicators - there are five LEDs:

Power - Glows when controller has power

Status - Glows when in ice making mode

Time to Clean - Glows when it is time to clean the machine

Auger - glows when the auger motor is on

Compressor - glows when the compressor is on

Scotsman
ICE THE WORLD DEMANDS

Controller

- Code Display
  - 0 - off
  - F - ice making
  - C - clean
  - b - bin full
  - d - test mode
  - E - controller failure
- Diagnostic codes

Scotsman
ICE THE WORLD DEMANDS

Controller Details

- The Time to Clean indicator light glows when 6 months of power up time have elapsed.
  - When on it does NOT stop ice making.
  - It is cleared and reset when the Cleaning process has been completed.
- The Cleaning process is initiated by a press of the Clean button. The auger motor will be operating during the entire Clean mode, and after 20 minutes the compressor starts automatically to make ice with the scale remover solution.
  - The scale is dissolved by the action of the scale remover solution and the auger's motion.
  - Ice making will stop after 20 minutes.

Controller Details

- Auger Motor failure is an immediate shut down.
  - Because of the critical nature of that failure there is no auto restart from an auger error.
- An open Water Sensor (dry probes) will stop the machine.
  - Because water can be restored at any time, whenever both Water Sensor probes are wet again AND the compressor has been off for at least two minutes, ice making will restart.
- An open High Pressure Switch will stop the machine.
  - Because the pressure switch is an automatic reset, when it closes AND the compressor has been off for at least two minutes, ice making will restart.

Operation – 115 volt models

R-134a (PSIG)					
Conditions	Suction	Discharge (AC)	Discharge (WC)	Hi Pressure Cut Out	High Pressure Cut In
70/50	6 - 8	130 - 135	135	260	190
90/70	8 - 9	180 - 185	135	260	190

Model	Compressor Amps	Gear Reducer Amps
UF or UN	5 – 6	1.1 – 1.3

Data is for NEW, CLEAN machines.

Scotsman
ICE THE WORLD DEMANDS

Maintenance

- Flush out drain
- Clean Filter - Pull air filter out
  - Wash off, dry and return
  - Also in water cooled
    - For appearance only

Scotsman
ICE THE WORLD DEMANDS

Water System Maintenance

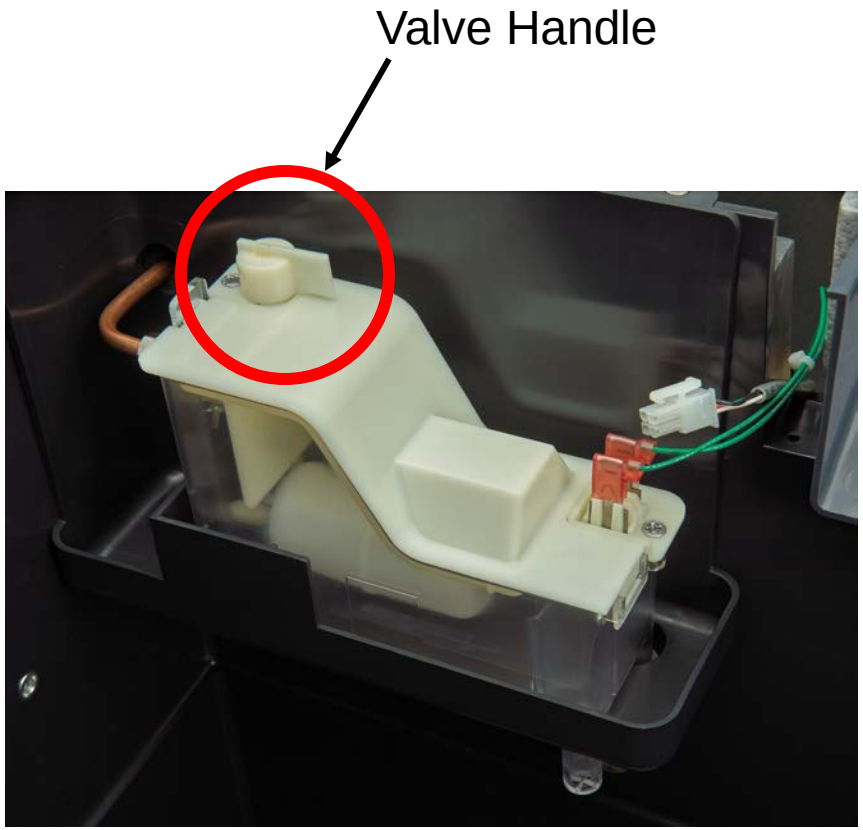
- Scale Removal
- Sanitizing
- Cleaning Reminder

  Indicator Light
  - On after 6 months of power connected time
  - Reset after following the factory cleaning process

Scotsman
ICE THE WORLD DEMANDS

Scale Removal

- Remove front panel
- Push On-Off button to shut ice making off
- Remove top and compartment cover
- Shut water off
  - At reservoir float valve or at hand valve to machine



Scotsman
ICE THE WORLD DEMANDS

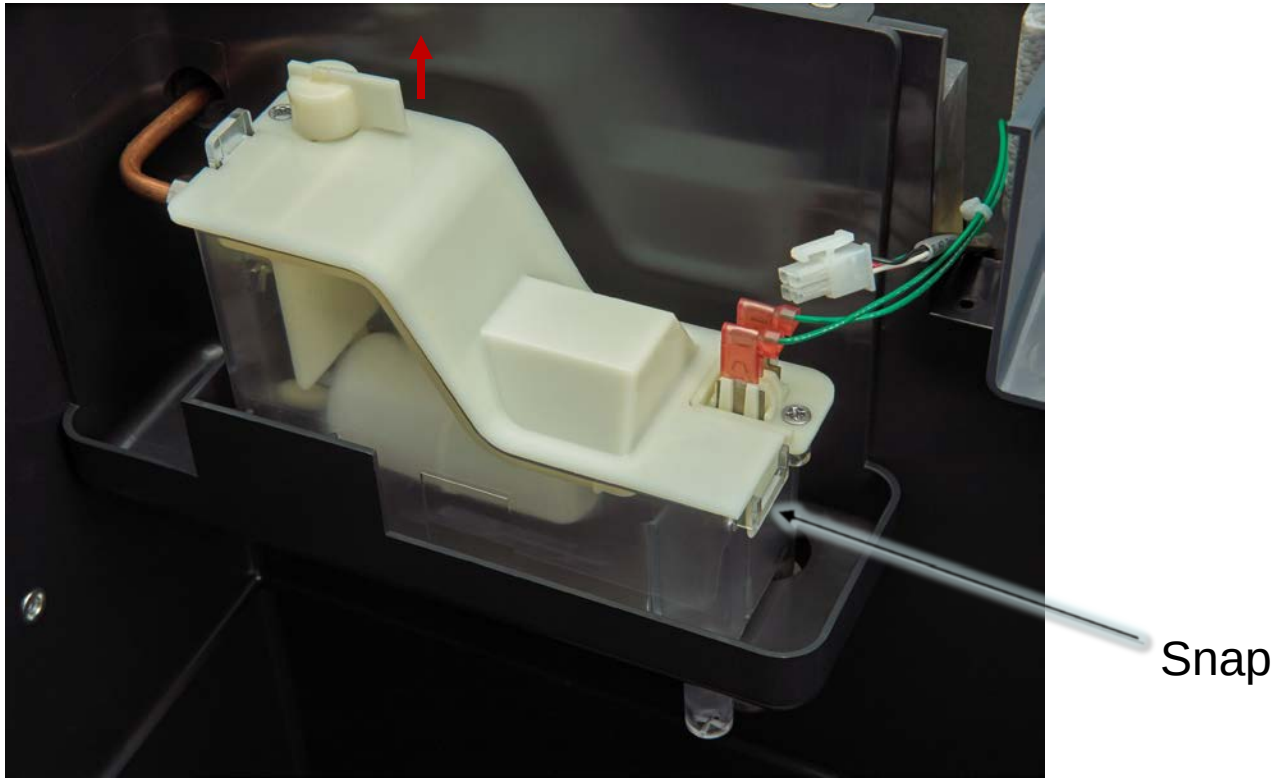
Scale Removal

- Drain water system
  - Pull reservoir drain hose plug
  - Reconnect hose plug when done

Scotsman
ICE THE WORLD DEMANDS

Scale Removal

- Pull up and remove valve handle
- Release snap and remove reservoir cover



Scotsman
ICE THE WORLD DEMANDS

Scale Removal

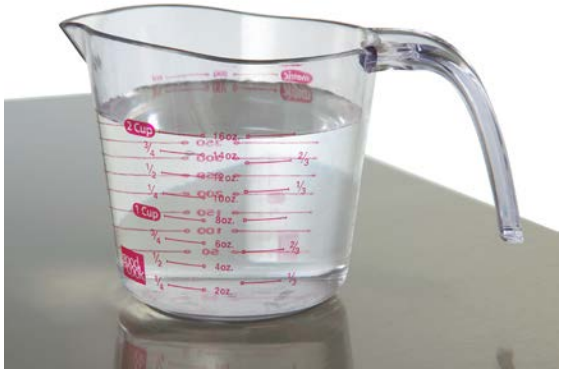
- Mix a solution of scale remover and potable water
  - 4 ounces Clear 1

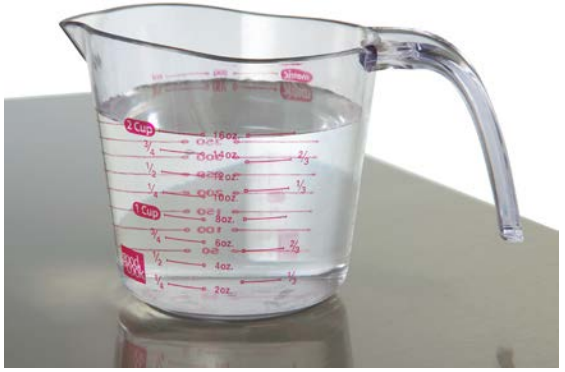
Use squirt bottle to add cleaning solution if top panel cannot be removed to access reservoir.

Scotsman
ICE THE WORLD DEMANDS

Mix Water and Scale Remover

- 48 ounces of potable water
  - 6 cups

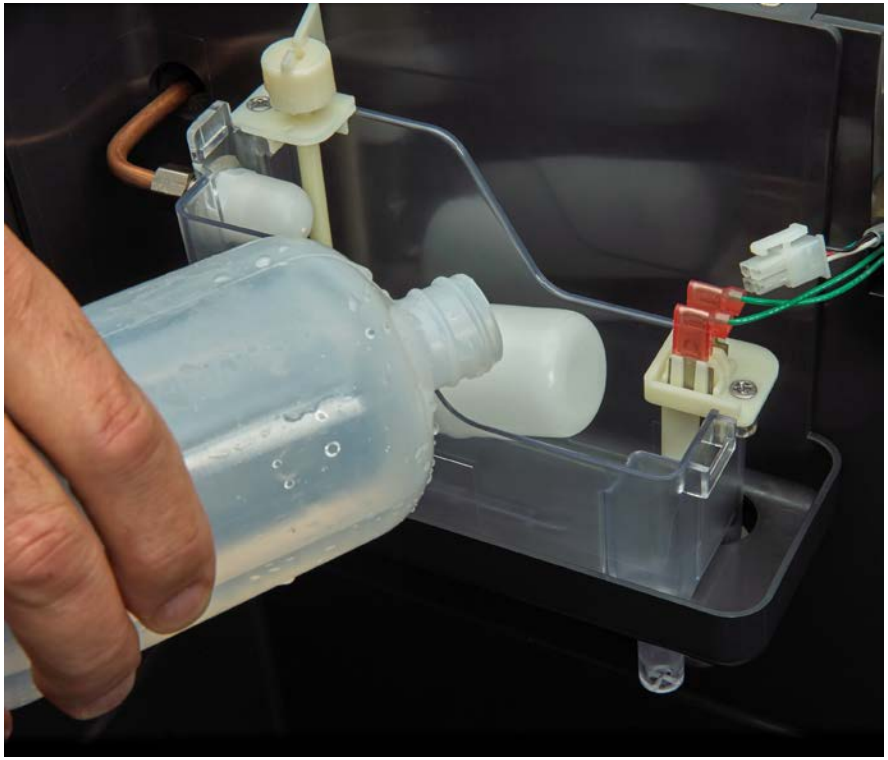




Scotsman
ICE THE WORLD DEMANDS

Scale Removal

- Pour the scale remover mixture into the reservoir
  - If under a counter or the top will not be removed
    - Use a squirt bottle or similar



Scotsman
ICE THE WORLD DEMANDS

Scale Removal

- Push the Clean button
  - Auger motor will start
    - Operates for 20 minutes
  - Compressor will start, auger motor stays on
    - 20 more minutes
    - Add scale remover solution until all gone
    - Add water until unit stops

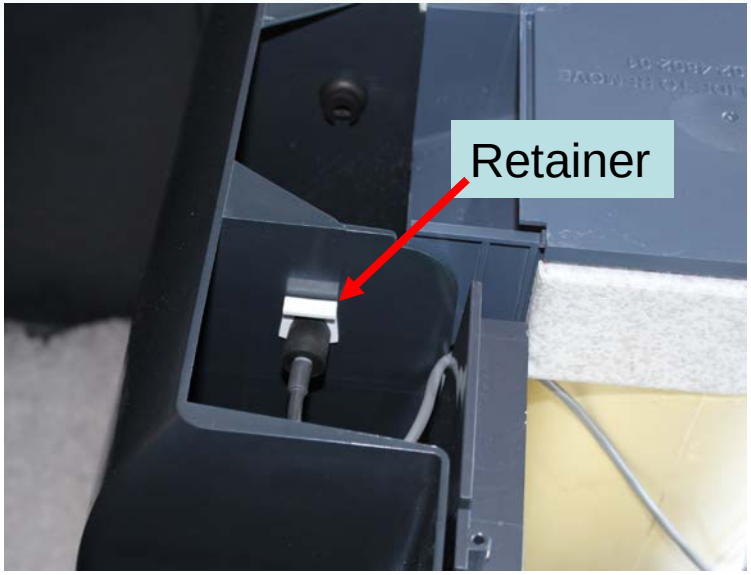
Scotsman
ICE THE WORLD DEMANDS

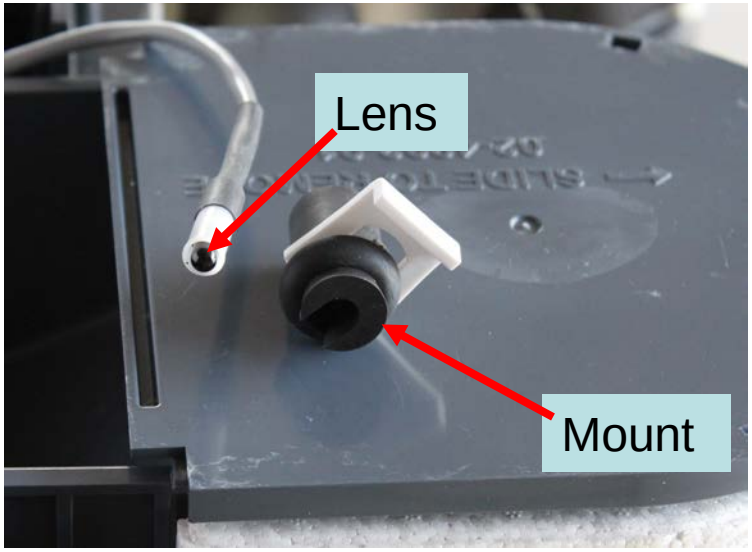
Scale Removal

- Drain the water system again.
- Mix 4 ounces of Clear 1 scale remover to 16 ounces of water.
  - Wash the reservoir cover, ice discharge chute, inner door surface and bin liner with the solution.
  - Wash the inside of the photo eye sensors with the cleaning solution and a cotton swab.
  - Pour remainder into the bin.

Cleaning Sensors

- Wipe photo eyes lenses clean with cotton swab and scale remover solution





Scotsman
ICE THE WORLD DEMANDS

Sanitize Now

- Use locally approved sanitizer.
  - Mix 2 to 2.5 gallons of solution per directions of the sanitizer
  - Pour sanitizer solution into reservoir until full
  - Reconnect electrical power and push On Off to restart ice making
    - Keep adding sanitizer as needed to keep reservoir full
  - Stop after 15 minutes
- Unplug power cord or disconnect electrical power

Scotsman
ICE THE WORLD DEMANDS

Sanitize

- Pour hot water into bin until ice is melted
- Wash the sweep cover, ice sweep and metal below the ice sweep with the sanitizer solution
- Drain the water system again
- Reconnect water supply

Scotsman
ICE THE WORLD DEMANDS

Sanitize – Finish Up

- Reconnect power
- Push On-Off to restart ice making
- Make ice for about 10 minutes
- Pour hot water into bin to melt ice until ice is gone
- Reattach all panels

Scotsman
ICE THE WORLD DEMANDS

Diagnostics

- No ice
  - Compressor and Auger motor are OFF
    - Check trouble code number on controller
    - Code chart is on unit

Trouble and Status Codes

0	for off
F	for ice making
b	for bin full
E	for controller error
C	for clean mode
d	for test mode
1	for auger rotation direction wrong
2	for auger speed too slow
3	for no water sensed
4	for high refrigerant pressure

Scotsman
ICE THE WORLD DEMANDS

Controller Details

- Recall Codes – From OFF
  - Push and HOLD the clean button (auger motor starts) AND then push and release the on/off button 3 times (auger motor stops) or until Status light is on. Release both.
    - Note: Uncorrected faults will not allow codes to be read. Example: An empty reservoir will trigger code 3. The codes cannot be read until there is water in the reservoir or until the water sensor probes are jumped.
  - Pushing Clean will cycle thru the available codes, the total number of codes stored is 30.
- Clear Codes
  - Only from Fault Code View: Push and HOLD the Clean button for about 3 seconds. The code display will blink 3 times. Release.

Scotsman
ICE THE WORLD DEMANDS

Code 1: Auger Motor Reversal

- Manual reset
- Almost certainly caused by defective auger motor
- May also be caused by auger frozen in place
  - Stuck contactor
  - Error in wiring power leads on contactor

Code 2: Auger Motor Slow

- Manual reset
- A slow or no turning auger motor is a symptom of
  - No power to motor
  - Motor failure
  - Significant scale on the evaporator and auger
    - May be associated with an unusual and loud noise
  - Low water level because of restriction in water supply to evaporator
  - Damaged auger bearings
  - Damaged gear reducer

Scotsman
ICE THE WORLD DEMANDS

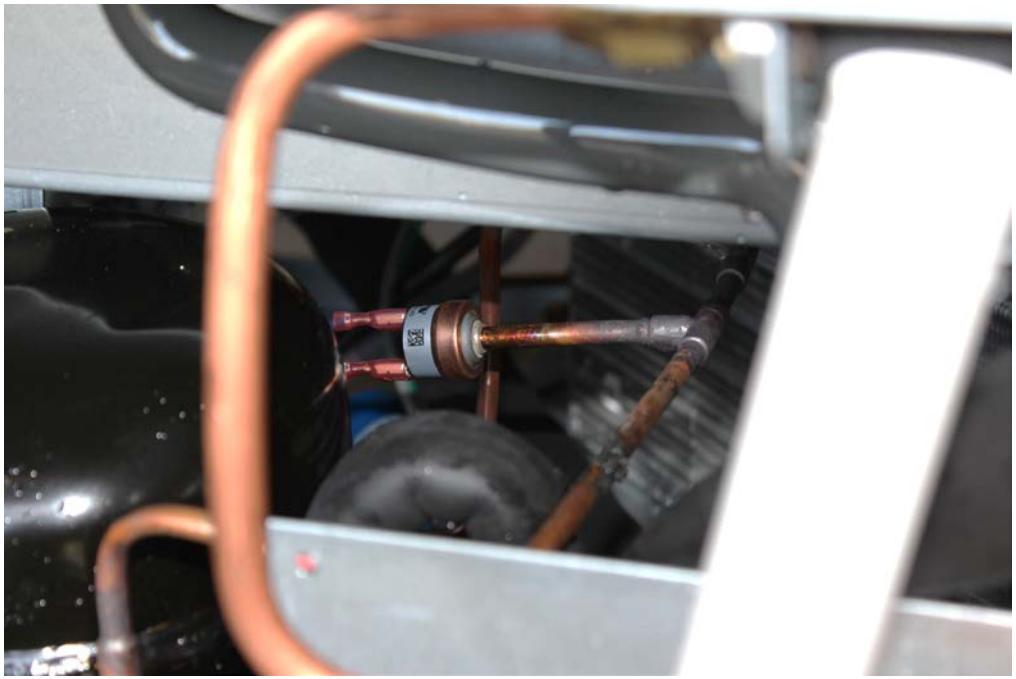
Code 3: No Water

- Auto reset when water restored
- Causes include:
  - Empty reservoir
  - Plugged filters
  - Blocked float valve
  - Water too clean
    - RO water can be no cleaner than 10 microSiemens/cm

Scotsman
ICE THE WORLD DEMANDS

Code 4: High Pressure Cut Out Open

- Opens at 260 PSIG, auto reset closed at 190
  - Check for water interruption to water cooled model
  - Check for fan motor failure on air cooled model



Scotsman
ICE THE WORLD DEMANDS

Diagnostics

- No ice
  - 6 displayed, but no ice in bin
    - Scale on photo eyes
    - Photo eye harness unplugged or poor connection
    - Photo eye failure
  - E displayed
    - Controller failure, replace it
  - 0 displayed
    - Unit switched off
- User unplugged it
  - Unit switches off and on repeatedly

Scotsman
ICE THE WORLD DEMANDS

Diagnostics

- Other causes of no ice
  - Compressor not on, compressor light is on
    - Contactor failure, coil open or damaged contacts or wires
    - Compressor starting component failure
    - Compressor failure
    - Compressor overheated and off on overload
      - TXV starving the evaporator
      - Low refrigerant charge
    - Overload open but compressor not overheated
      - Check for high current draw, defective overload
    - Controller not supplying power to the contactor coil

Test Mode

- To start Test Mode:
  - Push and HOLD the ON/OFF button; at the same time, push and HOLD the CLEAN button.
  - When a "d" appears in the code display, release the buttons, the test mode will begin.
- Controller will switch these on in this order
  - Compressor
  - Compressor and Auger Motor
  - Auger Motor only

Scotsman
ICE THE WORLD DEMANDS

Take It Apart

- Shut water off
- Unplug from power
- Remove all panels
  - Two back panels

Scotsman
ICE THE WORLD DEMANDS

Take It Apart

- Remove front panel
- Drain water system

Scotsman
ICE THE WORLD DEMANDS

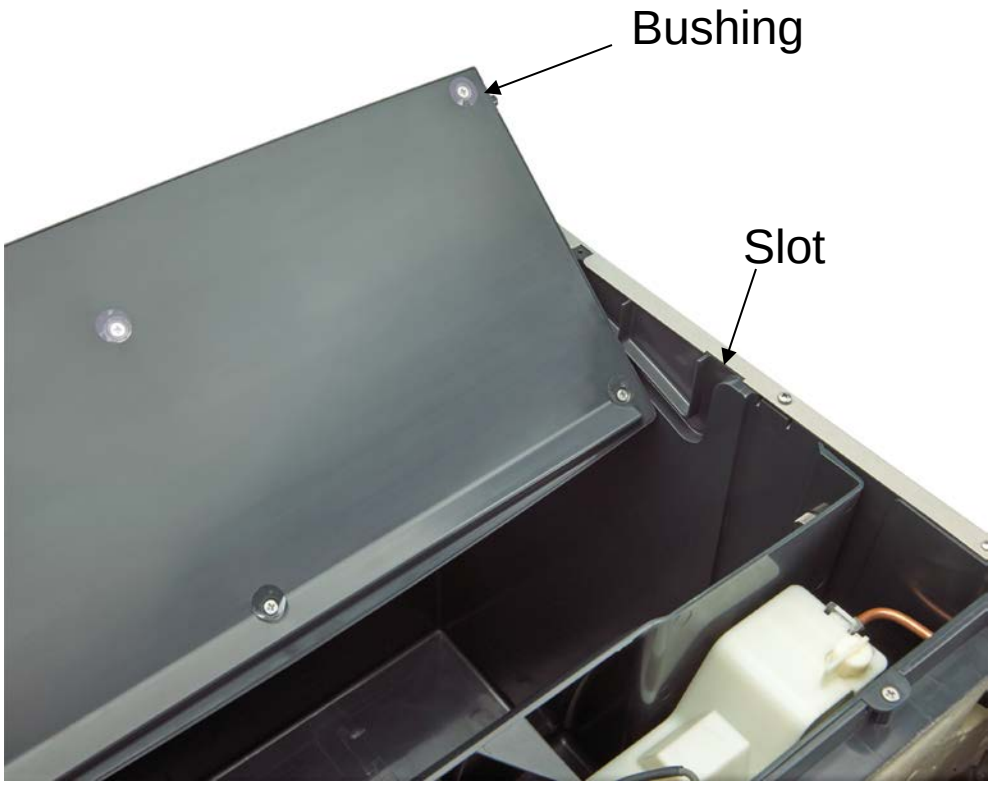
Take It Apart

- Remove top panel
  - Three thumb screws at back
  - Push panel back slightly
  - Lift up and off

Scotsman
ICE THE WORLD DEMANDS

Take It Apart

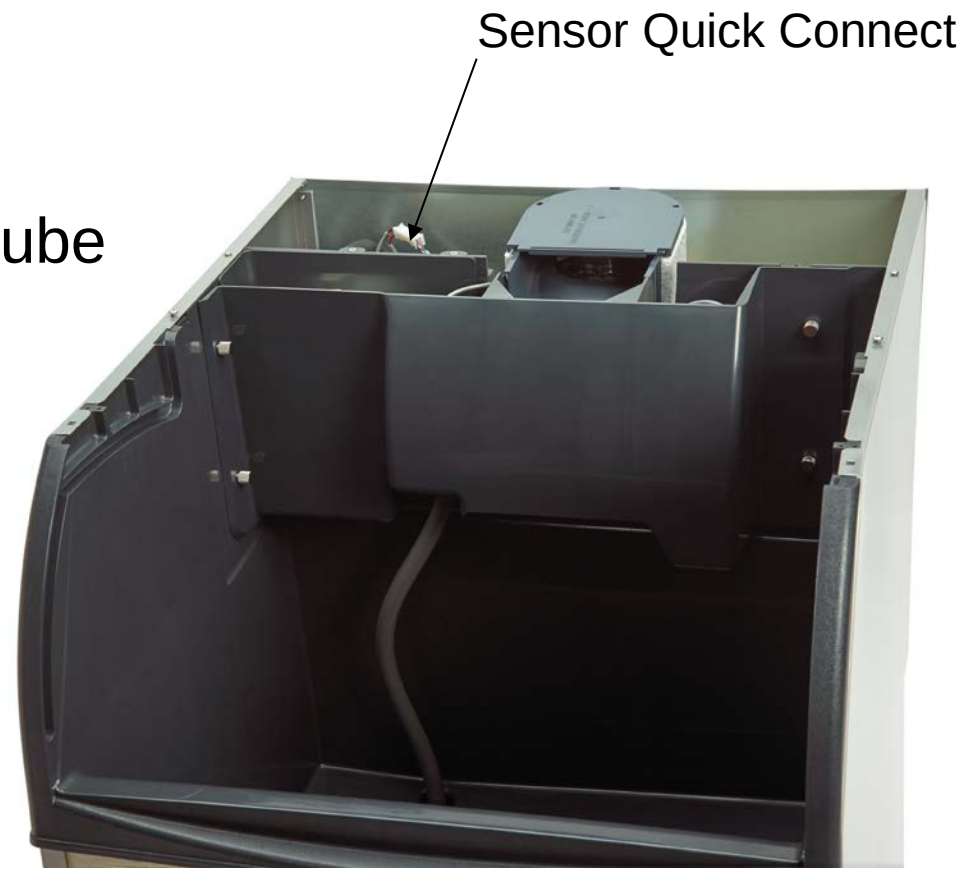
- Remove door
  - Push door up in back slot until two bushings appear
  - Remove bushings, retain
  - Pull door up and out of unit, remove bushings and retain



Scotsman
ICE THE WORLD DEMANDS

Remove Bin

- Disconnect
  - Photo eye sensors
  - Reservoir overflow tube
- Remove
  - Compartment cover
  - Ice sweep cover
  - Ice sweep
  - Ice chute



Scotsman
ICE THE WORLD DEMANDS

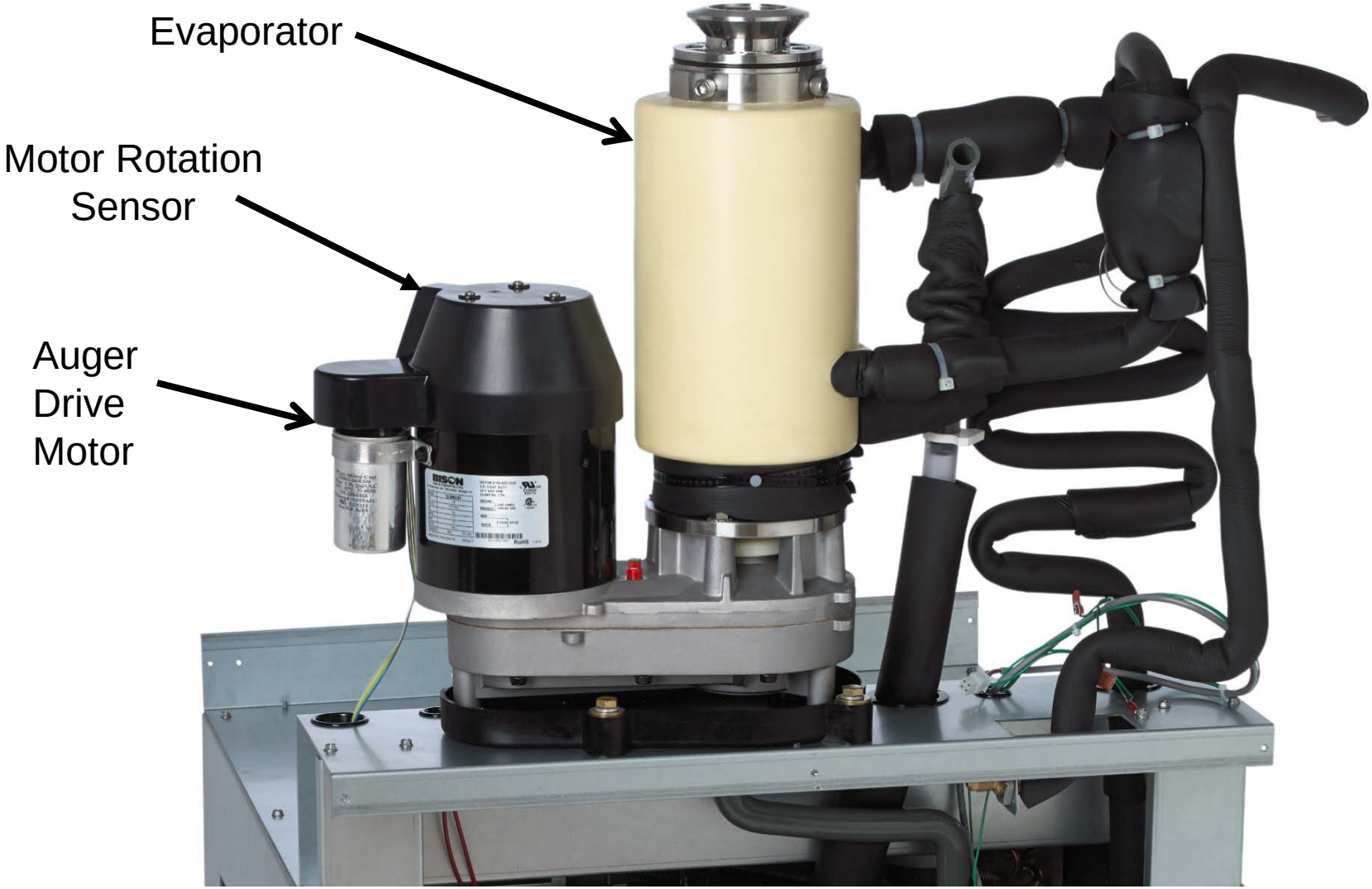
Remove Bin

- Disconnect
  - Reservoir water inlet
  - Evaporator water inlet
  - Bin drain tube
  - Water sensor leads

Take It Apart

- Remove side panels
- Lift bin off chassis

Scotsman
ICE THE WORLD DEMANDS



Scotsman
ICE THE WORLD DEMANDS

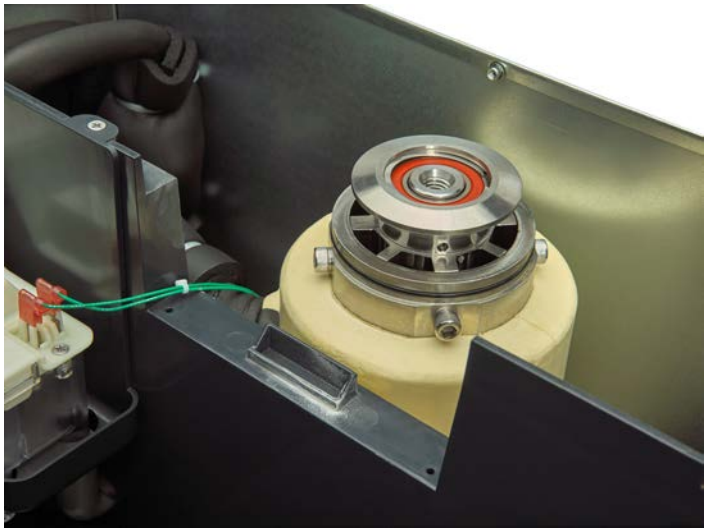
Take It Apart - With Bin in Place

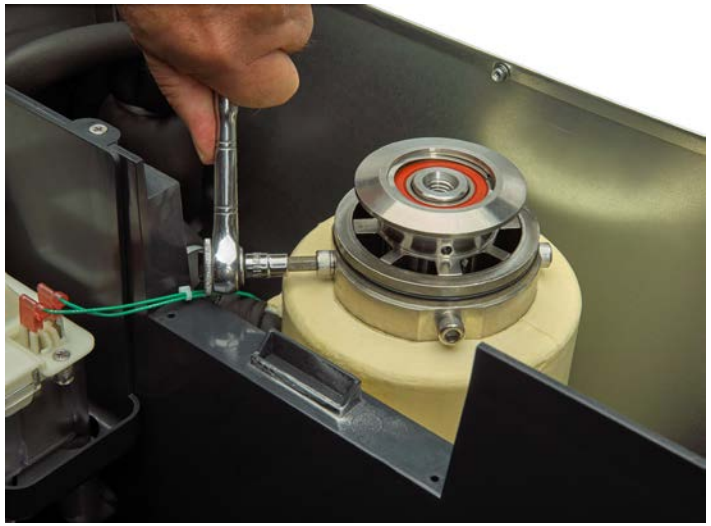
- Remove Extruder Head
  - Remove ice sweep
    - Unscrew CCW

Scotsman
ICE THE WORLD DEMANDS

Take It Apart

- Remove chute
  - Lift up and off
- Remove retaining bolts
  - ¼ inch socket head





Scotsman
ICE THE WORLD DEMANDS

Take It Apart

- Lift extruder head / breaker off

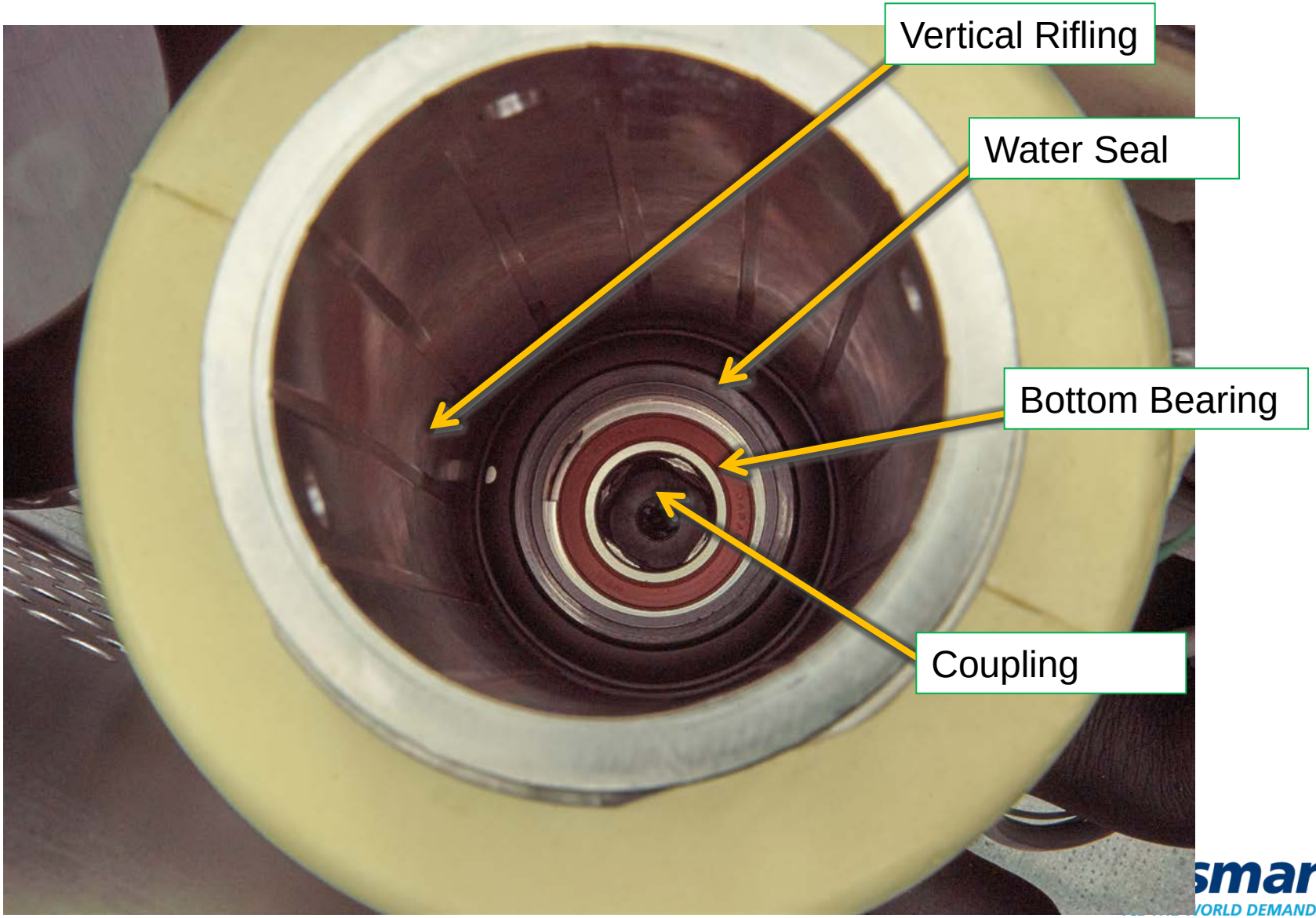
Scotsman
ICE THE WORLD DEMANDS

Take It Apart

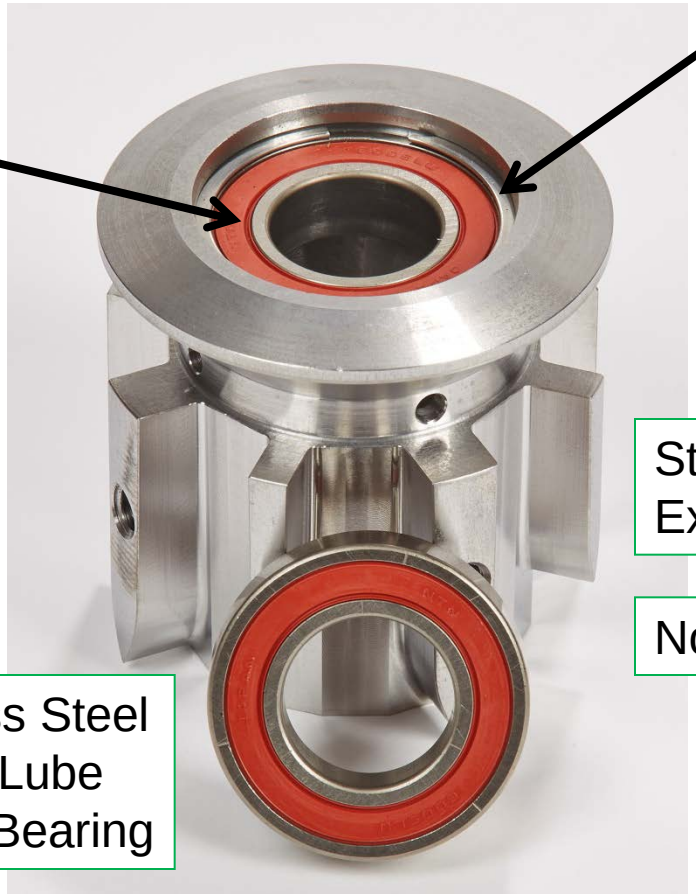
- Remove Auger
  - Lift auger
  - Re-attach ice sweep if needed to aid in lifting auger

Scotsman
ICE THE WORLD DEMANDS

Down The Barrel



Extruder - Breaker



Scotsman
ICE THE WORLD DEMANDS

Auger Bearing Service

- Do NOT grease the bearing
- Do NOT substitute bearings
- ONLY use OEM bearings
  - Any other bearing will VOID THE WARRANTY
- Change both bearings and water seal together

Scotsman
ICE THE WORLD DEMANDS

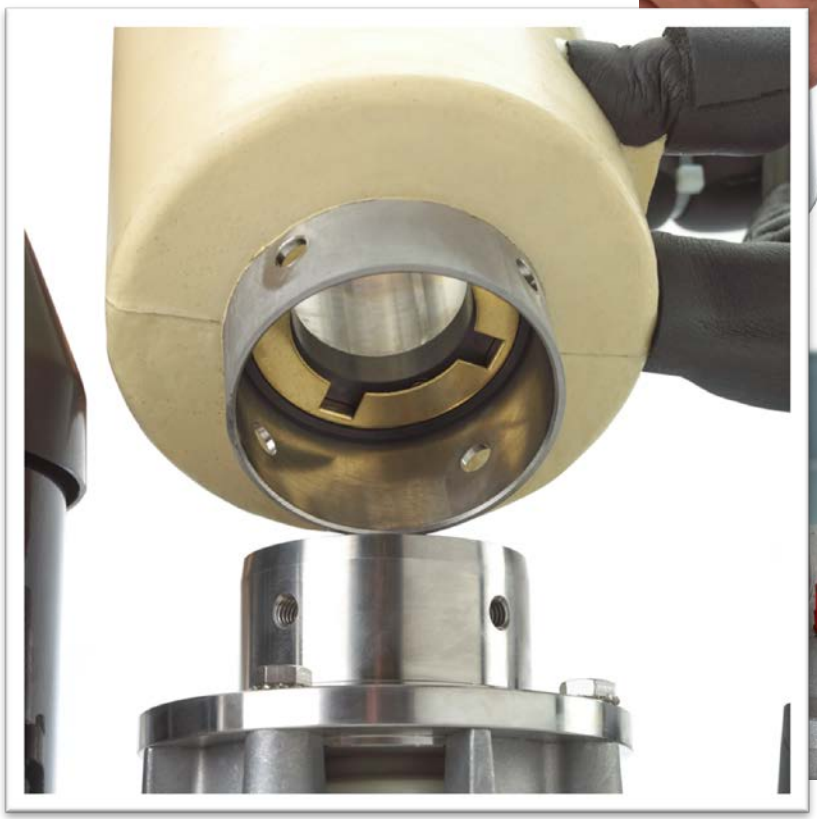
Take it Apart

- Water Seal
  - Remove bin
- Remove insulation wrap
- Remove bolts
  - Evaporator to Adapter

Scotsman
ICE THE WORLD DEMANDS

Take it Apart – Water Seal

- Lift Evaporator



Scotsman
ICE THE WORLD DEMANDS

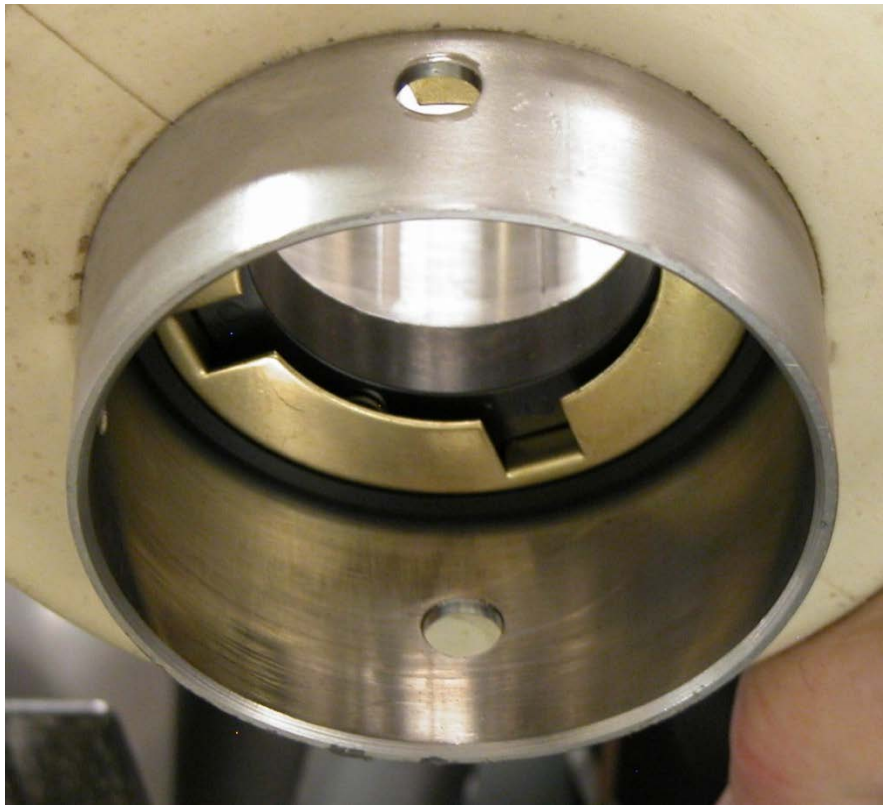
Water Seal

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

Scotsman
ICE THE WORLD DEMANDS

Water Seal

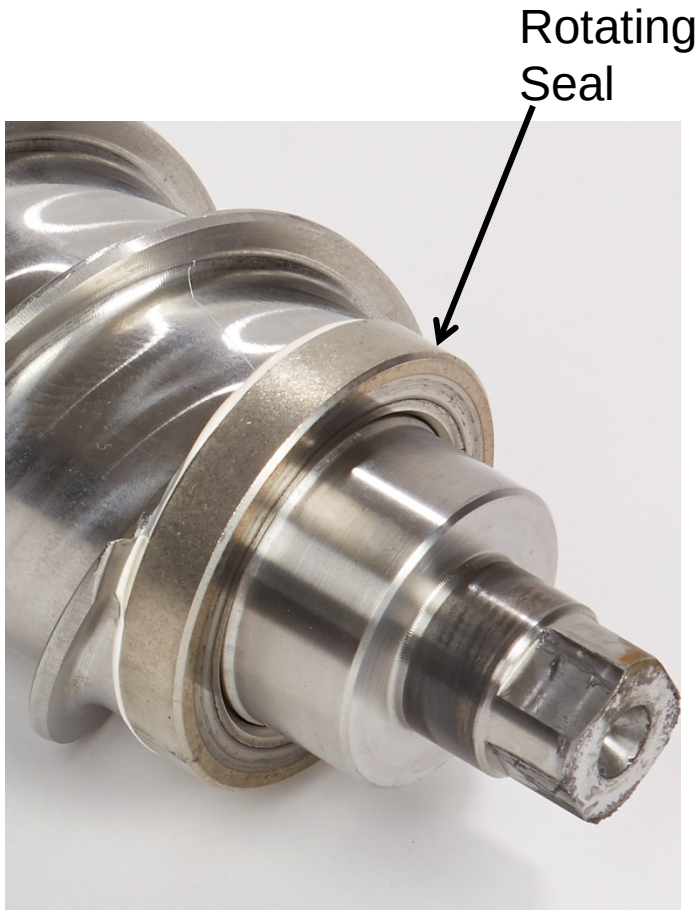
- Assembly
  - Wet stationary half
  - Insert 1 ¼ to 1 3/8 into bottom of evaporator tube
    - Adapter will push seal to correct height
      - About an inch and a half



Scotsman
ICE THE WORLD DEMANDS

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



Scotsman
ICE THE WORLD DEMANDS

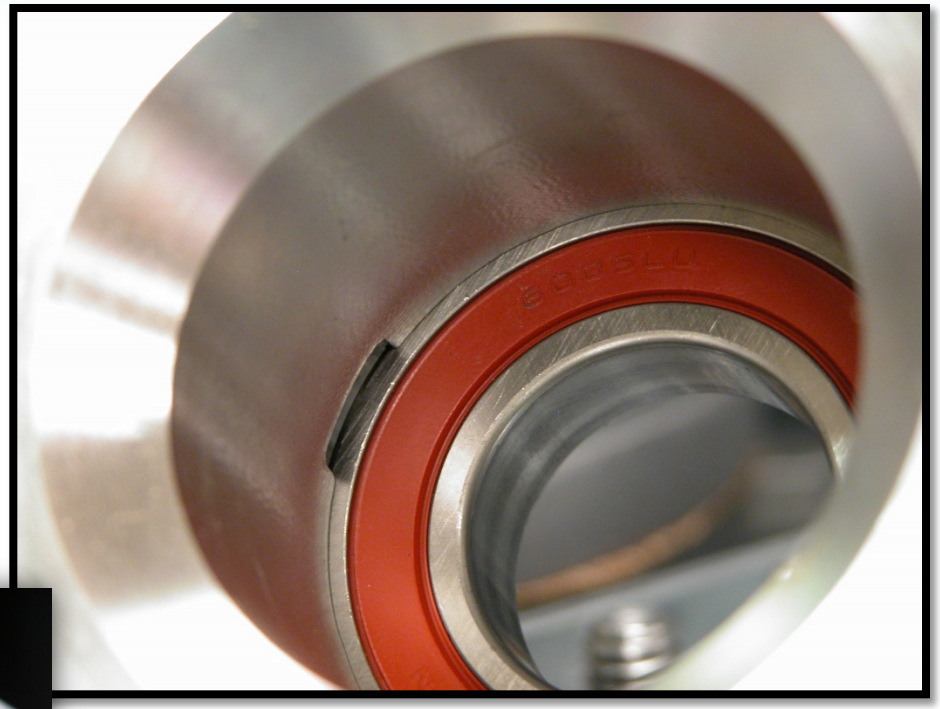
Take it Apart

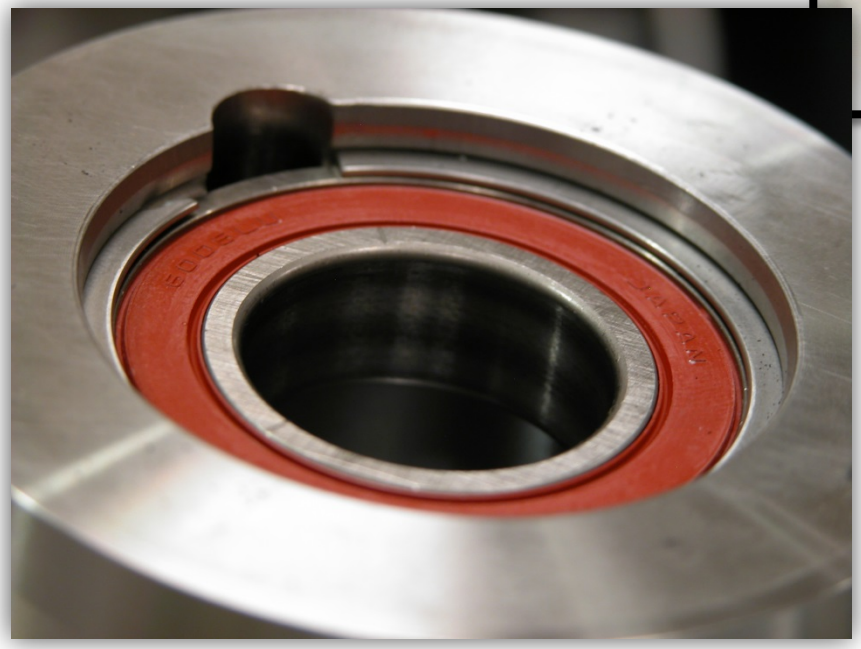
- Remove adapter
- 4 bolts
  - ½ inch gear wrench

Scotsman
ICE THE WORLD DEMANDS

Bottom Bearing

- Adapter contains bottom bearing
  - Remove clip
  - Push bearing out top

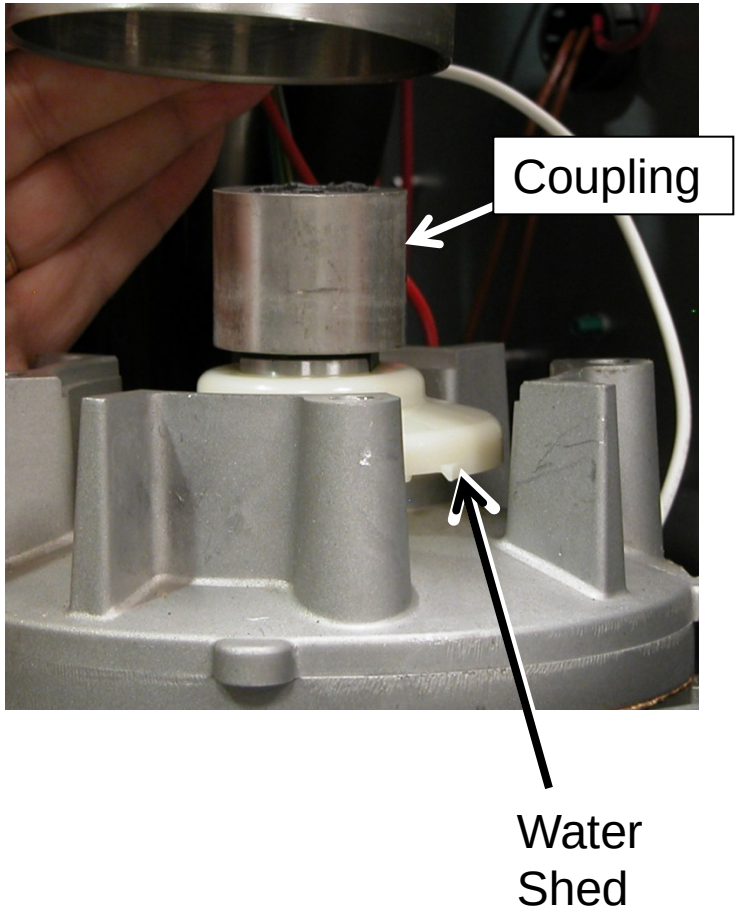




Scotsman
ICE THE WORLD DEMANDS

Gear Reducer

- 1/6 HP
- Coupling and Water Shed
- Square drive shaft



Scotsman
ICE THE WORLD DEMANDS

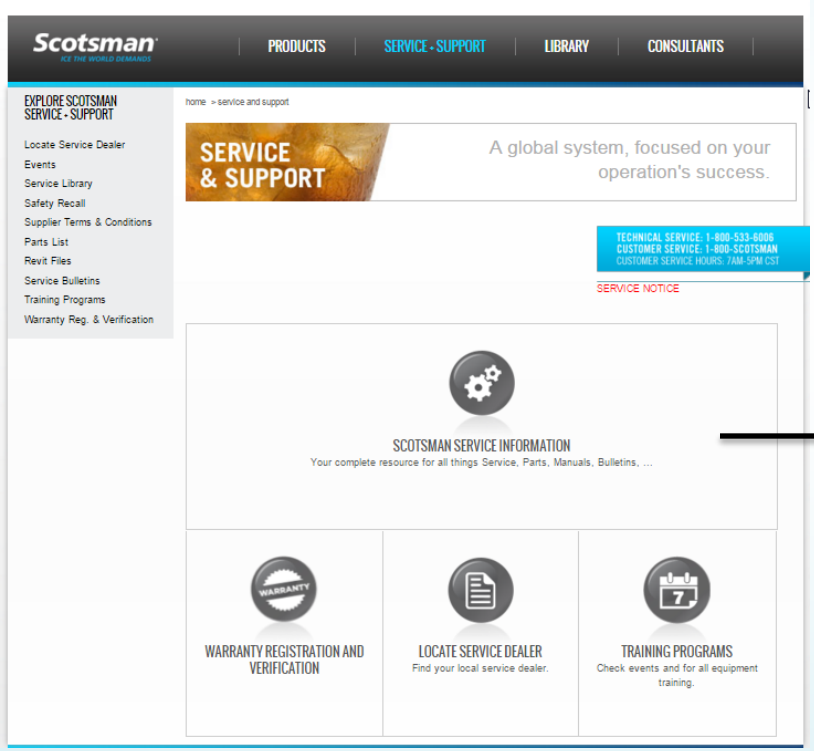
Potential Updates in the Future

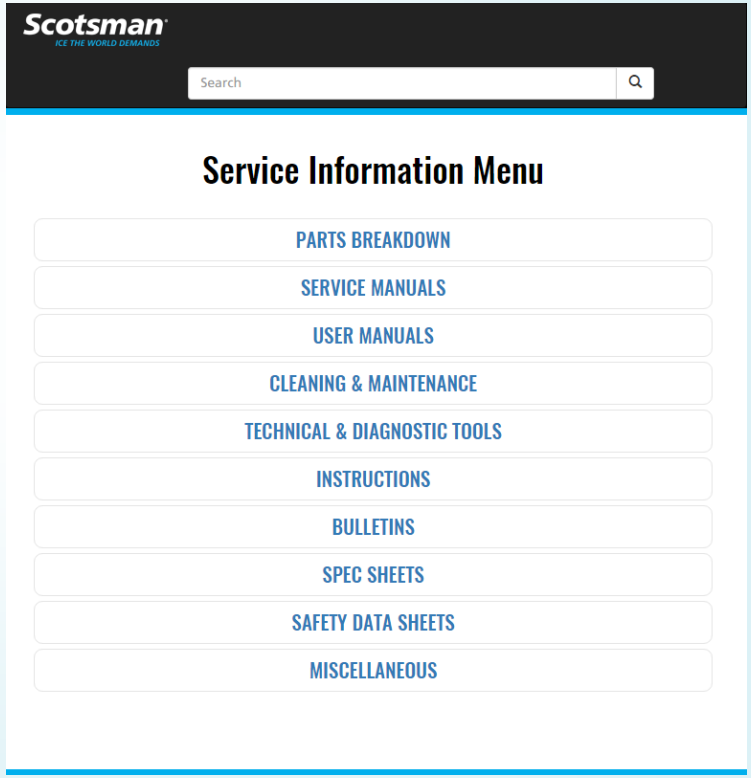
- By USB stick
  - Properly formatted with **only** the update file on it
    - Insert stick
    - Start Test Mode (d)
    - L will display and the lights will scroll
    - After 90 seconds 0 is displayed and the update is complete.

Scotsman
ICE THE WORLD DEMANDS

Technical Service: 1-800-533-6006

www.scotsman-ice.com





Scotsman
ICE THE WORLD DEMANDS

Are there any questions?

Scotsman
ICE THE WORLD DEMANDS