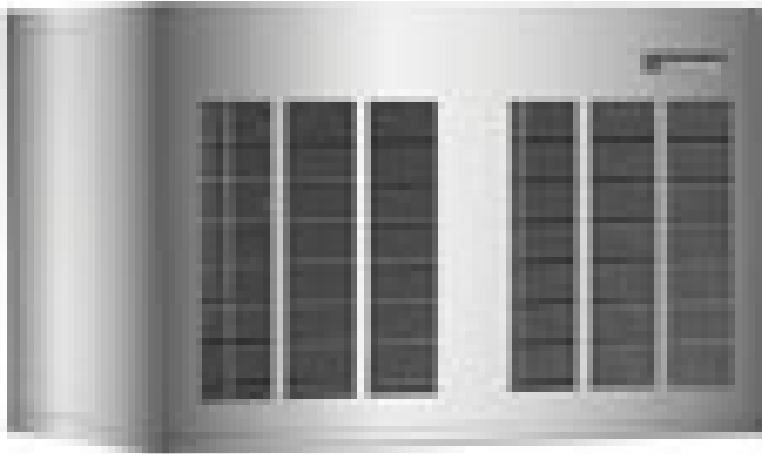


Installation and User Manual for  
Modular Flaked Ice Machine, model FME2404  
and Modular Nugget Ice Machine, model  
NME1854



*Air Cooled*

# FME2404 or NME1854

## INTRODUCTION

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To the owner or user: The service manual you are reading is intended to provide you, and the maintenance or service technician, with the information needed to install, start up, clean, maintain, and service this ice system.

This product contains 2 separate ice making systems in one cabinet.

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*Keep this manual for future reference.*

Note the Warning symbol where it appears, it marks a possible hazard.



# FME2404 or NME1854 FOR THE INSTALLER

The FME2404 and the NME1854 are modular flakers designed to fit the following Scotsman storage bins:

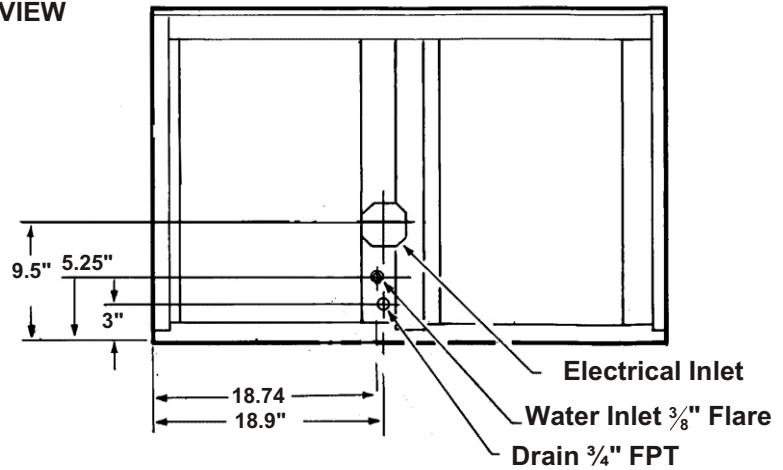
- B842S no bin top required.
- B948S using bin top KBT14A.
- BH1300 or BH1600, no bin top required.

When installing a new system, check to be sure that you have everything you need before beginning:

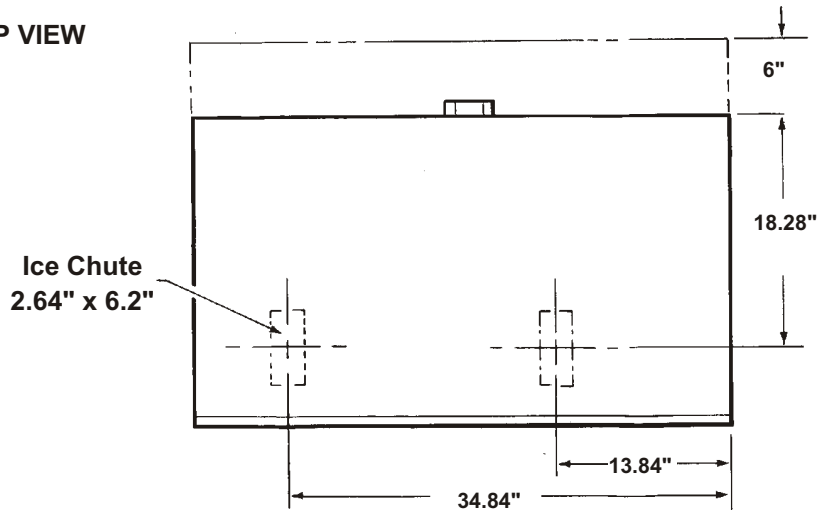
- Correct Bin
- Correct Ice Machine
- Correct Bin Top (if required)
- All kits, legs, and information required for the specific job.

**Note: Allow 6" behind and 6" above the unit for air circulation, utility connections, and service.**

**BACK VIEW**



**TOP VIEW**



**SPECIFICATIONS: Ice Machine**

Model	Dimensions (w/o Bin) W x D x H	Basic Electrical	Ice Type	Condenser Type	Minimum Circuit Ampacity	Max. Fuse Size	Refrigerant Charge, R-404A*
FME2404AS-32	42" x 24" x 27"	208-320/60/1	Flake	Air	21.0	25	30 oz
FME2404AS-6	same	230/50/1	Flake	Air	19.1	30	30 oz

\* Per system. Always go by the nameplate

Minimum circuit ampacity is used to determine wire size and type per the National Electric Code.

# FME2404 or NME1854

## FOR THE INSTALLER: Environmental Limitations

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### Installation Limitations:

This ice system is designed to be installed indoors, in a controlled environment:

	Min	Max
Air Temperature	50°F	100°F
Water Temperature	40°F	100°F
Water Pressure	20 PSI	80 PSI
Voltage	198 VAC	253 VAC

(Compared to the nameplate)

Operating the machine outside of the limitations is misuse and can void the warranty.

### Water Limitations:

An ice machine is a food manufacturing plant; it takes a raw material, water, and turns it into a food product, ice. The purity of the water is very important in obtaining pure ice and in maximizing product life. This is not intended as a complete resource for water related questions, but it does offer these general recommendations:

1. Check with a water treatment specialist for a water test, and recommendations regarding filters and treatment.
2. In most cases, the water used to make ice should be filtered or treated, depending upon the water. *There is no one type of water filter that will be effective in all situations.* That is why a water test is important.

**RO Water Limitation:** Water conductivity must be no less than 35 microSiemens/cm.

Scotsman Ice Systems are designed and manufactured with the highest regard for safety and performance. They meet or exceed the standards of UL, NSF, and CUL.

Scotsman assumes no liability or responsibility of any kind for products manufactured by Scotsman that have been altered in any way, including the use of any part and/or other components not specifically approved by Scotsman.

Scotsman reserves the right to make design changes and/or improvements at any time. Specifications and design are subject to change without notice.

# FME2404 or NME1854

## FOR THE INSTALLER

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### **Location:**

After uncrating and inspection the unit is ready for installation. Install the machine in a location where it has enough space around it to be accessible for service, and reserve a minimum of 6" at the back for air circulation on air cooled models.

Avoid hot, dirty and crowded locations. Be sure that the location for the machine is within the limitations described on page 3.

### **Storage Bin:**

Tip the storage bin on its back, using parts of the carton to protect the exterior finish. Install the legs into the threaded holes in the bottom of the bin. Turn the leg levelers all the way in preparation for leveling later. Return the bin to the upright position, remove paper covering the bin gasket.

Note: Do not push bin into position, instead lift it there. Pushing a bin, especially one with ice in it, can cause damage to the legs and the leg mounts.

Install the appropriate bin top on the bin, according to the instructions for the bin top.

### **Ice Machine:**

The machine is heavy, so the use of a mechanical lift is recommended for lifting the machine high enough to install on top of the bin. After the unit is placed on the bin, line it up so it is even with the back side. Secure the machine to the bin with the hardware provided with the machine.

Remove the front panel and remove any shipping blocks.

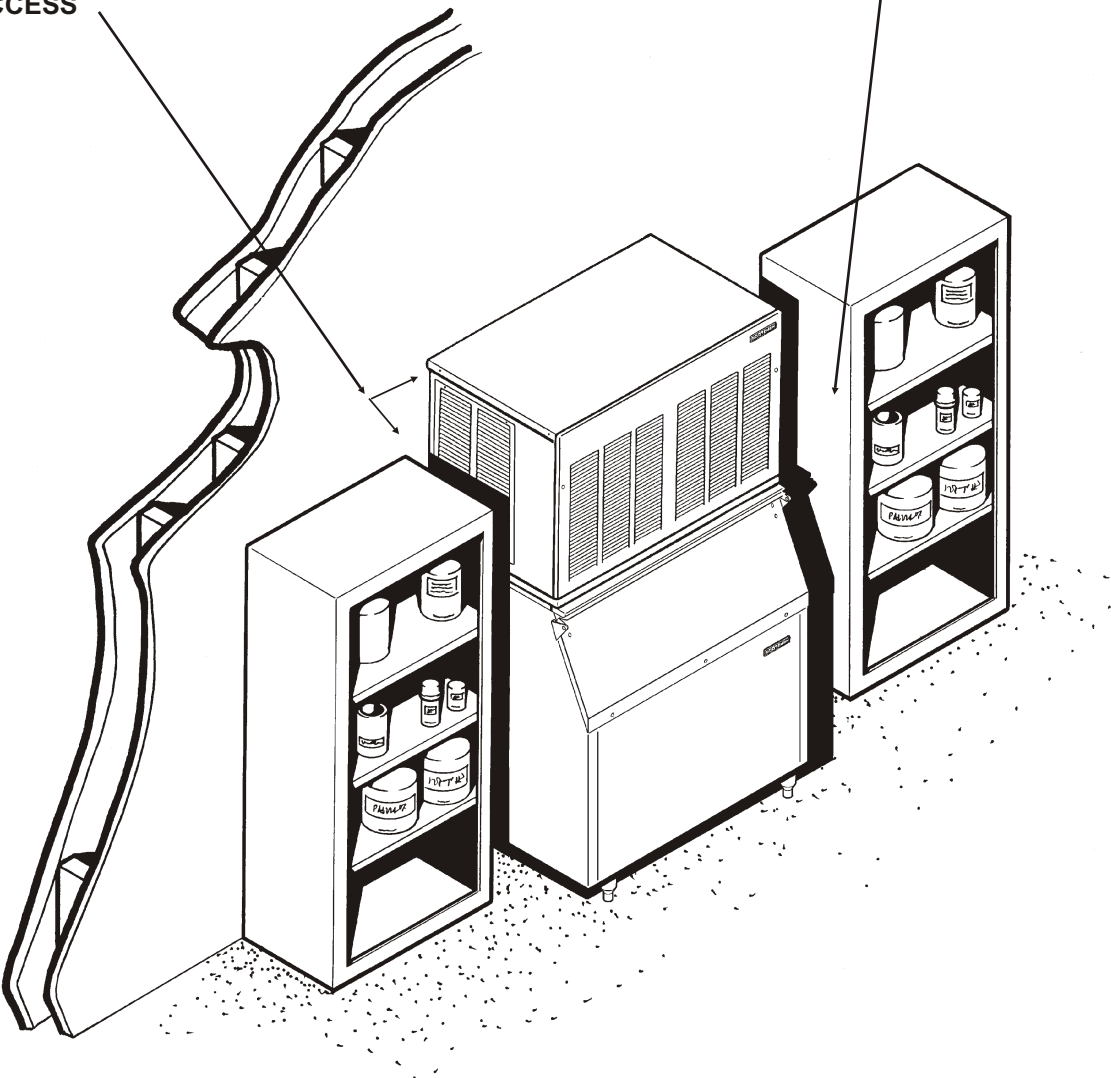
# FME2404 or NME1854

FOR THE INSTALLER: Location

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ALLOW ROOM  
FOR AIR  
CIRCULATION  
AND SERVICE  
ACCESS

DO NOT STACK ANYTHING IN  
FRONT OF THE MACHINE



# FME2404 or NME1854 FOR THE PLUMBER

## CONFORM TO ALL APPLICABLE CODES

### Water Inlet

**Air Cooled Models:** Connect to a water supply that is cold and potable. Use  $\frac{3}{8}$ " O.D. copper tubing, and connect to the single  $\frac{3}{8}$ " male flare at the back of the cabinet. This connection supplies water to both ice making systems. Install a hand valve near the machine to control the water supply.

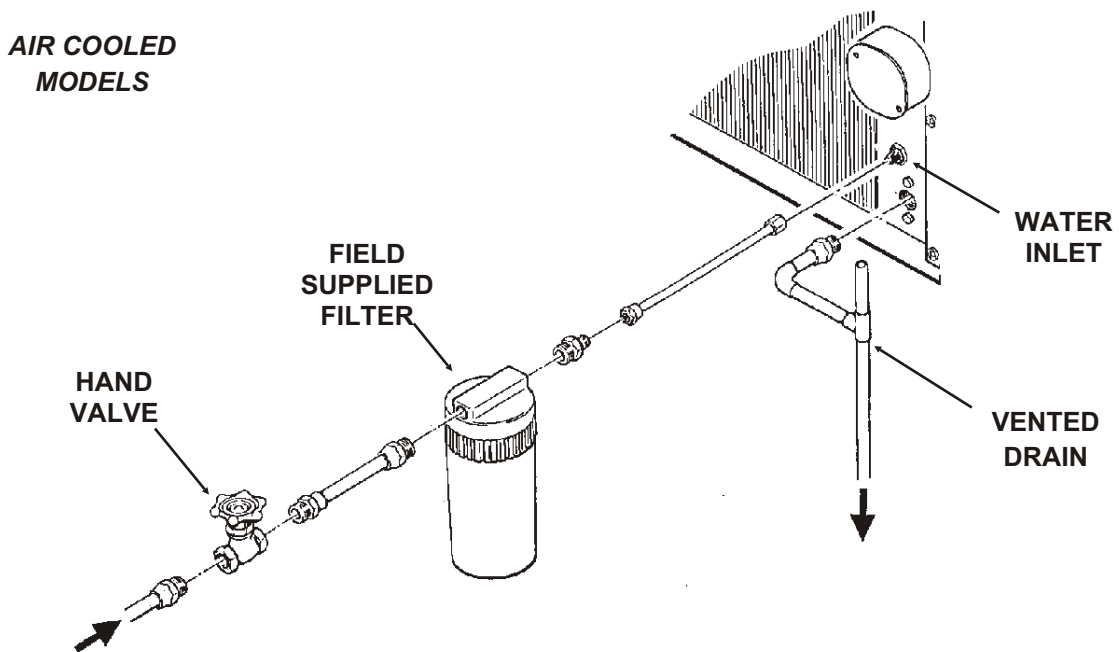
**Water Treatment:** In most areas, a water filter of some type will be useful. In areas where the water is highly concentrated with minerals the water should be tested by a water treatment specialist, and the recommendations of the specialist regarding filtration and/or treatment should be followed.

### Drains

**Air Cooled Models:** Connect a drain tube to the one  $\frac{3}{4}$ " FPT gravity drain fitting at the back of the cabinet (used or both ice making systems). A  $\frac{1}{4}$  inch per foot fall is the minimum pitch for the drain tubing. There MUST be a vent at the highest point of the drain line, and the ideal drain receptacle is a trapped and vented floor drain.

**Use only  $\frac{3}{4}$ " rigid tubing.**

**Storage Bin:** Connect a separate gravity type drain tube, similar to the air cooled drain. Insulation of this drain line is recommended.

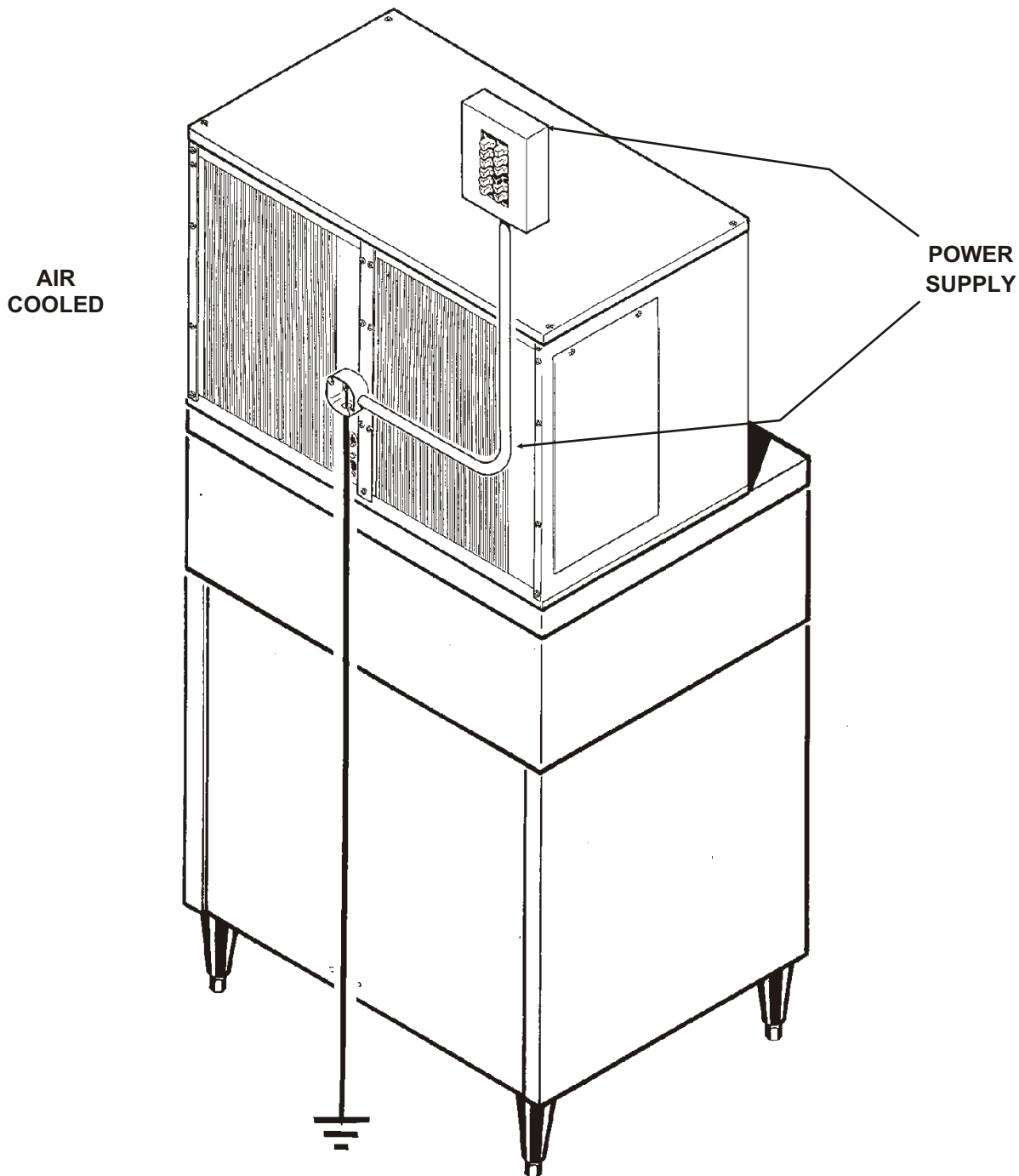


# FME2404 or NME1854 FOR THE ELECTRICIAN

## CONFORM TO ALL APPLICABLE CODES

Connect electrical power to the leads in the junction box at the rear of the machine.  
Check the nameplate (located on the back panel) for the voltage requirements, and for the minimum circuit ampacity. The machine requires a solid chassis to earth ground wire.  
The ice machine must be connected to its own electrical circuit so that it is individually fused.

Voltage variation must remain within design limitations, even under starting conditions.  
**All external wiring must conform to national, state, and local electrical codes. The use of a licensed electrician is required to perform the electrical installation.**





# FME2404 or NME1854

## FOR THE INSTALLER

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### Final Check List

- \_\_\_\_\_ 1. Is the ice system installed indoors in a location where the air and water temperatures are controlled, and where they do not exceed the design limitations?
- \_\_\_\_\_ 2. Is there an electrical service disconnect within sight of the installed machine? Has the voltage been checked, and compared to nameplate requirements?
- \_\_\_\_\_ 3. Have all the plumbing connections been made and checked for leaks?
- \_\_\_\_\_ 4. Has the machine and bin been leveled?
- \_\_\_\_\_ 5. Is there a minimum of 6" clearance at the back of the machine for proper service access and air circulation?
- \_\_\_\_\_ 6. Is the water pressure a minimum of 20 psig?
- \_\_\_\_\_ 7. Has the machine been secured to the bin?
- \_\_\_\_\_ 8. Is there clearance above the top of the machine for service access?
- \_\_\_\_\_ 9. Is there a water shut off valve installed near the machine?
- \_\_\_\_\_ 10. Have all of the shipping blocks been removed?

# FME2404 or NME1854

## START UP

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### Pre-Start Inspection

1. Remove the front and side service panels.
2. Check that any shipping blocks have been removed.
3. Inspect the interior of the machine for loose screws or wires. Check that no refrigerant lines are rubbing each other. Check that the fan blade turns freely (air cooled).
4. Check that the unit is installed correctly according to the final check list (page 8).

*The following procedure applies to each of the two separate ice making systems.*

### Start Up

1. Go through the prestart inspection.
2. Open the hand valve, observe that water enters the water reservoir, fills the tube from the reservoir to the evaporator, and then shuts off. Check for leaks.
3. Switch the master switch on.  
The electrical start up sequence is automatic.  
There will be a short (15 second) delay before the gear motor and compressor start.
4. Air cooled models will begin to discharge warm air out the back of the cabinet. Water cooled models will discharge warm water into the drain.
5. The unit will soon be making ice. If desired the low side pressure of each system may be checked: it should be 33 psig + or - 2 PSIG.  
The suction line temperature at the compressor is normally very cold, nearly to the point of frost up to the compressor body, but not on it.  
The air cooled discharge pressure will depend upon air and water temperatures, but should be between 200 psig and 280 psig.  
The above numbers are for new, clean machines, you can expect to see some values higher, and some lower between different units.
6. **THERE ARE NO ADJUSTMENTS TO MAKE**, so replace the panels.
7. Clean and/or sanitize the storage bin interior, wipe off the exterior with a clean, damp cloth.
8. Give the owner/user the manual, instruct him/her in the operation of the unit, and make sure they know who to call for service.
9. Fill out the manufacturers registration and mail it to Scotsman.

# FME2404 or NME1854

## COMPONENT DESCRIPTION

**Control Box:** Contains the electrical controls that operate the machine.

**High Pressure Cut Out Switch:** An automatic reset switch sensing the high side refrigeration pressure. It is set to shut the machine off if the discharge pressure should ever exceed 450 PSIG.

**Low Pressure Cut Out Switch:** An automatic reset control that shuts off the ice machine when the low side pressure drops below a preset point, 15 PSIG.

**Evaporator:** A vertical stainless steel tube, refrigerated, and water filled. In it there is a stainless steel auger.

**Compressor:** The refrigerant vapor pump.

**Reservoir:** Float operated, it maintains the water level in the evaporator at a constant level, it also contains the water level sensor.

**Water Level Sensor:** Senses if there is water in the reservoir to make ice out of. Will shut the machine off if there is none.

**Ice Discharge Chute:** Directs the ice produced by the evaporator into the storage bin.

**Ice Level Sensor:** An electronic "eye", it senses the presence of ice in the bottom of the ice discharge chute. Operates to turn the ice machine on and off automatically as the level of ice in the bin changes.

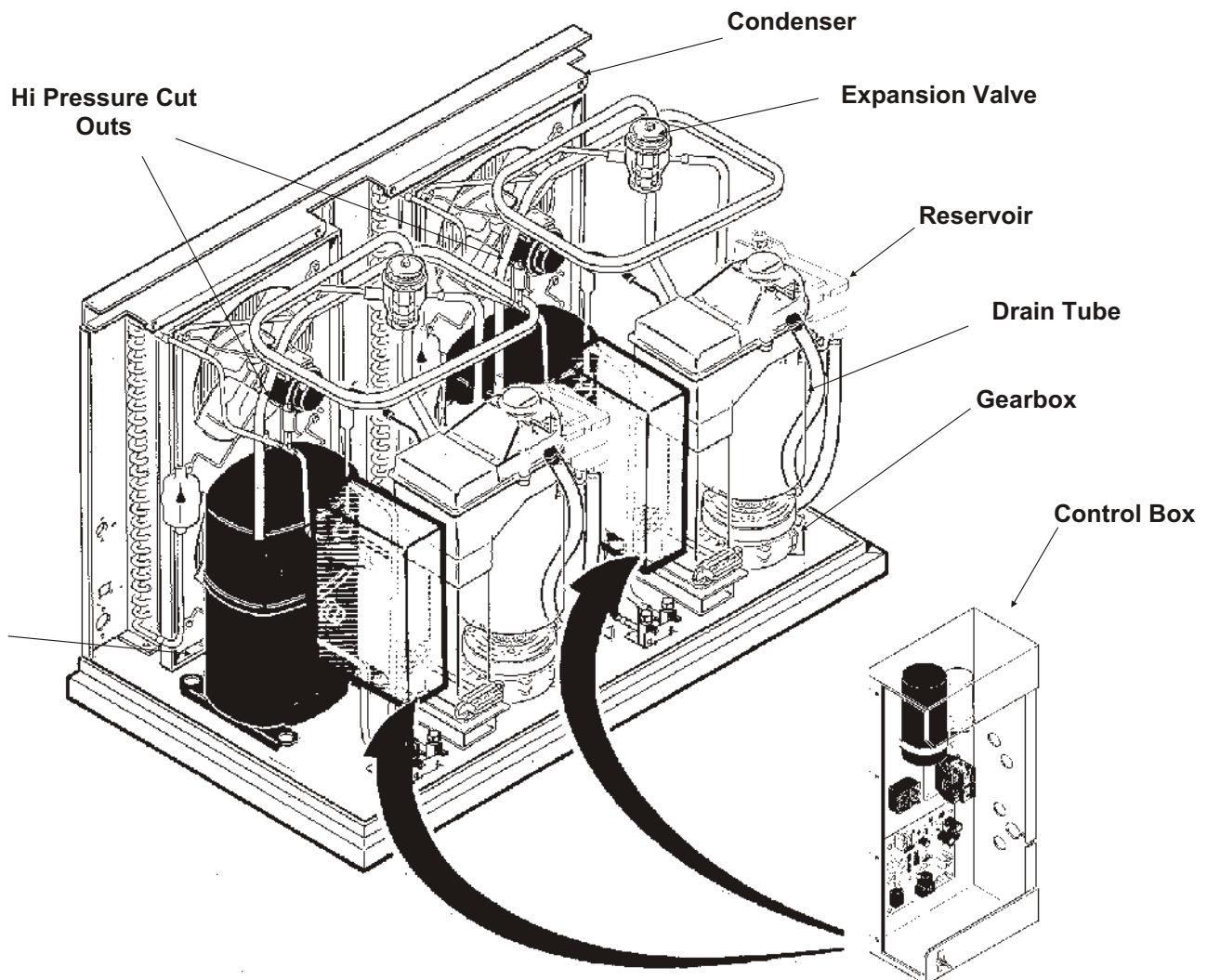
**Gear Motor:** An oil filled, speed reduction gearbox, driving the auger.

**Drain Tube:** When uncapped and lowered, drains the evaporator.

**Condenser:** Where the heat removed in ice making is discharged.

**Expansion valve:** The refrigerant metering device.

*There are two of each of the above components in these machines.*



# FME2404 or NME1854

## COMPONENT DESCRIPTION: Control Box

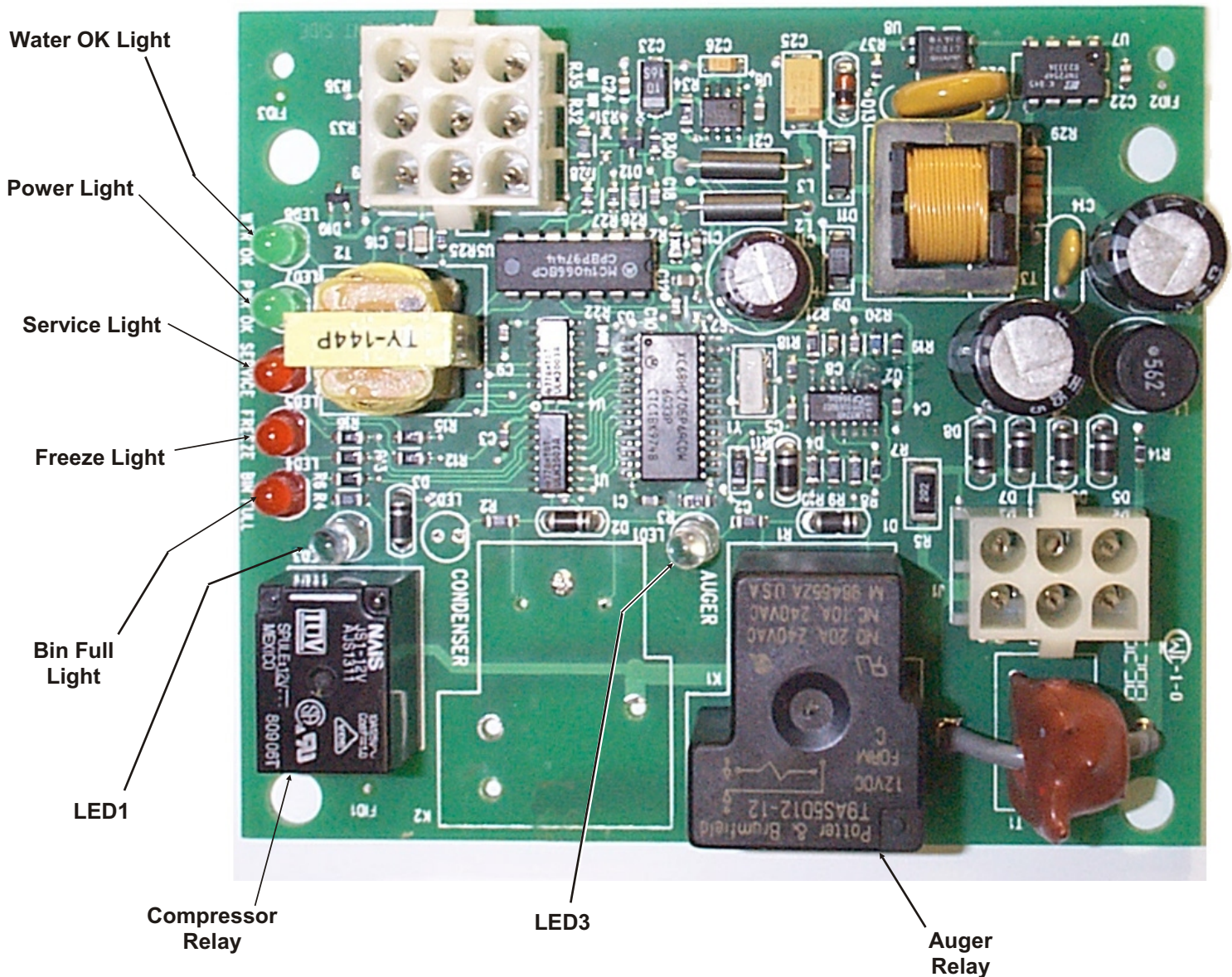
**Contactor:** A definite purpose contactor connecting the compressor and the remote condenser fan motor to the power supply.

**Circuit Board:** Controlling the ice machine through sensors and relays. The sensors are for ice level and water level. The relays are for the gear motor (with a built in time delay to clear the evaporator of ice when the unit turns off) and for the compressor contactor.

**Potential Relay:** The compressor start relay.

**On/Off Switch:** Manual control for the machine.

Control Board





# FME2404 or NME1854

## ELECTRICAL SEQUENCE

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There are 7 indicator lights on the control board:

- **WTR-OK** (Water OK). *Green*. **Normal = Glowing. Glows when there is water in the reservoir.**
- **PWR-OK** (Power OK). *Green*. **Normal = Glowing. Glows when the control board has power and is functional.**
- **Service**. *Red*. Normally Off.
- **Freeze**. *Red*. Normally glowing when making ice.
- **Bin Full**. *Red*. Normally Off when making ice.
- **LED1**. *White*. Located next to the board's Compressor Relay. Normally Glowing when making ice.
- **LED3**. *White*. Located next to the board's Auger Motor Relay. Normally Glowing when making ice.

If the machine is switched off at the mode switch, but is otherwise ready to go, switching the mode switch to ON does the following:

- The PWR-OK light glows.
- If there is water in the reservoir the WTR-OK light glows.
- After 10 seconds the Freeze, LED1 and LED3 lights glow and the machine starts up.

### Start Up:

- The compressor relay and auger motor relay become energized, connecting power to the windings of the auger motor and contactor coil.
- The contactor is energized, connecting power to the compressor, and the compressor starts.
- As ice is made it passes between the ice level sensors but because it is not a continuous stream it only interrupts the sensor's infrared beam momentarily. The bin full light remains off and the machine stays on until ice builds up in the bin and blocks the path between the sensors for 6 seconds or longer. When that occurs the bin full light glows and the machine shuts down.

### Shut Down:

- The compressor relay opens, LED1 goes out.
- The compressor contactor opens
- The compressor stops
- The auger motor stays on for 1 more minute, clearing out ice in the evaporator, and then
- The auger motor relay opens, LED3 goes out and the auger motor stops.

The compressor will not restart until 2 minutes or more have passed after the last shut down.

If the path between the ice level sensors remains clear for more than 10 seconds the ice machine will restart.

### Control Board Protection Devices

- When the water level in the reservoir falls below the water level sensor's tip, the WTR-OK light goes out and the machine shuts down. When water refills the reservoir the WTR-OK light glows and the machine starts up again.
- If the auger drive motor current becomes excessive the compressor and auger drive motor will be switched Off and the Service light will blink. The control board will restart the auger drive motor in 4 minutes. If during the first 60 seconds after restart the auger motor current stays within limits, the compressor is restarted and the machine returns to normal operation. If the auger motor's current is excessive within 60 seconds after the restart, the process will be repeated once more. If during that try the current is still excessive the machine shuts down and must be manually reset. The service light will then be glowing continuously.

**To Reset: Disconnect and reconnect power to the ice machine.**

### Other Protection Devices:

- If the **high pressure** cut out switch opens the machine will stop immediately. It will automatically reset when the pressure falls below its cut in point.
- If the **low pressure** cut out switch opens the machine will stop immediately. It will automatically reset when the pressure rises above its cut in point.
- The **mode (on - off)** switch is the manual control for the complete machine, but it is not a service disconnect.

# **FME2404 or NME1854**

## **OPERATION: Performance**

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### **Typical Low Side Pressure**

- Air Cooled: 34 - 38 PSIG

### **Typical Discharge Pressure**

- Air Cooled: 220 - 275 PSIG

### **Typical Compressor Amp Draw**

- Single phase = 4.3

### **Superheat**

- 5 - 7 degrees

### **High Pressure Cut Out - automatic reset**

- 450 PSIG

### **Low Pressure Cut Out - automatic reset**

- 15 PSIG

### **Refrigerant Charge (per system)**

- Air Cooled: 30 ounces R-404A

# FME2404 or NME1854

## CLEANING and SANITATION

To properly clean and maintain this product, these steps must be followed for **both** systems.


A Scotsman Ice System represents a sizable investment of time and money in any company's business. In order to receive the best return for that investment, it **MUST** receive periodic maintenance.

It is the **USER'S RESPONSIBILITY** to see that the unit is properly maintained. It is always preferable, and less costly in the long run, to avoid possible down time by keeping it clean; adjusting it as needed; and by replacing worn parts before they can cause failure. The following is a list of recommended maintenance that will help keep the machine running with a minimum of problems.

Maintenance and Cleaning should be scheduled at a minimum of twice per year.

ICE MAKING SYSTEM: In place cleaning

1. Check and clean any water treatment devices, if any are installed.
2. Remove screws and the front panel.
3. Move the ON-OFF switch to OFF.
4. Remove all the ice from the storage bin.
5. Remove the cover to the water reservoir and block the float up.
6. Drain the water reservoir and freezer assembly using the drain tube attached to the freezer water inlet. Return the drain tube to its normal upright position and replace the end cap.
7. Prepare the cleaning solution: Mix eight ounces of Scotsman Ice Machine Cleaner with three quarts of hot water. The water should be between 90-115 degrees F.

<b>⚠ WARNING</b>	<b>Scotsman Ice Machine Cleaner contains acids.</b>
	<b>These compounds may cause burns.</b>
	If swallowed, DO NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. In case of external contact, flush with water. Keep out of the reach of children.

8. Slowly pour the cleaning solution into the water reservoir until it is full. Wait 15 minutes, then switch the master switch to ON.
9. As the ice machine begins to use water from the reservoir, continue to add more cleaning solution to maintain a full reservoir.
10. After all of the cleaning solution has been added to the reservoir, and the reservoir is nearly empty, switch the master switch to OFF.
11. After draining the reservoir, as in step 6, wash and rinse the water reservoir.

12. Go thru steps 13-19 to sanitize the ice machine water system.

13. Mix two gallons of sanitizer solution. Use an approved sanitizer.

A possible sanitizer solution may be obtained by mixing two gallons of warm (90-115°F.) potable water with 1 ounce of household bleach.

14. Slowly pour the sanitizer solution into the water reservoir until the float rises, then switch the master switch ON.

15. As the ice machine uses water from the reservoir, continue to pour the sanitizer solution into the reservoir.

16. After ½ of the sanitizer solution has been added to the reservoir, and the reservoir is nearly empty, switch the master switch OFF.

17. Drain the reservoir and thoroughly wash the interior of the reservoir and cover with sanitizer solution. Be sure the drain hose is upright and capped.

18. Remove the block from the float in the water reservoir.

19. Switch the master switch to ON

20. Continue ice making for at least 15 minutes, to flush out any cleaning solution.

**DO NOT USE any ice produced from the cleaning solution. Be sure no ice remains in the bin.**

21. Remove all ice from the storage bin.

22. Add warm water to the ice storage bin and thoroughly wash and rinse all surfaces within the bin.

23. Sanitize the bin interior by washing the interior of the bin with the balance of the sanitizer solution.

24. Switch the master switch ON.

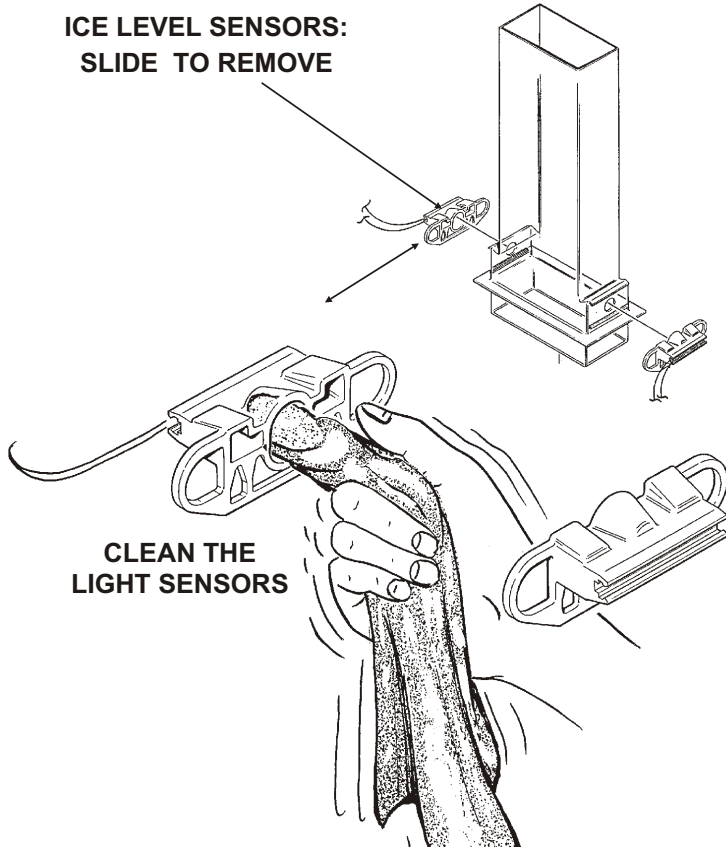
25. Replace the front panel.

# FME2404 or NME1854

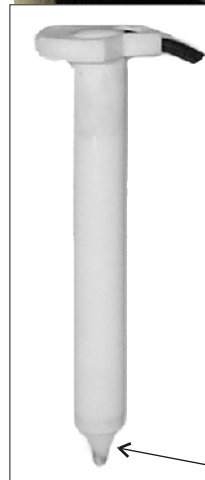
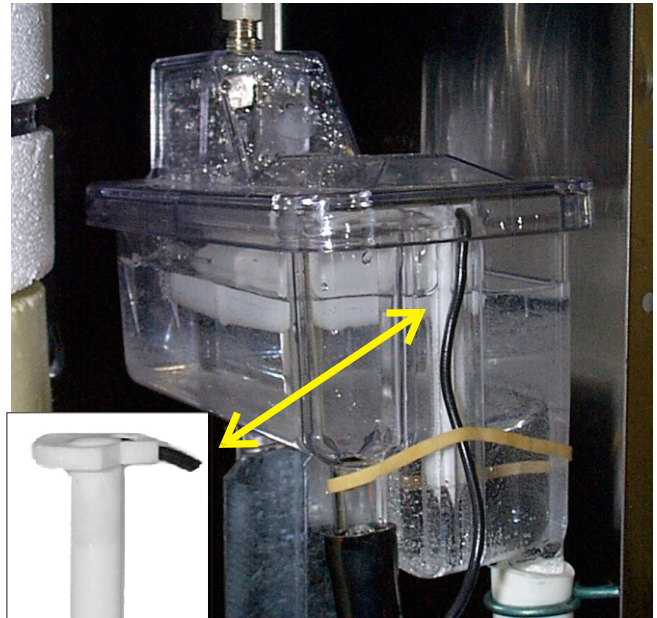
## SENSOR MAINTENANCE

*These steps must be followed for **both** systems.*

1. The bin control uses devices that sense light, therefore they must be kept clean enough so that they can “see”. At least twice a year, remove the bin control sensors from the base of the ice chute, and wipe the inside clean, as illustrated.



2. The ice machine senses water level by a probe located in the water reservoir. At least twice a year, the probe should be removed from the reservoir, and the tip wiped clean of mineral build-up.



Clean the Probe's Tip with ice machine cleaner and a clean, soft cloth.

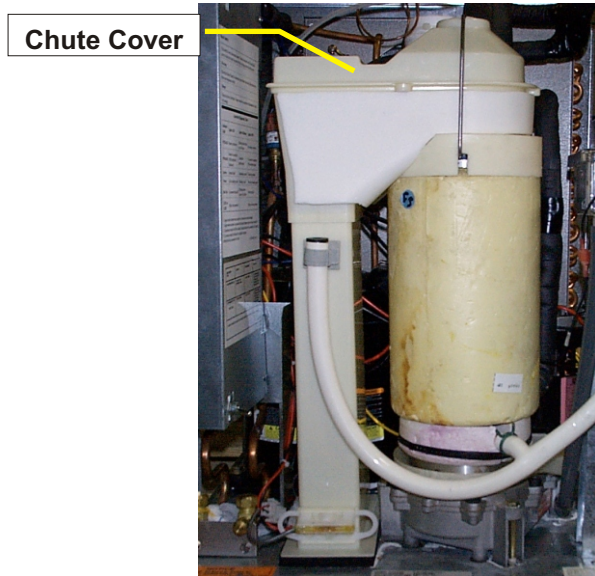


# FME2404 or NME1854 BEARING MAINTENANCE

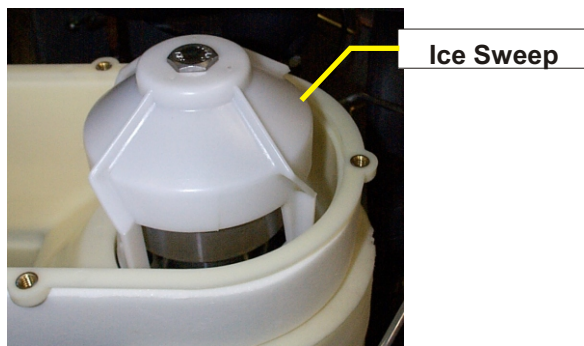
Check each top evaporator bearing at least **two times per year**.

A. Check the bearing by:

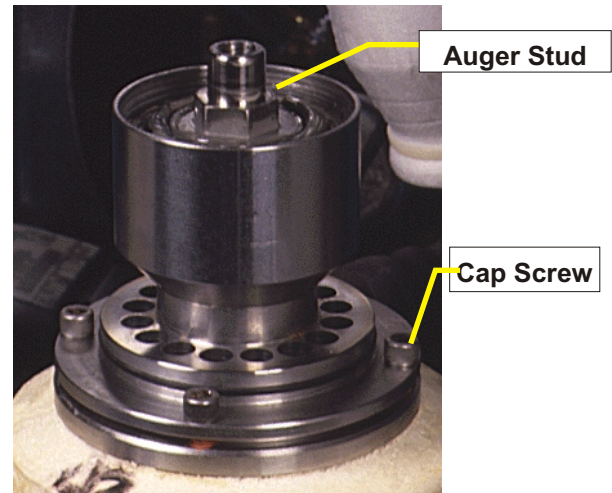
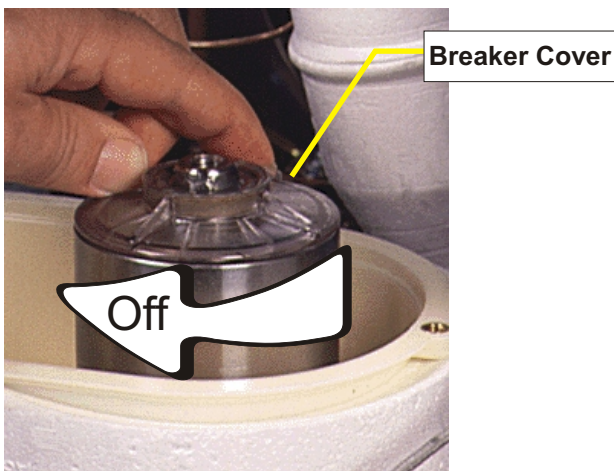
- removing the ice chute cover



- unscrewing the ice sweep



- removing the water shed & unscrewing the breaker cover.

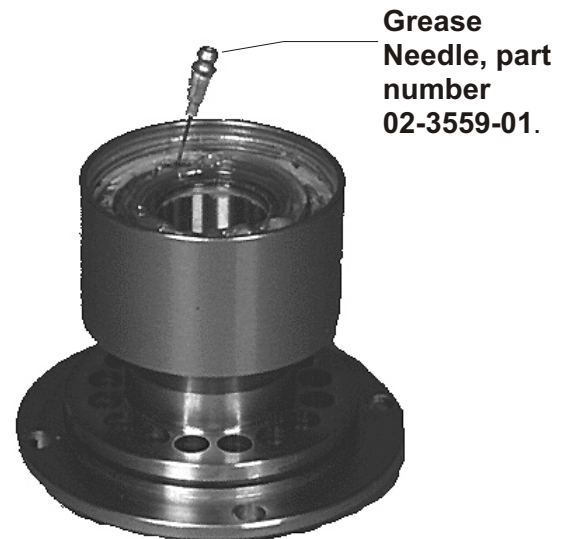


- unscrewing the auger stud

Inspect the bearing. There should be plenty of grease in sight. If grease is needed the bearing and breaker should be removed to check the action of the bearing. It should rotate smoothly.

To remove the breaker take out all four allen head cap screws and pull the breaker off the auger and evaporator.

If the bearing only needs grease, inject grease into the bearing using Scotsman grease needle pn 02-3559-01 and Scotsman bearing grease cartridge, pn A36808-001. Be sure to inject grease evenly and thoroughly.



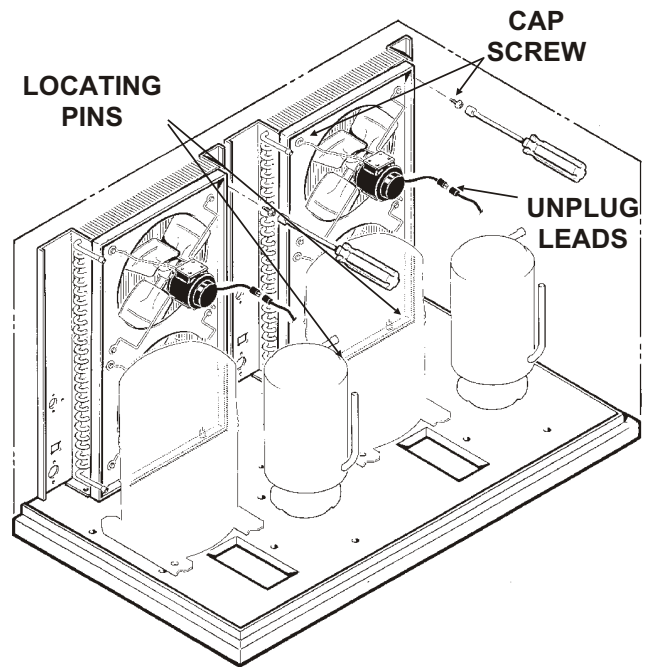
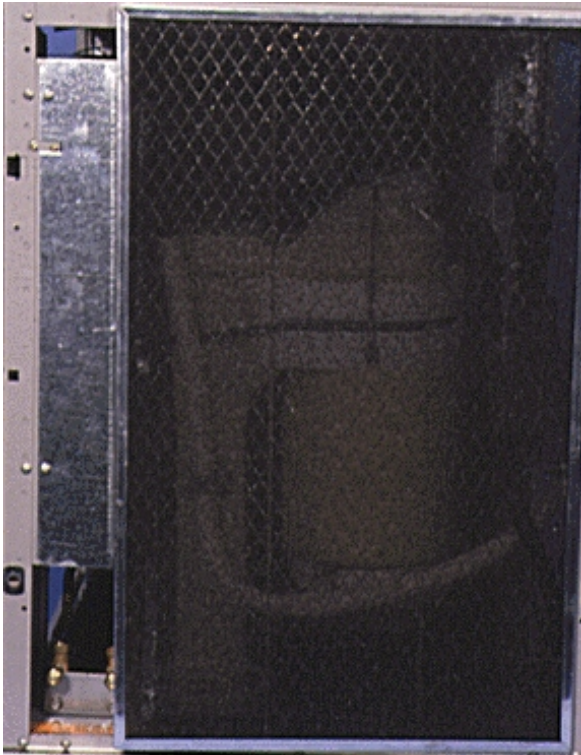
See Removal and Replacement section to replace bearing or seals.

Reverse to reassemble.


# FME2404 or NME1854

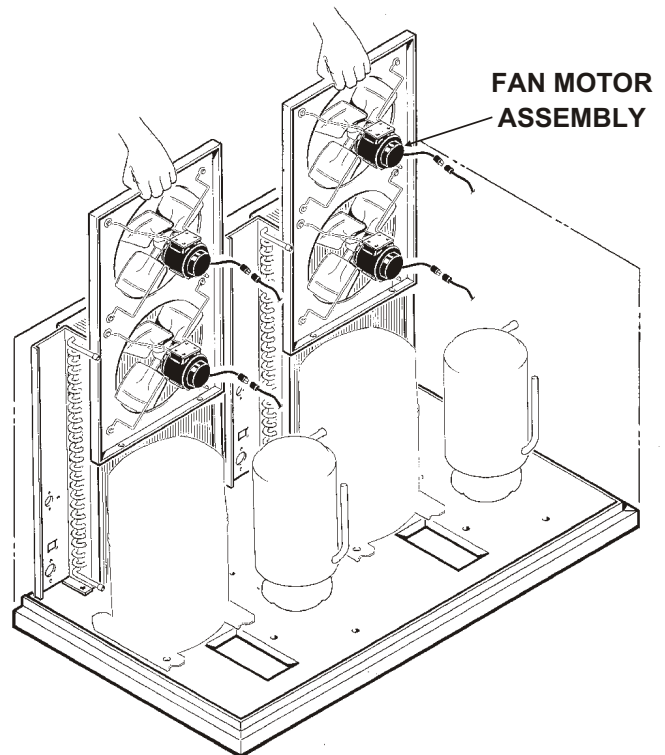
## AIR COOLED CONDENSER MAINTENANCE

Clean or replace the air filters regularly.



Clean each air cooled condenser. Use a vacuum cleaner or coil cleaner if needed. Do NOT use a wire brush.

	<p><b>⚠ WARNING</b></p> <p><b>Moving Parts Hazard.</b> Disconnect electrical power before beginning.</p>
---	--



- A. Remove top panel.
- B. Remove two screws, and unplug the fan motors
- C. Pull fan motor assembly off of locating pins and out of the unit.
- D. Clean the condenser; reassemble by placing the fan motor assembly onto the locating pins, replacing the mounting screws, plugging the fan motors back in, and replacing the top panel. Reconnect power.

# FME2404 or NME1854

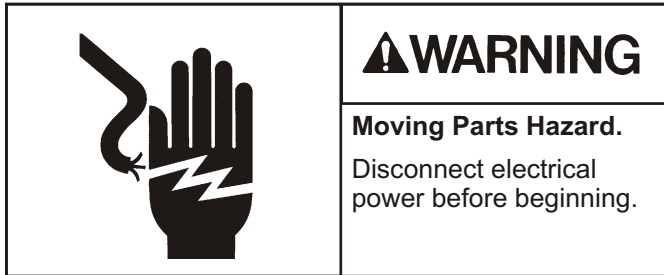
## AUGER MAINTENANCE

In some areas the water supply to the ice machine will have a great deal of minerals in it, and that will result in an evaporator and auger becoming coated with these minerals, requiring a more frequent removal than twice per year. If in doubt about the condition of the evaporator and auger, the auger can be removed so the parts can be inspected.

Note: Water filters can filter out suspended solids, but not dissolved solids. "Soft" water may not be the complete answer. Check with a water treatment specialist regarding water treatment.

**For more information on removal of these parts, see REMOVAL AND REPLACEMENT.**

1. To remove the auger, remove the front and top panels.



2. Push back bail clamp holding ice chute cover to ice chute, and remove cover.

3. Unscrew and remove ice sweep.

4. Loosen band clamp under ice chute, and remove ice chute from evaporator.

5. Remove 4 allen screws holding breaker to evaporator.

6. Drain the evaporator by pulling down and uncapping the evaporator drain tube.

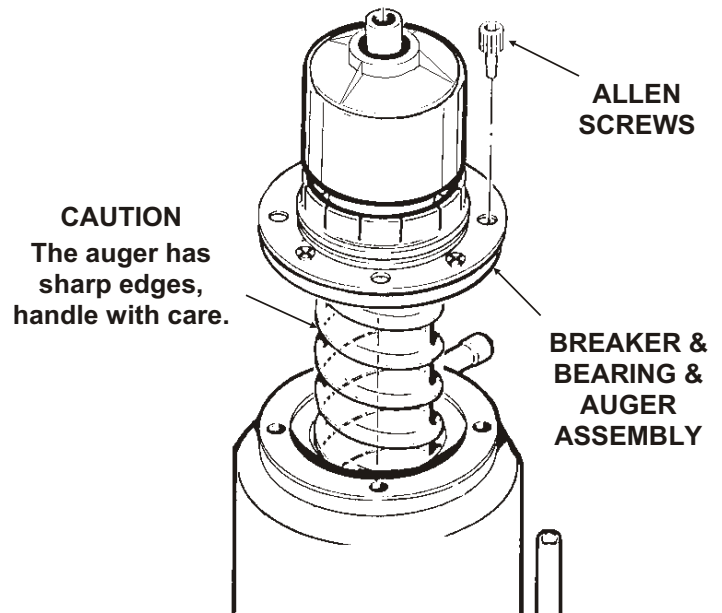
7. Pull up to remove auger.

After the auger has been removed, allow the auger to dry: if the auger is not bright and shiny, it must be cleaned.

Clean the auger and evaporator as required. **DO NOT HONE THE EVAPORATOR.**

8. Replace the water seal.

9. Reverse to reassemble.



# FME2404 or NME1854

## SERVICE DIAGNOSIS:

No ice is made, nothing operates	Unit off due to no power	Restore Power
	Unit off due to master switch in OFF position.	Switch master switch to ON.
	Unit off due to low water level.	Check water supply, filter, strainer, float valve. Correct water supply.
	Unit off due to ice level sensors (photo-electric eyes) blocked.	Check/clean ice level sensors.
	Unit off due to scale on water level sensor.	Clean water level sensor.
	Unit off due to high pressure control open.	Check for water interruption (water cooled) or fan motor failure (air cooled).
	Unit is shut down	Circuit board has shut ice machine down due to high auger motor amp draw. Check for cause of high amp draw, including bearings, gearmotor condition and scale on auger and in evaporator.
Unit makes ice, but very slowly.	High discharge pressure because of a dirty condenser	Clean the air filter and condenser.
	Low capacity because auger & evaporator are coated with mineral scale	Clean the water system
Water Leak	Drain plugged up	Clean out drain
	Tubing cracked	Replace tubing
	Condensation on drain tubing	Insulate tubing
	Hose off	Reattach hose
	Reservoir cover off	Return cover to reservoir
	Reservoir cracked	Replace reservoir
Excessive water use	Reservoir float valve leaks thru	Replace float valve or seat
Excessive ice meltage	Bin drain clogged	Clean out bin drain.
	Improper installation of drains, they are connected.	Drains must be separate.
	Poor fit between bin door and door frame	Adjust or replace
Machine makes too much noise	Evaporator coated internally with minerals	Clean with Scotsman Ice Machine Cleaner

# **SCOTSMAN ICE SYSTEMS**

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