



QF0400 Model Flake Ice Machine

Installation, Use & Care Manual

This manual is updated as new information and models are released.
Visit our website for the latest manual. www.manitowocice.com

Safety Notices

As you work on Manitowoc equipment, be sure to pay close attention to the safety notices in this manual. Disregarding the notices may lead to serious injury and/or damage to the equipment.

Throughout this manual, you will see the following types of safety notices:

Warning

Text in a Warning box alerts you to a potential personal injury situation. Be sure to read the Warning statement before proceeding, and work carefully.

Caution

Text in a Caution box alerts you to a situation in which you could damage the equipment. Be sure to read the Caution statement before proceeding, and work carefully.

Procedural Notices

As you work on Manitowoc equipment, be sure to read the procedural notices in this manual. These notices supply helpful information which may assist you as you work.

Throughout this manual, you will see the following types of procedural notices:

Important

Text in an Important box provides you with information that may help you perform a procedure more efficiently. Disregarding this information will not cause damage or injury, but it may slow you down as you work.

NOTE: Text set off as a Note provides you with simple, but useful, extra information about the procedure you are performing.

Read These Before Proceeding:

Caution

Proper installation, care and maintenance are essential for maximum performance and trouble-free operation of your Manitowoc equipment. Read and understand this manual. It contains valuable care and maintenance information. If you encounter problems not covered by this manual, do not proceed, contact Manitowoc Foodservice Group. We will be happy to provide assistance.

Important

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

Warning

PERSONAL INJURY POTENTIAL

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

NOTE: SAVE THESE INSTRUCTIONS.

We reserve the right to make product improvements at any time. Specifications and design are subject to change without notice.

Table of Contents

Section 1

General Information

Model Numbers	1-1
How to Read a Model Number	1-1
Accessories	1-1
Bin Caster	1-1
Arctic Pure Water Filter System	1-1
Manitowoc Cleaner and Sanitizer	1-1
Bin thermostat Kit	1-1
Model/Serial Number Location	1-2
Owner Warranty Registration Card	1-3
General	1-3
Commercial Warranty Coverage	1-3
General	1-3
Parts	1-3
Labor	1-3
Exclusions	1-3
Authorized Warranty Service	1-3
Service Calls	1-3
Residential Ice Machine Limited Warranty	1-4

Section 2

Installation Instructions

Ice Machine Dimensions	2-1
QF0406A Air Cooled Ice Machine	2-1
Location of Ice Machine	2-1
Ice Machine Head Section Clearance Requirements	2-2
Ice Machine Heat of Rejection	2-2
Leveling the Ice Machine	2-2
Electrical Service	2-3
Voltage	2-3
Ground Fault Interrupter Circuit (GFIC)	2-3
Fuse/Circuit Breaker	2-3
Total Circuit Ampacity	2-3
Electrical Requirements	2-3
For United Kingdom Only	2-3
Water Supply and Drains	2-4
Potable Water Supply	2-4
Potable Water Inlet Lines	2-4
Drain Connections	2-4
Water Supply and Drain Line Sizing/Connections	2-4
Installation Checklist	2-5
Before Starting the Ice Machine	2-5

Section 3

Ice Machine Operation

Component Identification	3-1
Operational Checks	3-2
General	3-2
Water Level Check	3-2
QF0406A	3-3
Prior to Start-Up	3-3
Initial Start-Up	3-3
Automatic Shut-Off	3-3
8 Minute Lockout	3-3
SafeGuard Feature	3-3

Section 4

Maintenance

Interior Cleaning and Sanitizing	4-1
General	4-1
Exterior Cleaning	4-1
Manitowoc's Cleaning Technology	4-2
Procedure to Clean Heavily Scaled Flake Ice Machines	4-4
Removal of Parts For Cleaning/Sanitizing	4-5
Cleaning the Condenser	4-9
Removal from Service/Winterization	4-10
General	4-10

Section 5

Before Calling Service

Checklist	5-1
Safeguard Feature	5-2
Reset Procedure	5-2
Standby Mode	5-2
SafeGuard Indicator Lights	5-2
SafeGuard Modes	5-3

Section 1

General Information

Model Numbers

This manual covers the following models:

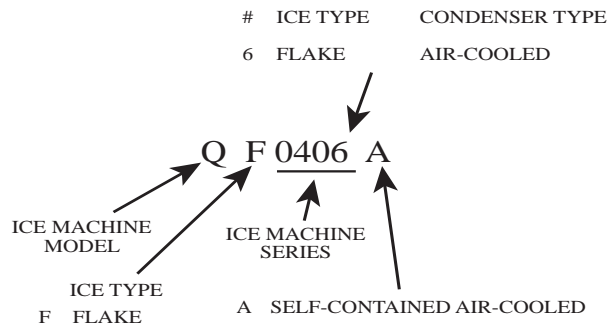
QF0406A	Flake Ice
Undercounter Self-Contained Air-Cooled	QF0406A

⚠ Warning

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.

How to Read a Model Number



Accessories

BIN CASTER

Replaces standard legs.

ARCTIC PURE WATER FILTER SYSTEM

Engineered specifically for Manitowoc ice machines, this water filter is an efficient, dependable, and affordable method of inhibiting scale formation, filtering sediment, and removing chlorine taste and odor.

MANITOWOC CLEANER AND SANITIZER

Manitowoc Ice Machine Cleaner is available in convenient 16 oz. (473 ml) bottles. Manitowoc Ice Machine Sanitizer is available in 16 oz. (473 ml) and 1 gal (3.78 l) bottles. These are the only cleaner and sanitizer approved for use with Manitowoc products.

Cleaner Part Number		Sanitizer Part Number	
16 Oz.	000000084	16 Oz.	94-0565-3
		1 Gallon	94-0581-3

NOTE: The Manitowoc Automatic Cleaning System (AuCS) accessory cannot be used with Flake Ice Machines.

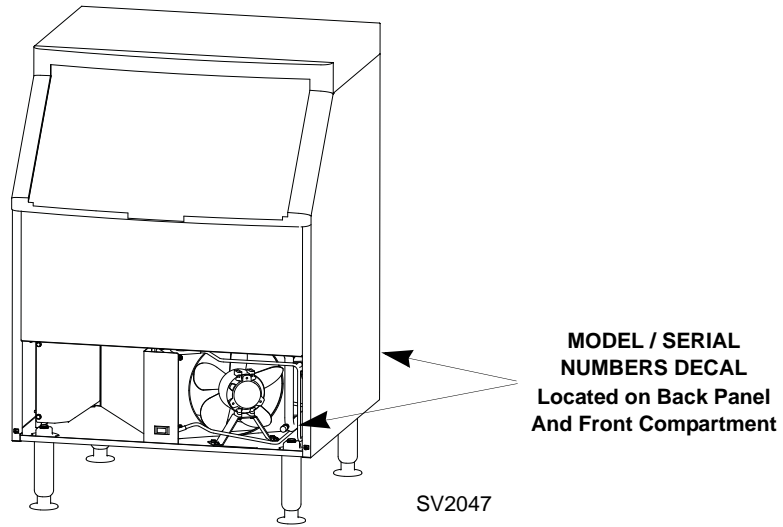
BIN THERMOSTAT KIT

Bin thermostat kit K00336 is required on QF0400 ice machines using reverse osmosis or deionized water. Failure to install this kit will result in overfilling of the bin.

Model/Serial Number Location

These numbers are required when requesting information from your local Manitowoc distributor, service representative, or Manitowoc Foodservice. Record the model and serial number of your ice machine in the space provided below.

The model and serial number are listed on the OWNER WARRANTY REGISTRATION CARD. They are also listed on the MODEL/SERIAL NUMBER DECAL affixed to the ice machine.



Model/Serial Number Location

Ice Machine	
Model Number	
Serial Number	

Flake/Chiplet/Nugget Commercial Ice Machine Warranty

Manitowoc Ice, Inc. (hereinafter referred to as the "COMPANY") warrants for a period of twentyfour months from the installation date (except as limited below) that new Flake/Chiplet ice machines manufactured by the COMPANY shall be free of defects in material or workmanship under normal and proper use and maintenance as specified by the COMPANY and upon proper installation and start-up in accordance with the instruction manual supplied with the ice machine. The COMPANY'S warranty hereunder with respect to the compressor shall apply for an additional thirty-six months, excluding all labor charges.

The obligation of the COMPANY under this warranty is limited to the repair or replacement of parts, components, or assemblies that in the opinion of the COMPANY are defective. This warranty is further limited to the cost of parts, components or assemblies and standard straight time labor charges at the servicing location.

Time and hourly rate schedules, as published from time to time by the COMPANY, apply to all service procedures. Additional expenses including without limitation, travel time, overtime premium, material cost, accessing or removal of the ice machine, or shipping are the responsibility of the owner, along with all maintenance, adjustments, cleaning, and ice purchases. Labor covered under this warranty must be performed by a COMPANY Contracted Service Representative or a refrigeration service agency as qualified and authorized by the COMPANY'S local Distributor. The COMPANY'S liability under this warranty shall in no event be greater than the actual purchase price paid by customer for the ice machine.

The foregoing warranty shall not apply to (1) any part or assembly that has been altered, modified, or changed; (2) any part or assembly that has been subjected to misuse, abuse, neglect, or accidents; (3) any ice machine that has been installed and/or maintained inconsistent with the technical instructions provided by the COMPANY; or (4) any ice machine initially installed more than five years from the serial number production date. This warranty shall not apply if the Ice Machine's refrigeration system is modified with a condenser, heat reclaim device, or parts and assemblies other than those manufactured by the COMPANY, unless the COMPANY approves these modifications for specific locations in writing.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR GUARANTEES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. In no event shall the COMPANY be liable for any special, indirect, incidental or consequential damages. Upon the expiration of the warranty period, the COMPANY'S liability under this warranty shall terminate. The foregoing warranty shall constitute the sole liability of the COMPANY and the exclusive remedy of the customer or user. To secure prompt and continuing warranty service, the warranty registration card must be completed and sent to the COMPANY within five (5) days from the installation date.

Complete the following and retain for your record:

Distributor/Dealer _____
Model Number _____ Serial Number _____
Installation Date _____

MANITOWOC ICE

2110 So. 26th St., P.O. Box 1720, Manitowoc, WI 54221-1720

Telephone: 920-682-0161 • Fax: 920-683-7585

Web Site - www.manitowocice.com

Residential Ice Machine Limited Warranty

WHAT DOES THIS LIMITED WARRANTY COVER?

Subject to the exclusions and limitations below, Manitowoc Foodservice (“Manitowoc”) warrants to the original consumer that any new ice machine manufactured by Manitowoc (the “Product”) shall be free of defects in material or workmanship for the warranty period outlined below under normal use and maintenance, and upon proper installation and start-up in accordance with the instruction manual supplied with the Product.

HOW LONG DOES THIS LIMITED WARRANTY LAST?

<u>Product Covered</u>	<u>Warranty Period</u>
Ice Machine	Twelve (12) months from the sale date

WHO IS COVERED BY THIS LIMITED WARRANTY?

This limited warranty only applies to the original consumer of the Product and is not transferable.

WHAT ARE MANITOWOC ICE’S OBLIGATIONS UNDER THIS LIMITED WARRANTY?

If a defect arises and Manitowoc receives a valid warranty claim prior to the expiration of the warranty period, Manitowoc shall, at its option: (1) repair the Product at Manitowoc’s cost, including standard straight time labor charges, (2) replace the Product with one that is new or at least as functionally equivalent as the original, or (3) refund the purchase price for the Product. Replacement parts are warranted for 90 days or the balance of the original warranty period, whichever is longer. The foregoing constitutes Manitowoc’s sole obligation and the consumer’s exclusive remedy for any breach of this limited warranty. Manitowoc’s liability under this limited warranty is limited to the purchase price of Product. Additional expenses including, without limitation, service travel time, overtime or premium labor charges, accessing or removing the Product, or shipping are the responsibility of the consumer.

HOW TO OBTAIN WARRANTY SERVICE

To obtain warranty service or information regarding your Product, please contact us at:
MANITOWOC FOODSERVICE
2110 So. 26th St.
P.O. Box 1720,
Manitowoc, WI 54221-1720
Telephone: 920-682-0161 Fax: 920-683-7585
www.manitowocice.com

WHAT IS NOT COVERED?

This limited warranty does not cover, and you are solely responsible for the costs of: (1) periodic or routine maintenance, (2) repair or replacement of the Product or parts due to normal wear and tear, (3) defects or damage to the Product or parts resulting from misuse, abuse, neglect, or accidents, (4) defects or damage to the Product or parts resulting from improper or unauthorized alterations, modifications, or changes; and (5) defects or damage to any Product that has not been installed and/or maintained in accordance with the instruction manual or technical instructions provided by Manitowoc. To the extent that warranty exclusions are not permitted under some state laws, these exclusions may not apply to you.

Except As Stated In The Following Sentence, This Limited Warranty Is The Sole And Exclusive Warranty Of Manitowoc With Regard To The Product. All Implied Warranties Are Strictly Limited To The Duration Of The Limited Warranty Applicable To The Products As Stated Above, Including But Not Limited To, Any Warranty Of Merchantability Or Of Fitness For A Particular Purpose.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

In No Event Shall Manitowoc Or Any Of Its Affiliates Be Liable To The Consumer Or Any Other Person For Any Incidental, Consequential Or Special Damages Of Any Kind (Including, Without Limitation, Loss Profits, Revenue Or Business) Arising From Or In Any Manner Connected With The Product, Any Breach Of This Limited Warranty, Or Any Other Cause Whatsoever, Whether Based On Contract, Tort Or Any Other Theory Of Liability.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

HOW STATE LAW APPLIES

This limited warranty gives you specific legal rights, and you may also have rights that vary from state to state or from one jurisdiction to another.

REGISTRATION CARD

To secure prompt and continuing warranty service, this warranty registration card must be completed and sent to Manitowoc within thirty (30) days from the sale date. Complete the registration card and send it to Manitowoc.

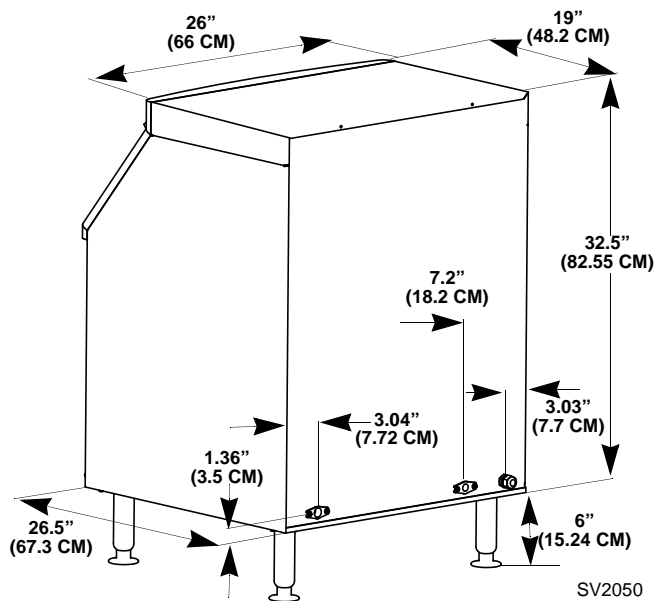
Section 2

Installation Instructions

Ice Machine Dimensions

These instructions are provided to assist the qualified installer. Check your local Yellow Pages for the name of the nearest Manitowoc distributor, or call Manitowoc Foodservice for information regarding start-up services.

QF0406A AIR COOLED ICE MACHINE



Important

Failure to follow these installation guidelines may affect warranty coverage.

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 ice machine will operate in an air temperature range of 45°F to 110°F (7°C to 43.4°C) although the recommended air temperature is 60°F to 100°F (16°C to 38°C)
- The ice machine will operate with water temperature range of 45°F to 90°F (7°C to 32°C) although the recommended water temperature range is 55°F to 80°F (13°C to 27°C).
- The location must not be near heat-generating equipment or in direct sunlight.
- The location must be capable of supporting the weight of the ice machine and a full bin of ice.
- The location must allow enough clearance for water, drain and electrical connections in the **rear of the ice machine**.
- The location must not obstruct airflow through or around the ice machine. QF0406A airflow is in and out of the front of the ice machine. Refer to below for clearance requirements.

Ice Machine Head Section Clearance Requirements

QF0406A	Self-Contained Air-Cooled	Self-Contained Water-Cooled
Top/Sides	5" (12.7 mm)	NA
Back	5" (12.7 mm)	NA

⚠ 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. See "Removal from Service/Winterization".

Ice Machine Heat of Rejection

Series Condensing Unit	Heat of Rejection*
QF0406A	4000
*B.T.U. / Hour	

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 the air conditioning equipment where self-contained air-cooled ice machines are installed.

Leveling the Ice Machine

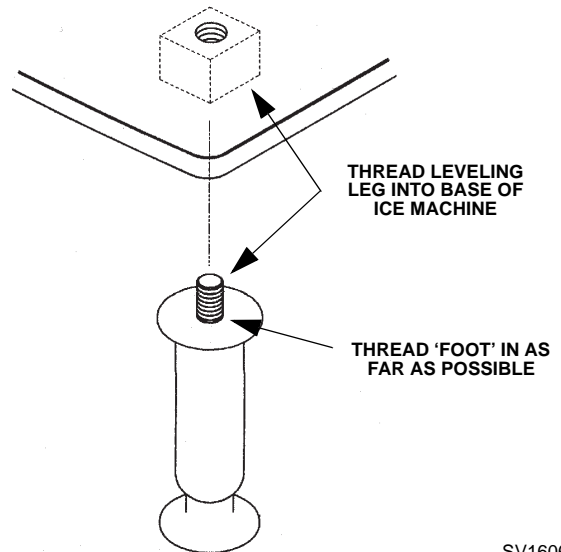
1. Screw the leveling legs onto the bottom of the ice machine.
2. Screw the foot of each leg in as far as possible.

⚠ Caution

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

3. Move the ice machine into its final position.
4. Level the ice machine - place a level on top of the ice machine and turn each foot as necessary to level the ice machine front to back and side to side.


NOTE: An optional caster assembly is available for use in place of the legs. Installation instructions are supplied with the casters.



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Leveling Leg and Foot

Electrical Service

 **Warning**

All wiring must conform to local, state and national codes.

VOLTAGE

The maximum allowable voltage variation is ±10% of the rated voltage on the ice machine model/serial number plate at start-up (when the electrical load is highest).

GROUND FAULT INTERRUPTER CIRCUIT (GFCI)


Ground Fault Circuit Interrupter protection is a system that shuts down the electric circuit (opens it) when it senses an unexpected loss of power, presumably to ground. Manitowoc does not recommend the use of a GFCI/GFI circuit protection 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.

FUSE/CIRCUIT BREAKER

A separate fuse/circuit breaker must be provided for each ice machine. Circuit breakers must be H.A.C.R. rated (does not apply in Canada).

QF0406A 115/60/1 ice machines are factory pre-wired with a power cord and 5-15P plug confirmation.

QF0406A 230/50/1 ice machines are factory pre-wired with a power cord, no plug is supplied.

 **Warning**

The ice machine must be grounded in accordance with national and local electrical codes.

TOTAL CIRCUIT AMPACITY

The total circuit ampacity is used to help select the wire size of the electrical supply.

The wire size (or gauge) is also dependent upon location, materials used, length of run, etc., so it must be determined by a qualified electrician.


Electrical Requirements

Maximum Fuse Size

Ice Machine Model	Voltage Phase Cycle	Maximum Fuse/ Circuit Breaker	Total Circuit Amps
QF0406A	115/1/60	15	6.9
	230/1/05	15	4.2

For United Kingdom Only

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

- The wire which is coloured 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 coloured green or green and yellow.
- The wire coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
- The wire coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

Water Supply and Drains

POTABLE WATER SUPPLY

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

POTABLE WATER INLET LINES

Follow these guidelines to install water inlet lines:

- 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 (80 psig 551.5 kPA) recommended pressure, obtain a water pressure regulator from your Manitowoc distributor.
- Install a water shut-off valve and union for both the ice making and condenser water lines.
- Insulate water inlet lines to prevent condensation.

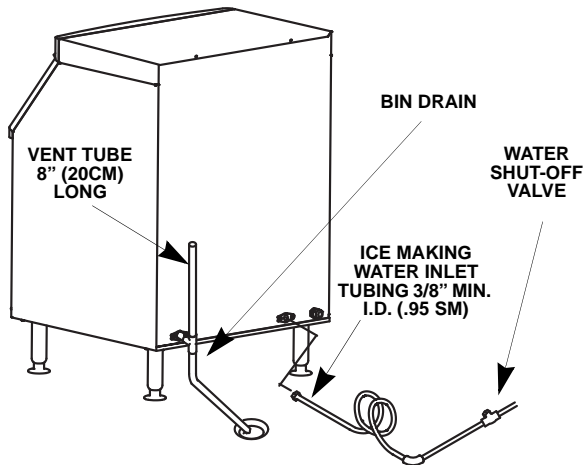
DRAIN CONNECTIONS

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 water-cooled condenser drain lines. Insulate them to prevent condensation.
- Vent the bin and ice machine drain to the atmosphere. The ice machine drain requires an 18" vent. Do not vent the condenser drain on water-cooled models.
- Drains must have a union or other suitable means to allow in place disconnection from the ice machine when servicing is required.

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	45°F (6°C) Min. 90°F (32.2°C) Max.	20 psi (137.9 kPA) Min. 80 psi (551.5 kPA) Max.	3/8" Female Pipe Thread	3/8" (9.5 mm) minimum inside diameter
Bin Drain	---	---	3/4" Female Pipe Thread	3/4" (19.1 mm) minimum inside diameter



Typical Water Supply Drain Installation

Caution
 Plumbing Must Conform To all Local and National Codes

Important
 If you are installing a Manitowoc water filter system, refer to the Installation Instructions supplied with the filter system for ice making water inlet connections.

Installation Checklist

X	Installation Checklist Items
	Is the Ice Machine level?
	Has all of the internal packing been removed?
	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?
	Has the ice machine been installed where ambient temperatures will remain in the range of 45° - 110°F (7° - 43.3°C)?
	Has the ice machine been installed where the incoming water temperature will remain in the range of 45° - 90°F (7° - 32.2°C)?
	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 Manitowoc Cleaner and Sanitizer?
	Has the warranty registration card been sent to the factory?
	Has the ice machine and bin been sanitized?
	Has this manual been given to the owner/operator?
	Is the water level (float valve) set correctly?
	Has the toggle switch been placed in the ice position? (Switch is located near the bottom of the front cover)


Before Starting the Ice Machine

All Manitowoc 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.

The float valve setting must be checked to verify it is correctly set. An adjustment may be necessary to obtain the proper water level.

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.

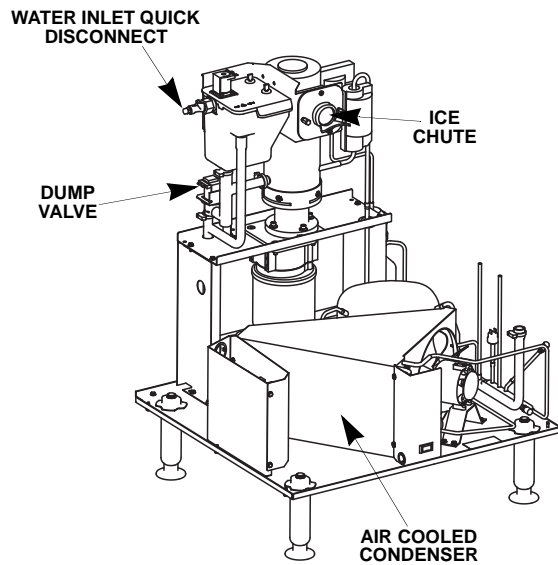
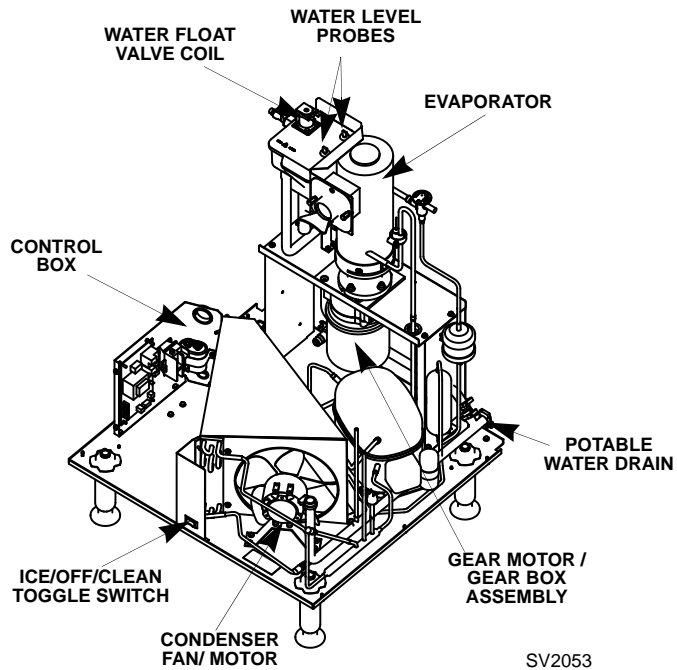
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Section 3

Ice Machine Operation

Component Identification

QF0406A



Operational Checks

GENERAL

Manitowoc ice machines are factory-operated and adjusted before shipment. Normally, a newly installed ice machine does 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 cleaning and sanitizing

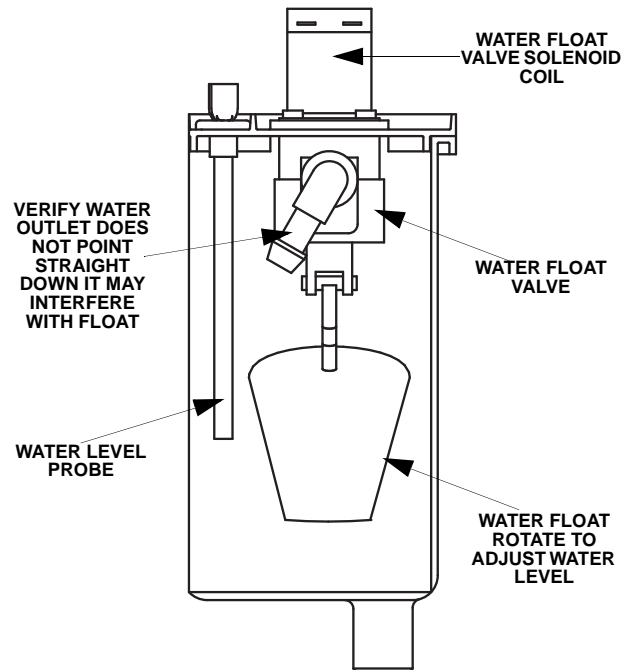
NOTE: Routine adjustments and maintenance procedures outlined in this manual are not covered by the warranty.

WATER LEVEL CHECK

The float valve maintains the correct water level. The water level must allow the water level probes to maintain water contact throughout the freeze cycle. The water level is factory set and normally will not require adjustment. Check the water level during the freeze cycle. The water level is correct if the water level indicator light is energized (compressor is running) and no water is entering the overflow tube. (Check for overflow water exiting the ice machine drain line at the floor drain).

If adjustments are necessary:

- Rotate float clockwise to increase water level
- Rotate float counterclockwise to decrease water level
- Verify the outlet for the water float valve is at a 20 to 30 degree angle to prevent contact with the float.



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QF0406A**PRIOR TO START-UP**

When the toggle switch is placed in the “ice” position the following must occur prior to starting an ice making cycle.

- A. The **bin level probe** must be **open** (bin level light off). If the probe is closed, (bin level light on) when the toggle switch is moved to ICE, the control system waits until the bin level probe opens, (bin level light off) before starting an ice making sequence. If the bin level probe is removed/disconnected the ice machine will not start.
- B. The **water level probe** must be **closed** (water level light on) to start the compressor. If the water level probe is open, (water level light off) the control system waits until the water level probe closes before starting the compressor.

INITIAL START-UP**1. Flush**

Immediately after placing the toggle switch into ICE, the gearbox energizes. After 45 seconds the water float valve solenoid is energized.

2. Freeze Cycle

When water contacts the water level probe, the compressor and condenser fan motor energize (condenser fan motor is wired through a fan cycling control).

The gear motor, compressor, condenser fan motor and water float valve solenoid remain energized as the ice machine makes ice. The water float valve will open and close automatically to maintain the proper water level.

AUTOMATIC SHUT-OFF**3. Ice Run Out**

Ice will build up in the bin until it contacts the bin level probe. After ice contacts the bin level probe for 30 continuous seconds the compressor de-energizes. To allow excess ice to run out, the gear motor and the water float valve solenoid remain energized for an additional 45 seconds, then de-energize.

A 8-minute lockout starts when the compressor de-energizes. When the ice drops away from the bin level probe the ice machine will begin an initial start-up cycle, provided the “8-minute lockout” has expired.

8 MINUTE LOCKOUT

The bin level light will flash until the 8-minute lockout expires.

After the 8 minute lockout expires the bin level light will de-energize.

The 8 minute lockout time can be overridden by moving the ON/OFF/CLEAN toggle switch from ICE to OFF then back to ICE.

SAFEGUARD FEATURE

In addition to standard safety controls, your Manitowoc ice machine features built-in SafeGuards. The ice machine will stop when conditions arise that would cause major component failure. Refer to Section 5 for full details.

Flake ice machines use an auger to remove ice from the evaporator. Occasional noises (creaks, groans, or pops) are a normal part of the ice making process.

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Section 4

Maintenance

Interior Cleaning 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.

Clean and sanitize the ice machine every six months for efficient operation. If the ice machine requires more frequent cleaning and sanitizing, 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 cleaning and sanitizing.

Manitowoc Ice Machine Cleaner and Sanitizer are the only products approved for use in Manitowoc ice machines.

Caution

Use only Manitowoc approved Ice Machine Cleaner (part number 000000084) and 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.

Caution

Do not mix Cleaner 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 Cleaner or Sanitizer.

Manitowoc Ice Machines have three separate cleaning procedures.

Preventative Maintenance Cleaning Procedure

Perform this procedure as required for your water conditions.

- Allows cleaning the ice machine without removing all of the ice from the bin
- Removes mineral deposits from areas or surfaces that are in direct contact with water during the freeze cycle (reservoir, evaporator, auger, drain lines).

Cleaning/Sanitizing Procedure

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

- All ice must be removed from the bin
- The ice machine and bin must be disassembled cleaned and sanitized
- The ice machine produces ice with the cleaner and sanitizer solutions
- All ice produced during the cleaning and sanitizing procedure must be discarded

Heavily Scaled Cleaning Procedure

Perform this procedure if you have some or all of these symptoms.

- Grinding, popping or squealing noises from the evaporator
- Grinding noise from gearbox
- Ice machine trips speed sensor

NOTE: A Cleaning/Sanitizing Procedure must be performed after this procedure.

EXTERIOR CLEANING

Remove dust and dirt off exterior surfaces with mild household dish-washing detergent and warm water. Wipe dry with a clean, soft cloth.

MANITOWOC'S CLEANING TECHNOLOGY

Manitowoc Flake Ice Machines include technology that allows the initiation and completion of a cleaning or sanitizing cycle at the flip of a switch. This cycle will permit cleaning of all surfaces that come in contact with the water distribution system. Periodic maintenance must be performed that includes sanitizing the bin and adjacent surface areas, which are not contacted by the water distribution system.

Depending on local water conditions Manitowoc recommends initiating preventative maintenance cleaning procedures between the 6 month cleanings.

This preventive maintenance removes mineral build-up from the evaporator, which results in peak efficiency and lower operating costs.

This technology will also allow initiation and completion of a clean or sanitize cycle, after which the ice machine automatically starts ice making again.

Refer to the cleaning/sanitizing procedure for complete details.

PREVENTATIVE MAINTENANCE CLEANING PROCEDURE

Use Ice machine cleaner part number 000000084 only. This cleaner is used to remove lime scale or other mineral deposits. It is not used to remove algae or slime. Refer to "Cleaning/Sanitizing Procedure" for removal of algae and slime. To initiate a cleaning cycle using Manitowoc's Cleaning Technology use the following procedure.

Step 1 Set the toggle switch to the OFF position. Open the bin door and remove the 2 thumbscrews and white plastic panel.

Step 2 Disconnect the water inlet line by depressing the stainless steel tab (refer to disassembly for cleaning for procedure).

Step 3 Move the toggle switch to the CLEAN position. Water will flow through the water dump valve and down the drain. The flush, gear motor, speed, dump valve and water solenoid lights will energize to indicate the ice machine is in the clean mode.

Step 4 Wait about one minute or until the dump valve de-energizes. Lift the front cover on the water reservoir and add the proper amount of Manitowoc Ice Machine Cleaner.

Step 5 Reconnect the water inlet line by pushing onto fitting and snapping into locked position.

Step 6 The ice machine will automatically time out flush and rinse cycles, and then stop. The flush light remains energized until the toggle switch is moved to the OFF position. This entire cycle lasts approximately 11 minutes.

Step 7 Replace the white plastic panel and move the toggle switch to the ice position.

NOTE: Periodic cleaning must be performed on adjacent surface areas not contacted by the water distribution system.

Manitowoc recommends disassembling, cleaning and sanitizing the ice machine and bin/dispenser every six months.

NOTE: The ice machine may be set to start and finish a cleaning procedure, and then automatically start ice making again. Wait about one minute into the cleaning cycle (until the dump valve light de-energizes), then move the switch from CLEAN to ICE position. When the clean cycle is complete ice making starts automatically

Model	Amount of Cleaner Part Number 000000084
QF0406A	3 ounces (90 ml)

CLEANING/SANITIZING PROCEDURE

Use Ice machine cleaner part number 000000084.

Use Ice machine sanitizer part number 94-0565-3.

Step 1 Set the toggle switch to the OFF position and remove all ice from the bin.

Step 2 Remove the 2 thumbscrews and white plastic panel.

Step 3 Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever (refer to disassembly for cleaning for procedure).

Step 4 Follow the chart and premix cleaner and water.

Amount of Water	Amount of Cleaner Part Number 000000084
1 gallon (3.8 Liters)	3 ounces (90 ml)

Step 5 To start cleaning, move the toggle switch to the ICE position.

Step 6 Wait about 45 seconds until the dump valve light de-energizes. Fill the evaporator and reservoir with cleaning solution. The ice machine will make ice with the cleaning solution and deposit the ice in the bin. Add the remaining cleaner/water solution when the water level in the reservoir drops.

NOTE: Do not allow the water level to drop below the water level probes. The ice machine will discontinue the cycle when the water level probes open (lose water contact) for more than 30 seconds.

Step 7 After all of the cleaner/water solution has been added reconnect the water supply line to the float valve. Continue the freeze cycle for 10 minutes to remove the cleaning solution from the water circuit.

Step 8 Place the toggle switch in the Off position.

Step 9 Disassemble the ice machine and hand clean all parts (refer to disassembly for cleaning/sanitizing).

Step 10 Hand sanitize all parts (refer to disassembly for cleaning/sanitizing for procedure).

Step 11 Remove and discard all ice produced during the cleaning process.

Step 12 Reassemble ice machine.

Step 13 Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.

Step 14 Remove the top cover from water reservoir.

Step 15 Remove the water level probes from the top cover and with the wires attached, place the water level probes (stand upright) inside the water reservoir.

Step 16 Refer to chart and premix water and sanitizer.

Amount of Water	Amount of Sanitizer
6 Gallons (23L) Cool Water	4 ounces (120 ml)

Step 17 To start sanitizing, move the toggle switch to the ICE position.

Step 18 Wait about 45 seconds until the dump valve light de-energizes. Fill the evaporator and reservoir with sanitizer/water solution. The ice machine will make ice with the sanitizer/water solution and deposit the ice in the bin. Add the remaining sanitizer/water solution when the water level in the reservoir drops.

NOTE: Do not allow the water level to drop below the water level probes. The ice machine will discontinue the cycle when the water level probes open (lose water contact) for more than 30 seconds.

Step 19 After all of the sanitizer/water solution has been added to the reservoir, reconnect the water supply line at the float valve quick disconnect. Continue the sanitize cycle for 10 minutes to remove the sanitizing solution from the water circuit.

Step 20 Place the toggle switch in the Off position, then disassemble the ice machine and hand sanitize all parts (refer to disassembly for cleaning/sanitizing for procedure).

Step 21 Remove and discard all ice produced in the sanitizing process, then reassemble the ice machine and reconnect the water supply.

PROCEDURE TO CLEAN HEAVILY SCALED FLAKE ICE MACHINES

Step 1 Set the toggle switch to the OFF position and remove all ice from the bin.

Step 2 Remove the 2 thumbscrews and white plastic panel from the interior back wall of the bin.

Step 3 Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.

Step 4 Refer to chart below:

Premix cleaner with lukewarm water in a non-metallic container.

Model	Water Reservoir Capacity	Mix Cleaner and Water Use Ice machine cleaner part number 00000084 only	
		Cleaner	Water
QF0406A	48 oz (1.4 L)	32 oz (0.94 L)	16 oz (0.5 L)

Step 5 Remove all water from the evaporator and water reservoir. Start an ice making cycle by moving the toggle switch to the ICE position. Water will flow through the water dump valve and down the drain for 45 seconds. After 45 seconds move the toggle switch to the OFF position. Lift the top cover of the water reservoir and add the entire cleaner/water solution.

Leave the cleaner/water solution in the evaporator for a minimum of 4 hours.

Step 6 Move the toggle switch from OFF to ICE. The cleaner/water solution will flow through the water dump valve and down the drain for 45 seconds.

Step 7 Move the toggle switch to the OFF position, then follow the standard cleaning and sanitizing procedures for the model ice machine you are cleaning.

REMOVAL OF PARTS FOR CLEANING/SANITIZING

⚠ Warning

Disconnect electric power to the ice machine at the electric switch box before proceeding.

⚠ Warning

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

⚠ Caution

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

1. Turn off the water supply to the ice machine at the water service valve or disconnect water supply line at float valve quick disconnect by depressing stainless steel lever and pulling the fitting off.
2. Remove the components listed on the following pages for cleaning and sanitizing.
3. Soak the removed part(s) in a properly mixed solution of cleaner and water.

Solution Type	Water	Mixed With
Cleaner	1 gal. (4 l)	16 oz (500 ml) cleaner Part Number 000000084

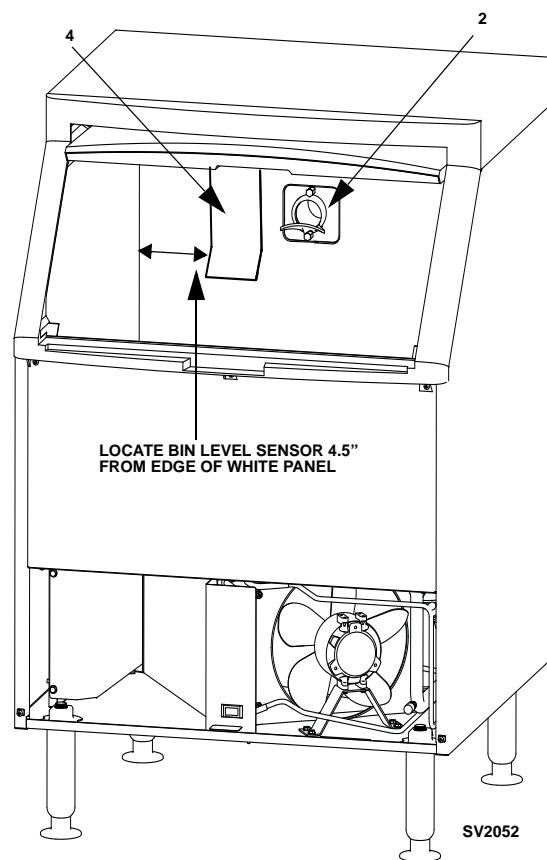
4. Use a soft-bristle brush or sponge (NOT a wire brush) to carefully clean the parts.
5. Use the solution and a brush or sponge to clean all disassembled components and the inside of the bin.
6. Rinse all cleaned parts with clear water.
7. Mix a solution of sanitizer and water.

Solution Type	Water	Mixed With
Sanitizer	3 gal. (11.4 l)	2 oz (60 ml) sanitizer Part Number 94-0565-3

8. Soak the parts in the sanitizer /water solution for 10 minutes. Use the sanitizer/water solution and a sponge to sanitize all removed components and the inside of the bin. Do not rinse the sanitized parts.
9. Install the removed parts in the ice machine.
10. Turn on the water and electrical supply.

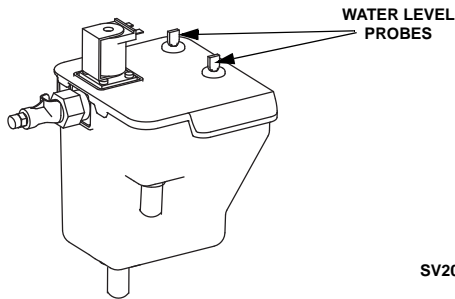
Inner Panel & Ice Diverter Removal

1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Open bin door to access panel and diverter.
3. Remove thumbscrews and lift inner panel forward.
4. Remove bin level sensor from white plastic inner panel.
5. Remove ice diverter from bin.
6. Remove white plastic inner panel from bin.
7. When the bin level sensor is reinstalled the correct position is 4.5" (114 mm) from the left edge of the white panel.



Water Level Probe Removal

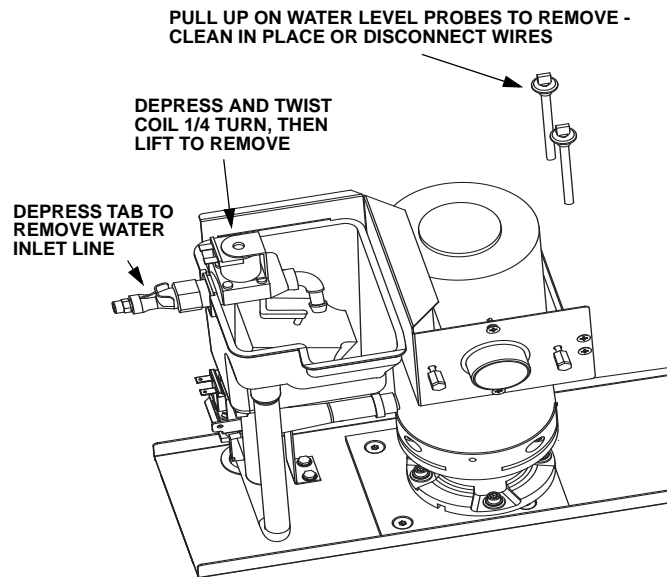
1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.
3. Pull up on water level probes to remove.
4. Clean in place or disconnect wires from water level probes.



Water Level Probe Removal

Float Valve Removal

1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.
3. Remove water float valve coil.
4. Depress coil and rotate 1/4 turn counterclockwise.
5. With coil wires attached, lift coil off enclosure tube.
6. Remove top cover from float reservoir.
7. Lift float valve out of float reservoir.

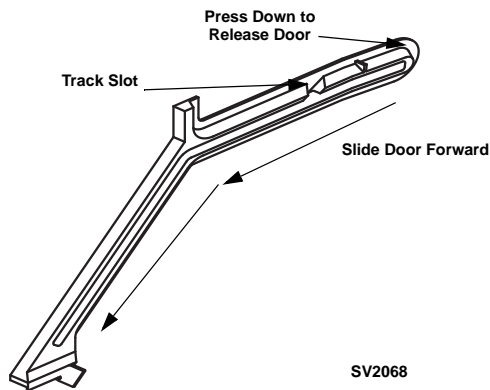


Float Valve Removal

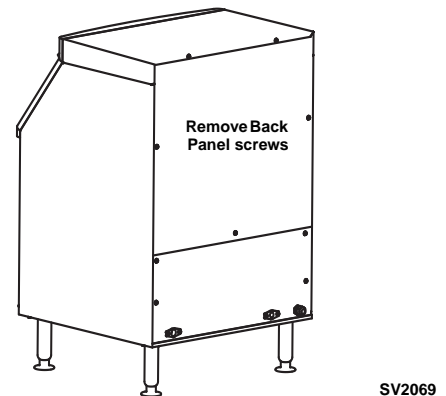
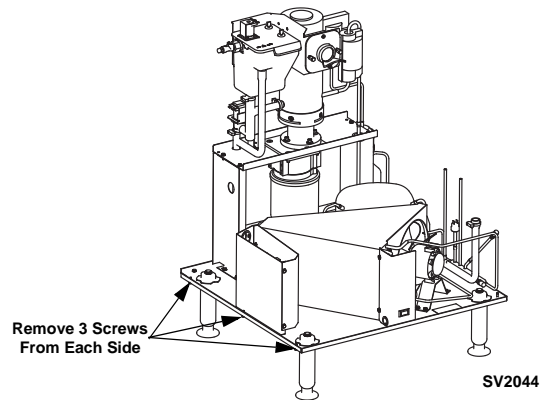
Bin Door Removal

Door removal allows easier access for cleaning and sanitizing.

1. Disconnect the electrical power to the ice machine and remove ice from bin.
2. Grasp the rear of the bin door and pull bin door forward approximately 5".
3. Slide bin door to the rear while applying upward pressure (the rear door pins will ride up into the track slot).
4. Slide the rear door pins off the end and then below the door track. Slide bin door forward allowing the back of the door to lower into the bin. Continue forward with the bin door until the front pins bottom out in the track.
5. Lift the right side of the bin door until the front pin clears the track.
6. Remove door from bin.

**Cabinet Removal**

1. Remove all ice from bin and disconnect power and water supplies.
2. Remove thumbscrews and evaporator panel.
3. Support both sides of the p
4. Remove three screws from the bottom of the left and right side of cabinet.
5. Remove screws from back panel.
6. Disconnect drain line clamp.
7. Slide cabinet forward and remove from base.



Water Dump Valve

The water dump valve normally does not require removal for cleaning. To determine if removal is necessary:

1. Locate the water dump valve.
2. Set the toggle switch to ICE.
3. While the ice machine is in the freeze mode, check the water trough to determine if the dump valve is leaking. If there is no or little water in the water trough (during the freeze cycle) the dump valve is leaking.
 - A. If the dump valve is leaking, remove, disassemble and clean it.
 - B. If the dump valve is not leaking, do not remove it. Instead, follow the "Ice Machine Cleaning Procedure".

Follow the procedure below to remove the dump valve.

Warning

Disconnect the electric power to the ice machine at the electric service switch box and turn off the water supply before proceeding.

1. If so equipped, remove the water dump valve shield from its mounting bracket.
2. Leaving the wires attached, twist coil and rotate it counter-clockwise 1/4 turn.
3. Lift the coil assembly off the valve body.
4. Remove the spring, plunger, and nylon gasket from the valve body.
- 5.

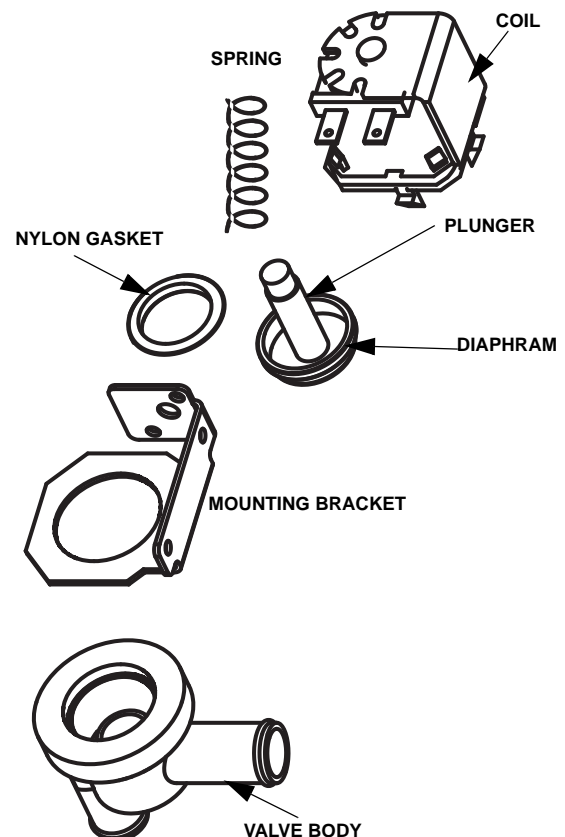
NOTE: At this point, the water dump valve can easily be cleaned. If complete removal is desired, continue with step 5.

Important

The plunger and the inside of the enclosing tube must be completely dry before assembly.

NOTE: During cleaning, do not stretch or damage the spring.

6. Remove the tubing from the dump valve by twisting the clamps off.
7. Remove the valve body, twist off.



Dump Valve Disassembly

CLEANING THE CONDENSER**⚠ Warning**

Disconnect electric power to the ice machine and the remote condenser at the electric service switch before cleaning the condenser.

Air-Cooled Condenser

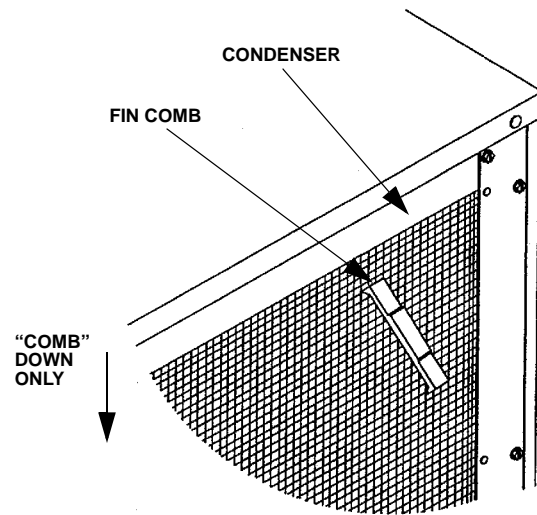
A dirty condenser restricts airflow, resulting in excessively high operating temperatures. This reduces ice production and shortens component life. Clean the condenser at least every six months. Follow the steps below.

⚠ Caution

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

1. The washable aluminum filter on self-contained ice machines is designed to catch dust, dirt, lint and grease. This helps keep the condenser clean. Clean the filter with a mild soap and water solution.
2. Clean the outside of the condenser with a soft brush or a vacuum with a brush attachment. Clean from top to bottom, not side to side. Be careful not to bend the condenser fins.

3. Shine a flashlight through the condenser to check for dirt between the fins. If dirt remains:
 - A. Blow compressed air through the condenser fins from the inside. Be careful not to bend the fan blades.
 - B. Use a commercial condenser coil cleaner. Follow the directions and cautions supplied with the cleaner.
4. Straighten any bent condenser fins with a fin comb.

**Straighten Bent Condenser Fins**

5. Carefully wipe off the fan blades and motor with a soft cloth. Do not bend the fan blades. If the fan blades are excessively dirty, wash with warm, soapy water and rinse thoroughly.

⚠ Caution

If you are cleaning the condenser fan blades with water, cover the fan motor to prevent water damage.

Removal from Service/Winterization

GENERAL

Special precautions must be taken if the ice machine head section is to be removed from service for an extended period of time or exposed to ambient temperatures of 32°F (0°C) or below.

 **Caution**

If water is allowed to remain in the ice machine in freezing temperatures, severe damage to some components could result. Damage of this nature is not covered by the warranty.

Follow the applicable procedure below.

1. Disconnect the electrical power at the circuit breaker or the electric service switch.
2. Turn off the water supply.
3. Disconnect and drain the incoming ice-making water line at the rear of the ice machine.
4. Disconnect drain tubing (from the inlet to dump valve) and drain water into container and discard.
5. Make sure water is not trapped in any of the water lines, drain lines, distribution tubes, etc.

Section 5 Before Calling Service

Checklist

If a problem arises during operation of your ice machine, follow the checklist below before calling for 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 main power switch/plug cord into receptacle.
	Control Board fuse open	
	ICE/OFF/CLEAN toggle switch set improperly.	Move toggle switch to the ICE position.
	8 minute lockout has not expired.	Bin level light will flash to indicate 8 minute lockout has not expired. Refer to Sequence of Operation
	Bin level sensor is disconnected or is contacting the ice.	Connect bin level sensor or remove ice contacting probe.
	High Pressure Control is open.	Clean condenser, check fan motor, check high pressure control operation.
Gear Motor runs but compressor will not start.	Water reservoir is empty. (Water must contact the water level probe to start the compressor).	Open water service valve or clean float valve screen.
	Water level probes out of position	Correct water level probe position.
Ice machine stops and can be restarted by moving the toggle switch to OFF and back to ICE.	The SafeGuard feature is stopping the ice machine.	Refer to "SafeGuard Feature" in this section
Ice quality is poor.	Poor incoming water quality.	Contact a qualified service company to test the quality of the incoming water and check filter.
	Water filtration is poor.	Replace filter.
	Incoming water temperature is above 90°F (32.3°C)	Correct water temperature. (Verify check/mixing valves in other equipment are working properly). Connect the ice machine to a cold water supply.
	Water pressure is low.	Water pressure must remain between 20 and 80 psig.
	Water softener is working improperly (if applicable).	Repair the water softener.
Low ice capacity.	Water float valve screen is dirty.	Remove and clean the filter screen.
	Incoming water supply is shut-off.	Open the water service valve.
	Water dump valve is leaking.	Clean the dump valve.
	Water Pressure is low.	Water pressure must remain between 20 and 80 psig.
	Incoming water temperature is above 90°F (32.2°C)	Correct water temperature. (verify check/mixing valves in other equipment is working properly)
	Water float valve stuck open or leaking.	Remove the float valve and clean it.
	Objects stacked around ice machine, blocking airflow to condenser.	Remove items blocking airflow.
	High air temperature around ice machine.	Air temperature must not exceed 110°F (43.3°C)
	Inadequate clearance around the ice machine.	Provide adequate clearance.
	The condenser is dirty.	Clean the condenser.

Safeguard Feature

In addition to standard safety controls, your Manitowoc ice machine features built-in SafeGuards. The ice machine will stop when conditions arise that would cause major component failure.

RESET PROCEDURE

1. Move the ICE/OFF/CLEAN toggle switch to OFF and then back to ICE.
 - A. If a safeguard 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 previous page.
2. Allow the ice machine to run to determine if the condition is reoccurring.
 - A. If the ice machine continues to run, the condition has corrected itself. Allow the ice machine to continue running.
 - B. If the ice machine stops again, the condition has reoccurred.

SafeGuards

- No Water
- Gear Motor Speed is Incorrect
- Discharge line temp. is too high or low during the freeze cycle.

STANDBY MODE

The first time a failure occurs, the ice machine de-energizes and initiates a Standby Mode. The ice machine will remain off for 60 minutes, then automatically restart to see if the problem reoccurs. During the Standby Mode the corresponding light flashes continuously (disch temp, water level or speed). If the same failure keeps occurring, the ice machine will initiate a SafeGuard Mode and remain off until manually restarted.

SAFEGUARD INDICATOR LIGHTS

During a SafeGuard Mode the corresponding light (disch temp, water level or speed) will flash continuously.

The SafeGuard will remain in memory for 48 hours of ice making time. After 48 hours of ice making time the SafeGuard will automatically be erased. If power is interrupted during the 48 hours, the timing will resume when power is applied to the ice machine.

Placing the toggle switch in the OFF position:

The corresponding light will flash continuously.

Placing the toggle switch in the ICE position:

The light will de-energize and a start-up sequence will initiate.

The corresponding light will flash anytime the toggle switch is placed in the OFF position provided 48 hours of ice making time has not been exceeded.

SAFEGUARD MODES

No Water

During the Freeze cycle if the water level probe opens or remains open for more than 30 continuous seconds, the ice machine will de-energize the compressor and gear motor, continuously flash the water level light and initiate a 60 minute Standby Mode.

During the Standby Mode the water level light will continually flash to indicate a Standby Mode.

After the 60 -minute Standby Mode, the ice machine will de-energize the water level light and initiate a start-up sequence.

WATER CONTACTS THE WATER LEVEL PROBE:

The ice machine continues to make ice.

WATER LEVEL PROBE OPENS OR REMAINS OPEN FOR MORE THAN 30 CONTINUOUS SECONDS:

The ice machine will start another 60-minute Standby Mode.

The ice machine repeats the above sequence until:

Water contacts the water level probe

or

The toggle switch is moved to the OFF position.

INDICATOR LIGHT

Before 48 hours have elapsed:

After a Standby Mode has been initiated the water level light will flash anytime the toggle switch is placed in the OFF position.

After 48 hours have elapsed:

The SafeGuard will be automatically erased from memory and the water level will not flash.

No Water Checklist

Possible Problem List	Corrective Action List
No water	Restore water supply.
Quick disconnect removed from water float valve	Restore water supply.
Water float valve screen blocked	Clean screen.
Water float valve solenoid coil defective	Replace coil (see Water float valve diagnostics).
Water float valve improperly adjusted	Adjust valve (see Water level check).
Dump valve leaking	Repair or replace dump valve.
Water level probes disconnected or removed	Connect and correctly position probes.

Gear Motor Speed

Anytime the motor speed sensor detects the motor speed (rpm) is below the minimum range for 3 continuous seconds, the ice machine will:

1. De-energize the compressor and/or gear motor.
2. Continuously flash the Gear Motor Speed light.
3. Initiate a 60-minute Standby Mode.

During the Standby Mode the Motor Speed Sensor light will flash to indicate a Standby Mode.

After the 60-minute Standby Mode, the ice machine will de-energize the Motor Speed light and initiate a start-up sequence.

GEAR MOTOR SPEED NORMAL:

The ice machine continues to make ice.

GEAR MOTOR SPEED BELOW MINIMUM RANGE FOR 3 CONTINUOUS SECONDS:

The ice machine will start another 60-minute Standby Mode.

If the gear motor speed drops below the minimum range for 3 continuous seconds during 7 consecutive cycles, the ice machine will initiate a SafeGuard Mode.

During the SafeGuard Mode the Motor Speed Sensor light will continually flash to indicate a SafeGuard Mode.

The ice machine remains off until:

- The toggle switch is moved from OFF to ICE.
- Line voltage is interrupted and restored.

INDICATOR LIGHT

Before 48 hours have elapsed:

After a Standby Mode has been initiated the Gear Motor Speed light will flash anytime the toggle switch is placed in the OFF position.

After 48 hours have elapsed:

The SafeGuard will be automatically erased from memory and the Gear Motor Speed light will not flash.

Gear Motor Speed Checklist

Possible Problem List	Corrective Action List
Low water pressure	Verify water pressure is between 20 and 80 psig.
Defective motor speed sensor	Replace motor speed sensor.
Defective motor	Replace motor.
Defective coupler	Replace coupler.
Defective evaporator/auger assembly	Replace evaporator assembly.
Low voltage	Verify voltage is within $\pm 10\%$ of nameplate voltage.
Ice frozen to auger/evaporator	Allow evaporator to thaw.

Temperature is Too High or Low

The temperature sensor (thermistor) is mounted on the compressor discharge line. The temperature sensor provides input to the control board. The control board monitors the temperature anytime the compressor is energized.

If the thermistor detects 245°F or higher for 15 continuous seconds:

1. The ice machine will de-energize the compressor and gear motor and initiate a SafeGuard Mode.
2. The control board “Disch Temp” light will continue to flash twice then pause, to indicate the ice machine has shut off on high temperature.
3. The ice machine will remain off until the toggle switch is moved from ICE to OFF, and back to ICE.

or

Line voltage is interrupted and restored.

If the thermistor detects 155°F or less for 3 continuous minutes:

1. The control board ignores the low temperature limit for the first 30 minutes of compressor run time.
2. The ice machine will de-energize the compressor and gear motor, continuously flash the control board “Disch Temp” light and initiate a 60-minute Standby Mode.
3. After the 60-minute Standby Mode, the ice machine will de-energize the “Disch Temp” light and initiate a start-up sequence.

4. After 30 minutes of compressor run time, the ice machine will check the discharge line temperature.

Discharge line temperature normal:

The ice machine continues to make ice.

Discharge line temperature below 155°F after 30 minutes of run time:

The ice machine will start another 60-minute Standby Mode.

If the discharge line temperature drops below 155°F for 3 continuous minutes during 7 consecutive cycles the ice machine will start a SafeGuard Mode.

During the SafeGuard Mode the “Disch Temp” light will continually flash to indicate a Safeguard Mode. The ice machine remains off until:

- The toggle switch is moved from ICE to OFF, then back to ICE.
- Line voltage is interrupted and restored.

INDICATOR LIGHT

Before 48 hours have elapsed:

After a Standby Mode has been initiated the Control Board “Disch Temp” light will flash anytime the toggle switch is placed in the OFF position.

After 48 hours have elapsed:

The SafeGuard will be automatically erased from memory and the “Disch Temp” light will not flash.

Temperature Sensor Checklist

Possible Problem List	Corrective Action List
Thermistor is not properly insulated	Insulate thermistor.
Thermistor loose	Secure thermistor to discharge line.
Thermistor mounted in the wrong location	Position thermistor on discharge line 6 in. from compressor discharge port.
Thermistor defective	Refer to CHECK PROCEDURE under “Thermistor.”
Flooding expansion valve	Replace expansion valve.
Refrigerant overcharge or undercharge	Recover and weigh in nameplate charge.
Low ambient temperature	Verify ambient temperature remains above 45°F (7.2°C).
Defective compressor	Replace compressor.
Insufficient or low water pressure	Verify water pressure is between 20 and 80 psig.

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EC DECLARATION OF CONFORMITY

We hereby declare that our products, ice machines and Multiplex refrigeration equipment comply with all the essential requirements of the listed EC - directives.

Manufacturer:

*Manitowoc Ice, Inc.
2110 S. 26th Street, P.O. Box 1720
Manitowoc, Wisconsin 54221-1720 USA*

European Distributor:

Representative of Manitowoc Ice, Inc.:

Engineering Manager. (Printed name)

Signature

Model and Serial No.

Representative of European Distributor:

Applied Standards:

EN60335-1 Safety of household and similar electrical appliances
EN60335-2-24 Particular requirements refrigerators, food freezers and ice makers

EN55014 Electrical Motor Operated Appliances (Emissions)
EN55014 Electro Magnetic Compatibility (Immunity)
EN378 -1 to -4 Refrigeration Plants

Applied EC Directives:

*Low Voltage 73/23/EEC
EMC 89/336/EEC
Pressure Equipment 97/23/EC*



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Continuing product improvements
may necessitate change of
specifications without notice.
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