Manitowoc®



M Series
Ice Machines

Installation, Operation & Maintenance Manual

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America's #1 Selling Ice Machine

Part Number 040004575 08/22

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⚠ Warning

Follow these precautions to prevent personal injury:

- Remove all panels before lifting and installing.
- Two or more people or a lifting device are required to lift or move this appliance to avoid injury or tipping.
- Do not damage the refrigeration circuit when installing, maintaining or servicing the unit.
- Do not obstruct vents or openings or store gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.
- It is the responsibility of the equipment owner to perform a Personal Protective Equipment Hazard Assessment to ensure adequate protection during maintenance procedures.
- Do not operate equipment that has been misused, abused, neglected, damaged, or altered/modified from that of original manufactured specifications. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision concerning use of the appliance by a person responsible for their safety. Do not allow children to play with this appliance.
- Ice machines require a deflector when installed on an ice storage bin. Prior to using a storage system with this ice machine, contact the manufacturer to ensure their ice deflector is compatible with this ice machine.
- This equipment contains high voltage electricity and refrigerant charge. Installation and repairs are to be performed by properly trained technicians aware of the dangers of dealing with high voltage electricity and refrigerant under pressure. The technician must also be certified in proper refrigerant handling and servicing procedures. All lock out and tag out procedures must be followed when working on this equipment.
- Objects placed or dropped in the bin can affect human health and safety. Locate and remove any objects immediately.

⚠ Warning

When using electric appliances, basic precautions must always be followed, including the following:

- Read all the instructions before using the appliance.
- To reduce the risk of injury, close supervision is necessary when an appliance is used near children.
- Do not contact moving parts.
- Do not use electrical appliances or accessories other than those supplied by the manufacturer.
- Do not use outdoors.
- All covers and access panels must be in place and properly secured, before operating this equipment.
- Connect to a properly grounded outlet only.
- For a cord-connected appliance, the following precautions must be observed:
  - A. Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
  - B. Unplug from outlet when not in use and before servicing or cleaning.
  - C. Do not operate any appliance with a damaged cord or plug, or after the appliance malfunctions or is dropped or damaged in any manner. Contact the nearest authorized service facility for examination, repair, or electrical or mechanical adjustment.

Model Numbers

This manual covers the following models:

Self-Contained Air-Cooled	Self-Contained Water-Cooled	Remote
MD0420A MY0420A	---- ----	---- ----
MD0500A MY0500A	MD0500W ----	---- ----
MD0700A MY0700A	MD0700W ----	---- ----
MD1000A MY1000A	MD1000W MY1000W	---- ----
MD1400A MY1400A	---- ----	---- ----

ICE DEFLECTOR

An ice deflector is required when the ice machine is installed on a bin. An ice deflector is not required when the ice machine is installed on a dispenser.

BIN INSTALLATION

- All ice machines installed on a bin require an ice deflector.
- M bins have a deflector installed and require no modifications when used with a forward facing evaporator.
- Align sides and back of ice machine with sides and back of bin, when placing ice machine on bin.

Location of Ice Machine

The location selected for the ice machine must meet the following criteria. If any of these criteria are not met, select another location.

- The location must be free of airborne and other contaminants.
- The air temperature must be at least 35°F (1.6°C), but must not exceed 110°F (43.4°C).

NOTE: M1400 Minimum air temperature is 40°F (4.4°C).

- Remote air-cooled - The air temperature must be at least -20°F (-29°C), but must not exceed 120°F (49°C).
- The location must not be near heat-generating (ovens, dishwashers, etc) equipment or in direct sunlight and must be protected from weather.
- The location must not obstruct airflow through or around the ice machine. Refer to the clearance requirements chart.

These ice machines are intended for use in applications such as:

- Staff kitchen areas in shops, offices and other work environments
- Clients in hotels, motels, farmhouses, bed and breakfast and other residential type environments
- Catering and similar non-retail applications

⚠ Warning

Two or more people or a lifting device are required to lift this appliance.

Clearance Requirements

⚠ Warning

Do not obstruct ice machine vents or openings.

M0420 M0500/M0700/ M1000/M1400	Self-Contained Air-Cooled	Water-Cooled and Remote*
Top/Sides	8" (20.3 cm)**	8" (20.3 cm)**
Back	5" (12.7 cm)**	5" (12.7 cm)**

M0420 Tropical Rating 50 Hz Only	Self-Contained Air-Cooled	Water-Cooled*
Top	24" (61.0 cm)**	8" (20.3 cm)**
Sides	12" (30.5 cm)**	8" (20.3 cm)**
Back	5" (12.7 cm)**	5" (12.7 cm)**

M1000 Tropical Rating 50 Hz Only	Self-Contained Air-Cooled	Water-Cooled and Remote*
Top	12" (30.5 cm)**	8" (20.3 cm)**
Sides	8" (20.3 cm)**	8" (20.3 cm)**
Back	5" (12.7 cm)**	5" (12.7 cm)**

* There is no minimum clearance required for water-cooled or remote ice machines. This value is recommended for efficient operation and servicing only.

** Indicates Preliminary Data

⚠ Caution

The ice machine must be protected if it will be subjected to temperatures below 32°F (0°C). Failure caused by exposure to freezing temperatures is not covered by the warranty.

Ice Machine Heat of Rejection

Series Ice Machine	Heat of Rejection [1]	
	Air Conditioning [2]	Peak
M0420	5400	6300
M0500	5300	6100
M0700	9000	13900
M1000	16250	18600
M1400	28300	34300

1 B.T.U./Hour
2 Because the heat of rejection varies during the ice making cycle, the figure shown is an average.

Ice machines, like other refrigeration equipment, reject heat through the condenser. It is helpful to know the amount of heat rejected by the ice machine when sizing air conditioning equipment where self-contained air-cooled ice machines are installed.

This information is also necessary when evaluating the benefits of using water-cooled or remote condensers to reduce air conditioning loads. The amount of heat added to an air conditioned environment by an ice machine using a water-cooled or remote condenser is negligible.

Knowing the amount of heat rejected is also important when sizing a cooling tower for a water-cooled condenser. Use the peak figure for sizing the cooling tower.

Removing Drain Plug and Leveling the Ice Storage Bin

⚠ Warning

To avoid instability, the bin/dispenser must be installed in an area capable of supporting the weight of the bin/dispenser, ice machine and a full bin of ice (48" models 1000 lbs [454 kg], 30" models 750 lbs [340 kg]). The bin/dispenser must be level side-to-side and front-to-back before installing the ice machine.

1. Remove threaded plug from drain fitting.
2. Screw the leveling legs onto the bottom of the bin.
3. Screw the foot of each leg in as far as possible.

⚠ Caution

The legs must be screwed in tightly to prevent them from bending.

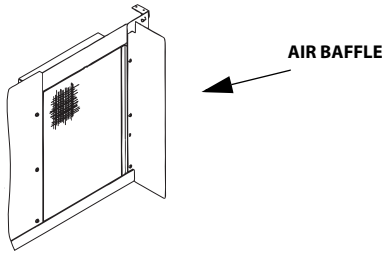
4. Move the bin into its final position.
5. Level the bin to assure that the bin door closes and seals and the ice machine operates properly. Use a level on top of the bin. Turn the base of each foot as necessary to level the bin.
6. Inspect bin gasket prior to ice machine installation. (Our bins come with a closed cell foam gasket installed along the top surface of the bin.)
7. Remove all panels from ice machine before lifting and installing on bin. Remove front panel, top cover, left and right side panels.

Air Baffle

Self-Contained Air-Cooled Only

The air-cooled baffle prevents condenser air from recirculating. To install:

1. Loosen the back panel screws next to the condenser.
2. Align the keyhole slots in the air baffle with the screw holes and slide the baffle down to lock in place.



Electrical Service

⚠ Warning

All electrical work, including wire routing and grounding must conform to all applicable national and local electrical codes.

MINIMUM CIRCUIT AMPACITY

The minimum circuit ampacity is used to help select the wire size of the electrical supply. (Minimum circuit ampacity is not the ice machine's running amp load.)

ELECTRICAL REQUIREMENTS

Refer to Ice Machine Model/Serial Plate for voltage/amperage specifications.

- A separate fuse/circuit breaker must be provided for each ice machine.
- The wire size (or gauge) is dependent upon location, materials used, length of run, etc., so it must be determined by a qualified electrician.
- The ice machine must be grounded. Check all green ground screws in the control box and verify they are tight before starting the ice machine.
- The maximum allowable voltage variation is ±10% of the rated voltage at ice machine start-up (when the electrical load is highest).

⚠ Caution

Observe correct polarity of incoming line voltage. Incorrect polarity can lead to erratic ice machine operation. Operate equipment only on the type of electricity indicated on the specification plate.

GROUND FAULT CIRCUIT INTERRUPTER

Ground Fault Circuit Interrupter (GFCI/GFI) protection is a system that shuts down the electric circuit (opens it) when it senses an unexpected loss of power, presumably to ground. GFCI/GFI circuit protection is not recommended with our equipment. If code requires the use of a GFCI/GFI, then you must follow the local code. The circuit must be dedicated, sized properly and there must be a panel GFCI/GFI breaker. We do not recommend GFCI/GFI outlets as they are known for more intermittent nuisance trips than panel breakers.

MINIMUM POWER CORD SPECIFICATIONS

If a power cord is used, the wire size to the receptacle is dependent upon location, materials used, length of run, etc., so it must be determined by a qualified electrician. Local, state or national requirements will supersede our minimum requirements.

FOR UNITED KINGDOM ONLY

As the colors of the wires in the mains lead of the appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows:

- The wire which is colored green and yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth ground symbol ⏚ or colored green or green and yellow.
- The wire colored blue must be connected to the terminal which is marked with the letter N or colored black.
- The wire colored brown must be connected to the terminal which is marked with the letter L or colored red.

Maximum Breaker Size & Minimum Circuit Amperage Chart

Important

Due to continuous improvements, this information is for reference only. Please refer to the ice machine serial number tag to verify electrical data. Serial tag information overrides information listed on this page.

Ice Machine	Voltage/Phase/ Cycle	Air-Cooled		Water-Cooled		Remote	
		Maximum Fuse/ Circuit Breaker	Minimum Circuit Amps	Maximum Fuse/ Circuit Breaker	Minimum Circuit Amps	Maximum Fuse/Circuit Breaker	Minimum Circuit Amps
M0420	115/1/60	15	11.3	N/A	N/A	N/A	N/A
	230/1/50	15	6.2	N/A	N/A	N/A	N/A
	230/1/60	15	6.2	N/A	N/A	N/A	N/A
M0500	115/1/60	20	12.7	20	12.0	N/A	N/A
	230/1/50	15	6.3	15	5.9	N/A	N/A
M0700	208-230/1/60	20	9.2	20	8.8	N/A	N/A
	230/1/50	20	8.6	20	8.2	N/A	N/A
M1000	208-230/1/60	20	13.9	20	13.2	N/A	N/A
	230/1/50	20	13.8	20	13.1	N/A	N/A
M1400	208-230/1/60	20	–	N/A	N/A	N/A	N/A
	230/1/50	20	–	N/A	N/A	N/A	N/A

Water Supply and Drain Requirements

WATER SUPPLY

Local water conditions may require treatment of the water to inhibit scale formation, filter sediment, and remove chlorine odor and taste.

> **⚠ Warning**
> Connect to a potable water supply only. Plumbing must conform to state, local and national codes.

WATER INLET LINES

Follow these guidelines to install water inlet lines:

- If you are installing a water filter system, refer to the installation instructions supplied with the filter system for ice making water inlet connections.
- Do not connect the ice machine to a hot water supply. Be sure all hot water restrictors installed for other equipment are working. (Check valves on sink faucets, dishwashers, etc.)
- If water pressure exceeds the maximum recommended pressure of 80 psi (552 kPa), obtain a water pressure regulator from your local distributor.
- Install a water shut-off valve for both the ice making and condenser water lines.
- Insulate water inlet lines to prevent condensation.

> **⚠ Caution**
> Do not apply heat to water valve inlet fitting. This will damage plastic water inlet connection.

DRAIN CONNECTIONS

Follow these guidelines when installing drain lines to prevent drain water from flowing back into the ice machine and storage bin:

- Drain lines must have a 1.5 inch drop per 5 feet of run (2.5 cm per meter), and must not create traps.
- The floor drain must be large enough to accommodate drainage from all drains.
- Run separate bin and ice machine drain lines. Insulate them to prevent condensation.
- Vent the bin and ice machine drain to the atmosphere. Do not vent the condenser drain on water-cooled models.
- A separate auxiliary drain is located in the ice machine base to remove moisture in high humidity areas. The drain fitting is a female socket for 1/2" CPVC pipe. The drain is sealed and the seal must be removed before attaching the drain fitting/tubing. Tap the seal out with a wooden dowel or similar tool. Seal the CPVC pipe to the ice machine socket with silicone sealant to allow future removal.

INSTALLATION NOTE (ONLY AUSTRALIA)

This ice machine incorporate a registered air gap as a back flow prevention device.

Please also refer to the installation in accordance with standard AS/NZS 3500.1 and AS/NZS 3500.2.

Water Supply and Drain Line Sizing/Connections

Location	Water Temperature	Water Pressure	Ice Machine Fitting	Tubing Size Up to Ice Machine Fitting
Ice Making Water Inlet	35°F (2°C) Min. 90°F (32°C) Max.	20 psi (140 kPa) Min. 80 psi (552 kPa) Max.	3/8" (.95 cm) Female Pipe Thread	3/8" (.95 cm) min. inside diameter
Ice Making Water Drain	–	–	1/2" (1.27 cm) Female Pipe Thread	1/2" (1.27 cm) min. inside diameter
Condenser Water Inlet	90°F (32°C) Max.	**Standard** 20 psi (140 kPa) Min. 150 psi (1034 kPa) Max. **High Pressure Option** 20 psi (140 kPa) Min. 350 psi (2410 kPa) Max.	3/8" Female Pipe Thread	
Condenser Water Drain	–	–	1/2" (1.27 cm) Female Pipe Thread	1/2" (1.27 cm) min. inside diameter
Bin Drain	–	–	3/4" (1.91 cm) Female Pipe Thread	3/4" (1.91 cm) min. inside diameter
Large Capacity Bin Drain	–	–	1" (2.54 cm) Male Pipe Thread	1" (2.54 cm) min. inside diameter

WATER-COOLED CONDENSER WATER PRESSURE

Water pressure at the condenser cannot exceed 150 psig (1034 kPa) with the standard water-regulating valve. Contact your distributor if your water pressure is greater than 150 psig (1034 kPa). A special order condenser/water-regulating valve is available that allows water pressure up to 350 psig (2413 kPa).

Important

The Commonwealth of Massachusetts requires that all water-cooled models must be connected only to a closed loop, cooling tower system.

COOLING TOWER APPLICATIONS (WATER-COOLED MODELS)

A water cooling tower installation does not require modification of the ice machine. The water regulator valve for the condenser continues to control the refrigeration discharge pressure.

It is necessary to know the amount of heat rejection and the pressure drop through the condenser and water valves (inlet and outlet) when using a cooling tower on an ice machine.

- Water entering the condenser must not exceed 90°F (32°C).
- Water flow through the condenser must not exceed 5 gallons (19 liters) per minute.
- Allow for a pressure drop of 7 psi (50 kPa) between the condenser water inlet and the outlet of the ice machine.
- Water exiting the condenser must not exceed 110°F (43°C).

Remote Condenser/Line Set Installation

Ice Machine	Remote Single Circuit Condenser	Line Set*
M1000	MC1000	RTK-20-R410A RTK-35-R410A RTK-50-R410A

*Line Set	Discharge Line	Liquid Line
RTK	1/2" (1.27 cm)	5/16" (.79 cm)
RLK	1/2" (1.27 cm)	3/8" (.95 cm)

Air Temperature Around the Condenser	
Minimum	Maximum
-20°F (-29°C)	120°F (49°C)

Important

Remote systems are only approved and warranted as a complete new package. Warranty on the refrigeration system will be void if a new ice machine head section is connected to pre-existing (used) tubing or remote condensers.

REMOTE ICE MACHINE REFRIGERANT CHARGE

Each remote ice machine ships from the factory with a refrigerant charge appropriate for installation with line sets of up to 50' (15 m). The serial tag on the ice machine indicates the refrigerant charge.

Additional refrigerant may be required for installations using line sets between 50' and 100' (15-30 m) long. If additional refrigerant is required, refer to the chart below for the correct amount to be added.

Ice Machine	Refrigerant to be added for 50'-100' Line Sets
M1000	2 lbs (907g)

Important

EPA CERTIFIED TECHNICIANS

If remote line set length is between 50' and 100' (15 and 30 m), add additional refrigerant to the nameplate charge. Refer to the table below for the model being worked on.

Tubing length: _____

Refrigerant added to nameplate: _____

New total refrigerant charge: _____

⚠ Warning

Potential Personal Injury Situation

The ice machine contains refrigerant charge. Installation of the line sets must be performed by a properly trained and EPA certified refrigeration technician aware of the **dangers of dealing with refrigerant** charged equipment.

GENERAL

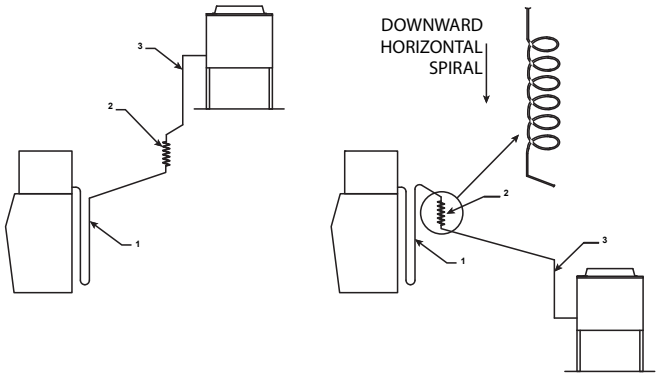
Condensers must be mounted horizontally with the fan motor on top with nothing obstructing it. There must be at least a 16" (41 cm) clearance from the bottom for air intake. The front coupling panel and one other panel (back or side) must also be unobstructed.

Remote condenser installations consist of vertical and horizontal line sets between the ice machine and the condenser. When combined, they must fit within approved specifications. The following guidelines, drawings and calculation methods must be followed to verify a proper remote condenser installation.

⚠ Caution

The compressor warranty (including the labor replacement warranty) will not apply if the remote ice machine is not installed according to specifications.

The warranty also will not apply if the refrigeration system is modified with a condenser, heat reclaim device, or other parts or assemblies not manufactured by us unless we specifically approved the component in writing.



Routing Line Sets

WIRING

Interconnecting line voltage wiring is used to energize and de-energize the condenser fan motor.

- The remote condenser voltage matches the ice machine head section voltage.

Interconnecting Wire Connections	
Ice Machine Head Section	Remote Condenser
F1	L1
F2	L2

GUIDELINES FOR ROUTING LINE SETS

First, cut a 2.5" (6.35 cm) circular hole in the wall or roof for tubing routing. The line set end with the 90° bend will connect to the ice machine. The straight end will connect to the remote condenser.

Follow these guidelines when routing the refrigerant lines. This will help ensure proper performance and service accessibility.

1. Optional - Make the service loop in the line sets (as shown in Routing Line Sets graphic). This permits easy access to the ice machine for cleaning and service. Do not use hard rigid copper at this location.
2. Required - Do not form traps in the refrigeration lines (except the service loop). Refrigerant oil must be free to drain toward the ice machine or the condenser. Route excess tubing in a supported downward horizontal spiral (as shown below). Do not coil tubing vertically.
3. Required - Keep outdoor refrigerant line runs as short as possible.

CALCULATING REMOTE CONDENSER INSTALLATION DISTANCES

Line Set Length

The maximum length is 100' (30 m).

The ice machine compressor must have the proper oil return. The receiver is designed to hold a charge sufficient to operate the ice machine in ambient temperatures between -20°F (-29°C) and 120°F (49°C), with line set lengths of up to 100' (30 m).

Line Set Rise/Drop

The maximum rise is 35' (10.7 m).

The maximum drop is 15' (4.5 m).

⚠ Caution

If a line set has a rise followed by a drop, another rise cannot be made. Likewise, if a line set has a drop followed by a rise, another drop cannot be made.

Calculated Line Set Distance

The maximum calculated distance is 150' (45 m).

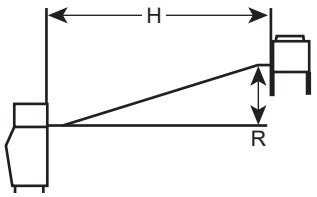
Line set rises, drops, horizontal runs (or combinations of these) in excess of the stated maximums will exceed compressor start-up and design limits. This will cause poor oil return to the compressor.

Make the following calculations to make sure the line set layout is within specifications.

1. Insert the **measured rise** into the formula below. Multiply by 1.7 to get the **calculated rise.** (Example: A condenser located 10 feet above the ice machine has a **calculated rise** of 17 feet.)
2. Insert the **measured drop** into the formula below. Multiply by 6.6 to get the **calculated drop.** (Example. A condenser located 10 feet below the ice machine has a **calculated drop** of 66 feet.)
3. Insert the **measured horizontal distance** into the formula below. No calculation is necessary.
4. Add together the **calculated rise, calculated drop,** and **horizontal distance** to get the **total calculated distance.** If this total exceeds 150' (45 m), move the condenser to a new location and perform the calculations again.

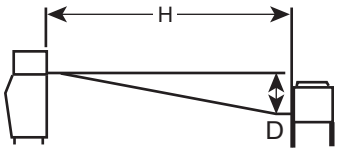
Maximum Line Set Distance Formula

Step 1.	Measured Rise (35' [10.7 m] Maximum)	_____ x 1.7	=	_____ Calculated Rise
Step 2.	Measured Drop (15' [4.5 m] Maximum)	_____ x 6.6	=	_____ Calculated Drop
Step 3.	Measured Horizontal Distance (100' [30 m] Maximum)			_____ Horizontal Distance
Step 4.	Total Calculated Distance 150' (45 m)			_____ Total Calculated Distance



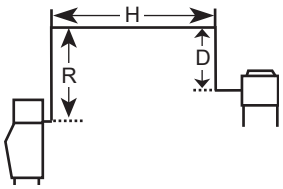
SV1196

Combination of a Rise and a Horizontal Run



SV1195

Combination of a Drop and a Horizontal Run



SV1194

Combination of a Rise, a Drop and a Horizontal Run

ROUTE THE LINE SET

- Route the line set to avoid traps and kinks.
- Minimize the amount of line set exposed on the roof.

CONNECT THE LINE SET

- Cut the line set to the correct length.
- Purge line set with dry nitrogen while brazing.
- Line set shutoff valves on the ice machine must remain closed and be protected from heat during brazing.

PRESSURE TEST AND EVACUATE LINE SET AND CONDENSER

- Lineset shutoff valves must remain closed until pressure testing and evacuation are complete.
- Pressure test @ 150 psi (1000 kPa) for a minimum of 15 minutes.
- Minimum evacuation level is 500 microns.
- Pressure test the line set and condenser with 150 psig of dry nitrogen. Add nitrogen at the line set shutoff valves located at the back of the ice machine head section. Complete the pressure test, verify no leaks are present and remove the nitrogen from the system before connecting the vacuum pump.

OPEN LINE SET VALVES

You will not hear refrigerant flow when the valves are opened. Refrigerant will not flow until the ice machine is started and the solenoid valve opens.

- All valve caps must be reinstalled, tightened and leak-checked to assure no refrigerant leakage exists.
- Counterclockwise opens all valves.

Installation Check List

- ☐ Is the Ice Machine level?
- ☐ Have all of the electrical and water connections been made?
- ☐ Has the supply voltage been tested and checked against the rating on the nameplate?
- ☐ Is there proper clearance around the ice machine for air circulation?
- ☐ Is the ice machine grounded and polarity correct?
- ☐ Has the ice machine been installed where ambient temperatures will remain in the range of 35° - 110°F (1.6° - 43.3°C)?
- ☐ Has the ice machine been installed where the incoming water temperature will remain in the range of 35° - 90°F (1.6° - 32.2°C)?
- ☐ Is there a separate drain for the potable water, bin and water-cooled condenser?
- ☐ Are the ice machine and bin drains vented?
- ☐ Are all refrigerant lines free from contact with other components?
- ☐ Are all electrical leads free from contact with refrigeration lines and moving equipment?
- ☐ Has the owner/operator been instructed regarding maintenance and the use of our De-scaler and Sanitizer?
- ☐ Has the owner/operator completed the warranty registration card?
- ☐ Has the ice machine and bin been sanitized?
- ☐ Is the ice thickness set correctly? (Refer to Operational Checks to check/set the correct ice bridge thickness).

Additional Checks for Remote Models

- ☐ Does the remote condenser fan operate properly after start-up?
- ☐ Has the remote condenser been located where ambient temperatures will remain in the range of -20° - 120°F (-29 - 49°C).
- ☐ Is the line set routed properly?
- ☐ Are both refrigeration lines to remote condenser run so they do not lay in water and are properly insulated?

Before Starting the Ice Machine

All ice machines are factory-operated and adjusted before shipment. Normally, new installations do not require any adjustment.

To ensure proper operation, follow the Operational Checks in Section 3 of this manual. Starting the ice machine and completing the Operational Checks are the responsibilities of the owner/operator.

Adjustments and maintenance procedures outlined in this manual are not covered by the warranty.

⚠ Warning

Potential Personal Injury Situation

Do not operate equipment that has been misused. abused, neglected, damaged, or altered/modified from that of original manufactured specifications.

Ice Making Sequence of Operation

NOTE: The toggle switch must be in the ICE position and the water curtain must be closed before the ice machine will start.

Water Purge Cycle

The ice machine purges any remaining water from the water trough down the drain and the refrigeration compressor starts.

Freeze Cycle

Prechill - The refrigeration system chills the evaporator before water flow over the evaporator starts. The water inlet valve energizes during the pre-chill and remains on until the Ice Thickness Float Switch is satisfied.

Freeze - Water flowing across the evaporator freezes and builds ice on the evaporator. After a sheet of ice has formed, the Harvest Float Switch signals the control board to start a harvest cycle.

Harvest Cycle

Any remaining water is purged down the drain as refrigerant gas warms the evaporator. When the evaporator warms, the sheet of cubes slides off the evaporator and into the storage bin. If all cubes fall clear of the water curtain, the ice machine starts another freeze cycle.

Full Bin Cycle

If the water curtain is held open by ice cubes, the ice machine shuts off and starts a 3-minute delay period. When the water curtain closes, the ice machine starts a new cycle at the water purge, provided the 3-minute delay period has expired.

Control Board Timers

The control board has the following non-adjustable timers:

- The ice machine is locked into the freeze cycle for 6 minutes before a harvest cycle can be initiated.
- The maximum freeze time is 60 minutes, at which time the control board automatically initiates a harvest sequence.
- The maximum harvest time is 3.5 minutes. The control board automatically initiates a freeze sequence when these times are exceeded.

SAFETY LIMITS

Safety limits are stored and indicated by the control board. The number of cycles required to stop the ice machine varies for each safety limit.

Safety limits can be reset by pressing the On/Off button and starting a new ice making cycle.

A safety limit is indicated by a flashing Service Light on the control board.

- Safety Limit 1 - If the freeze time reaches 60 minutes, the control board automatically initiates a harvest cycle. If 6 consecutive 60-minute freeze cycles occur, the ice machine stops.
- Safety Limit 2 - If the harvest time reaches 3.5 minutes, the control board automatically returns the ice machine to the freeze cycle. If 100 consecutive 3.5 minute harvest cycles occur, the ice machine stops.
- Safety Limit 3 - If the freeze time reaches 4 minutes and water is not sensed, the ice machine stops and initiates a 30 minute delay period. The ice machine will automatically restart at the end of the 30 minute delay period. If 100 consecutive failures occur, the ice machine stops.

Operational Checks

GENERAL

All ice machines are factory-operated and adjusted before shipment. Normally, new installations do not require any adjustment.

To ensure proper operation, always follow the Operational Checks:

- when starting the ice machine for the first time
- after a prolonged out-of-service period
- after de-scaling and sanitizing

NOTE: Routine adjustments and maintenance procedures are not covered by the warranty.

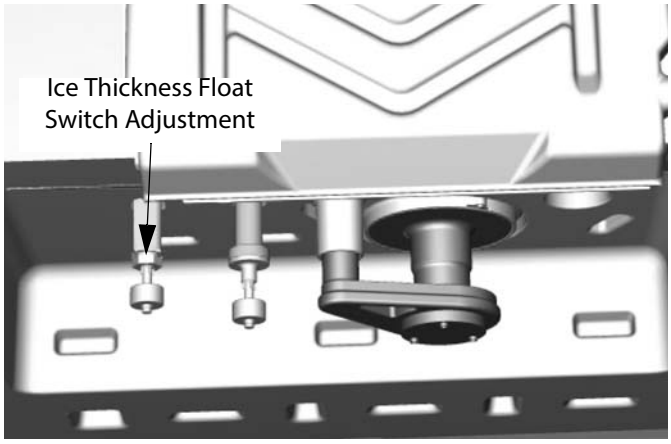
ICE THICKNESS CHECK

After a harvest cycle, inspect the ice cubes in the ice storage bin. The ice thickness float switch is factory-set to maintain the ice bridge thickness at 1/8" (3 mm).

NOTE: Make sure the water curtain is in place when performing this check. It prevents water from splashing out of the water trough.

1. Inspect the bridge connecting the cubes. It should be about 1/8" (3 mm) thick.
2. If adjustment is necessary, turn the ice thickness float switch clockwise to increase bridge thickness, counterclockwise to decrease bridge thickness. Adjust to achieve a 1/8" (3 mm) bridge thickness.

NOTE: The float can be adjusted with a 1/4" wrench while the water trough is in place. Test run two cycles to verify water level.



De-scaling and Sanitizing

GENERAL

You are responsible for maintaining the ice machine in accordance with the instructions in this manual. Maintenance procedures are not covered by the warranty.

De-scale and sanitize the ice machine every six months for efficient operation. If the ice machine requires more frequent de-scaling, consult a qualified service company to test the water quality and recommend appropriate water treatment. An extremely dirty ice machine must be taken apart for de-scaling and sanitizing.

NOTE: Sanitizing can be performed independently and more frequently than de−scaling if desired.

Manitowoc Ice Machine De-scaler and Sanitizer are the only products approved for use in this ice machine.

⚠ Caution

Use only approved Ice Machine De-scaler and Sanitizer for this application (Manitowoc De-scaler part number 94-0546-3 and Manitowoc Sanitizer part number 94-0565-3). It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling. Read and understand all labels printed on bottles before use.

DETAILED DE-SCALING/SANITIZING PROCEDURE

This procedure must be performed a minimum of once every six months.

- The ice machine and bin must be disassembled, de-scaled and sanitized.
- All ice produced during the de-scaling and sanitizing procedures must be discarded.
- Removes mineral deposits from areas or surfaces that are in direct contact with water.

REMEDIAL DE-SCALING PROCEDURE

- This procedure cleans all components in the water flow path, and is used to clean the ice machine between the bi-yearly de-scaling/sanitizing procedure without removing the ice from the bin/dispenser.
- This technology will also allow initiation and completion of a de-scale or sanitize cycle, after which the ice machine automatically starts ice making again.

Detailed De-scaling/Sanitizing Procedure

Ice machine De-scaler is used to remove lime scale and mineral deposits. Ice machine sanitizer disinfects and removes algae and slime.

⚠ Caution

Do not mix De-scaler and Sanitizer solutions together. It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling.

⚠ Warning

Wear rubber gloves and safety goggles (and/or face shield) when handling Ice Machine De-scaler or Sanitizer.

DE-SCALING PROCEDURE

Step 1 Remove the front door to access the evaporator compartment. Ice must not be on the evaporator during the de-scale/sanitize cycle. Set the toggle switch to the OFF position after ice falls from the evaporator at the end of a harvest cycle. Or, set the switch to OFF and allow the ice to melt off the evaporator(s).

⚠ Caution

Never use anything to force ice from the evaporator. Damage may result.

Step 2 Remove all ice from the bin/dispenser.

Step 3 Place the toggle switch in the CLEAN position. Water will flow through the water dump valve and down the drain. Wait until the water trough refills, then add the proper amount of ice machine de-scaler.

Model	Amount of de-scaler
M0420	3 ounces (90 ml)
M0500 M0700 M1000	5 ounces (150 ml)
M1400	9 ounces (265 ml)

Step 4 Wait until the clean cycle is complete (approximately 24 minutes). Then disconnect power to the ice machine (and dispenser when used).

⚠ Warning

Disconnect the electric power to the ice machine at the electric service switch box.

Step 5 Remove parts for de-scaling.

Please refer to the Parts Removal for De-scaling/ Sanitizing on page 19. Continue with step 6 when the parts have been removed.

Step 6 Mix a solution of de-scaler and lukewarm water. Depending upon the amount of mineral buildup, a larger quantity of solution may be required. Use the ratio in the table below to mix enough solution to thoroughly clean all parts.

Solution Type	Water	Mixed with
de-scaler	1 gal. (4 L)	16 oz (500 ml) de-scaler

Step 7 Use 1/2 of the de-scaler/water mixture to clean all components. The de-scaler solution will foam when it contacts lime scale and mineral deposits; once the foaming stops use a soft-bristle nylon brush, sponge or cloth (NOT a wire brush) to carefully clean the parts. Soak parts for 5 minutes (15-20 minutes when heavily scaled). Rinse all components with clean water.

Step 8 While components are soaking, use 1/2 of the de-scaler/water solution to clean all foodzone surfaces of the ice machine and bin (or dispenser). Use a nylon brush or cloth to thoroughly clean the following ice machine areas:

- Evaporator plastic parts – including top, bottom and sides
- Bin bottom, sides and top

Rinse all areas thoroughly with clean water.

SANITIZING PROCEDURE

NOTE: Sanitizing can be performed independently and more frequently than de–scaling if desired.

Step 9 Mix a solution of sanitizer and lukewarm water.

Solution Type	Water	Mixed with
Sanitizer	3 gal. (12 L)	2 oz (60 ml) sanitizer

Step 10 Use 1/2 of the sanitizer/water solution to sanitize all removed components (Refer to the Parts Removal for De-scaling/Sanitizing on page 19). Use a spray bottle to liberally apply the solution to all surfaces of the removed parts or soak the removed parts in the sanitizer/water solution. Do not rinse parts after sanitizing.

Step 11 Use 1/2 of the sanitizer/water solution to sanitize all foodzone surfaces of the ice machine and bin (or dispenser). Use a spray bottle to liberally apply the solution. When sanitizing, pay particular attention to the following areas:

- Evaporator plastic parts - including top, bottom and sides
- Ice machine base (top of bin) and area above the water trough
- Bin sides and bottom

Do not rinse the sanitized areas.

Step 12 Replace all removed components.Wait 25 minutes.

Step 13 Reapply power to the ice machine and place the toggle switch in the CLEAN position.

Step 14 Wait until the water trough refills, then add the proper amount of Manitowoc Ice Machine Sanitizer to the water trough.

Model	Amount of Sanitizer
M0420 M0500 M0700 M1000	3 ounces (90 ml)
M1400	6 ounces (180 ml)

Step 15 After the sanitize cycle is complete (approximately 24 minutes) move the toggle switch to the ICE position to start ice making.

PARTS REMOVAL FOR DE-SCALING/SANITIZING

A. Remove the water curtain

- Gently flex the curtain in the center and remove it from the right side.
- Slide the left pin out.

B. Remove the water trough

- Depress tabs on right and left side of the water trough.
- Allow front of water trough to drop as you pull forward to disengage the rear pins.

C. Remove the ice thickness and harvest float switches

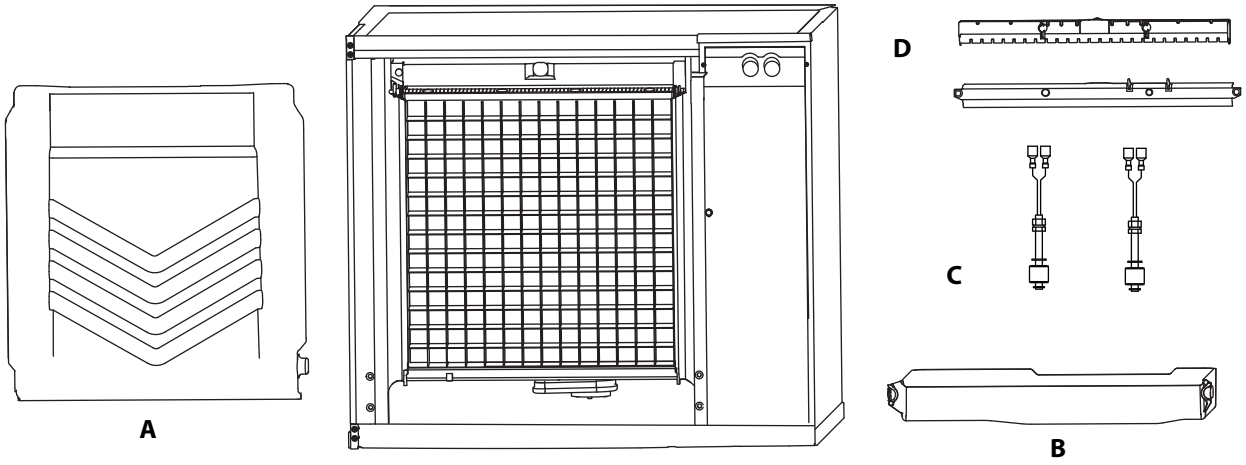
- Pull the float switch straight down to disengage.
- Lower the float switch until the wiring connector is visible.
- Disconnect the wire lead from the float switch.
- Remove the float switch from the ice machine.

D. Remove the water distribution tube

NOTE: Distribution tube thumbscrews are retained to prevent loss. Loosen thumbscrews but do not pull thumbscrews out of distribution tube.

- Loosen the two outer screws (do not remove screws completely they are retained to prevent loss) and pull forward on the distribution tube to release from slip joint.
- Disassemble distribution tube by loosening the two (2) middle thumbscrews and dividing the distribution tube into two pieces.
- Proceed to Page 18 Step 6

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Remedial De-scaling Procedure

This procedure cleans all components in the water flow path, and is used to clean the ice machine between the bi-yearly cleaning/sanitizing procedure.

NOTE: Ice machine de-scaler is used to remove lime scale and mineral deposits. Ice machine sanitizer disinfects and removes algae and slime.

Step 1 Ice must not be on the evaporator during the de-scale/sanitize cycle. Follow one of the methods below:

- Move the toggle switch to the OFF position at the end of a harvest cycle after ice falls from the evaporator(s).
- Move the toggle switch to the OFF position and allow the ice to melt.

⚠ Caution

Never use anything to force ice from the evaporator. Damage may result.

Step 2 Open the front door and move the toggle switch to the CLEAN position. Wait until the water trough refills (approximately 1 minute) and then add the proper amount of Ice Machine De-scaler to the water trough.

Model	Amount of De-scaler
M0420	3 ounces (90 ml)
M0500 M0700 M1000	5 ounces (150 ml)
M1400	9 ounces (265 ml)

Step 3 After 1 minute place the toggle switch in the ICE position and close and secure the front door. The ice machine will automatically start ice making after the Clean cycle is complete (approximately 24 minutes).

Door Removal

1. Use a Phillips screwdriver to loosen the two screws securing the door. Do not remove, they are retained to prevent loss.
2. Tilt door forward and lift up to remove.

Exterior Cleaning

Clean the area around the ice machine as often as necessary to maintain cleanliness and efficient operation.

Wipe surfaces with a damp cloth rinsed in water to remove dust and dirt from the outside of the ice machine. If a greasy residue persists, use a damp cloth rinsed in a mild dish soap and water solution. Wipe dry with a clean, soft cloth.

The exterior panels have a clear coating that is stain resistant and easy to clean. Products containing abrasives will damage the coating and scratch the panels.

- Never use steel wool or abrasive pads for cleaning.
- Never use chlorinated, citrus-based or abrasive cleaners on exterior panels and plastic trim pieces.

Cleaning the Condenser Filter

The washable filter on self-contained ice machines is designed to catch dust, dirt, lint and grease. Clean the filter with a mild soap and water.

Cleaning the Condenser

⚠ Warning

Disconnect electric power to the ice machine head section and the remote condensing unit at the electric service switches before cleaning the condenser.

A dirty condenser restricts airflow, resulting in excessively high operating temperatures. This reduces ice production and shortens component life.

- Clean the condenser at least every six months.

⚠ Warning

The condenser fins are sharp. Use care when cleaning them.

- Shine a flashlight through the condenser to check for dirt between the fins.
- Blow compressed air or rinse with water from the inside out (opposite direction of airflow).
- If dirt still remains call a service agent to clean the condenser.

Removal from Service/Winterization

1. Clean and sanitize the ice machine.
2. Move the toggle switch to the OFF position and turn off the ice machine.
3. Turn off the water supply, disconnect and drain the incoming ice-making water line at the rear of the ice machine and drain the water trough.
4. Energize the ice machine, wait one minute for the water inlet valve to open and blow compressed air in both the incoming water and the drain openings in the rear of the ice machine to remove all water.
5. Move the toggle switch to the OFF position and turn off the ice machine. Disconnect the electric power at the circuit breaker or the electric service switch.
6. Fill spray bottle with sanitizer/water solution and spray all interior food zone surfaces. Do not rinse and allow to air dry.
7. Replace all panels.

WATER-COOLED ICE MACHINES

1. Perform steps 1-6 under “Removal from Service/ Winterization”.
2. Disconnect the incoming water and drain line from the water-cooled condenser.
3. Energize the ice machine in the freeze cycle. The increasing refrigerant pressure will open the water regulating valve.
4. Blow compressed air through the condenser until no water remains.
5. Replace all panels.

Checklist

If a problem arises during operation of your ice machine, follow the checklist below before calling service. Routine adjustments and maintenance procedures are not covered by the warranty.

Problem	Possible Cause	To Correct
Ice machine does not operate.	No electrical power to the ice machine.	Replace the fuse/reset the breaker/turn on the main switch/plug power cord into receptacle.
	Ice machine needs to be turned on.	Place the toggle switch in the ICE position to start ice making.
	Curtain in open position (down).	Curtain must be in the closed position and capable of swinging freely.
Ice machine stops, and can be restarted by turning the ice machine OFF and then ON.	Safety limit feature stopping the ice machine.	Refer to "Safety Limit Feature" on the next page.
Ice sheet is thick	Water trough level is too high.	Adjust ice thickness float.
	Power button was turned off/on during freeze cycle and ice remained on evaporator.	Allow ice to thaw and release from evaporator, then restart.
	Ice damper was opened then closed in the harvest cycle before the ice released.	Allow ice to thaw and release from evaporator, then restart.
Ice machine does not release ice or is slow to harvest.	Ice machine is dirty.	De-scale and sanitize the ice machine.
	Ice machine is not level.	Level the ice machine.
	Low air temperature around ice machine (air-cooled models).	Air temperature must be at least 40°F (4°C).
	Water regulating valve leaks in harvest mode (water-cooled models).	Replace water regulating valve.
Ice machine does not cycle into harvest mode.	The six-minute freeze time lock-in has not expired yet.	Wait for freeze lock-in to expire.
	Ice thickness float switch is dirty.	De-scale and sanitize the ice machine.
	Ice thickness float switch wire is disconnected.	Connect the wire.
	Ice thickness float switch is out of adjustment.	Adjust the ice thickness float switch.
	Uneven ice fill (thin at top of evaporator).	See "Shallow or Incomplete Cubes" on the next page.
Ice quality is poor (soft or not clear).	Poor incoming water quality.	Contact a qualified service company to test the quality of the incoming water and make appropriate filter recommendations.
	Water filtration is poor.	Replace the filter.
	Ice machine is dirty.	De-scale and sanitize the ice machine.
	Water softener is working improperly (if applicable).	Repair the water softener.

Continued on next page...

Problem	Possible Cause	To Correct
Ice machine produces shallow or incomplete cubes, or the ice fill pattern on the evaporator is incomplete.	Ice thickness float switch is out of adjustment.	Adjust the ice thickness float switch.
	Water trough level is too high or too low.	Check the water level and adjust if required.
	Water filtration is poor.	Replace the filter.
	Hot incoming water.	Connect the ice machine to a cold water supply.
	Incorrect incoming water pressure.	Water pressure must be 20-80 psi (137.9 - 551.5 kPa).
	Ice machine is not level.	Level the ice machine.
Low ice capacity.	The condenser is dirty.	De-scale the condenser.
	High air temperature around ice machine (air-cooled models).	Air temperature must not exceed 110°F (43°C).
	Inadequate clearance around the ice machine.	Provide adequate clearance.
	Objects stacked around ice machine, blocking airflow to condenser (air-cooled models).	Remove items blocking airflow.
	Hot incoming water.	Connect the ice machine to a cold water supply.
	Incorrect incoming water pressure. Water pressure is too low or water filter is restricted.	Water pressure must be 20-80 psi (137.9 - 551.5 kPa). Refer to Section 2 for plumbing requirements. Replace water filter.

Safety Limit Feature

In addition to the standard safety controls, such as the high pressure cutout, your ice machine features built-in safety limits which will stop the ice machine if conditions arise which could cause a major component failure.

Refer to Safety Limits Section 3 for more information on safety limits.

Before calling for service, re-start the ice machine using the following procedure:

1. Move the toggle switch to OFF, then the ICE position,
   A. If the safety limit feature has stopped the ice machine, it will restart after a short delay. Proceed to step 2.
   B. If the ice machine does not restart, see “Ice machine does not operate” on the previous page.
2. Allow the ice machine to run to determine if the condition repeats.
   A. If the ice machine stops again, the condition has repeated. Call for service.
   B. If the ice machine continues to run, the condition has corrected itself. Allow the ice machine to continue running.

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