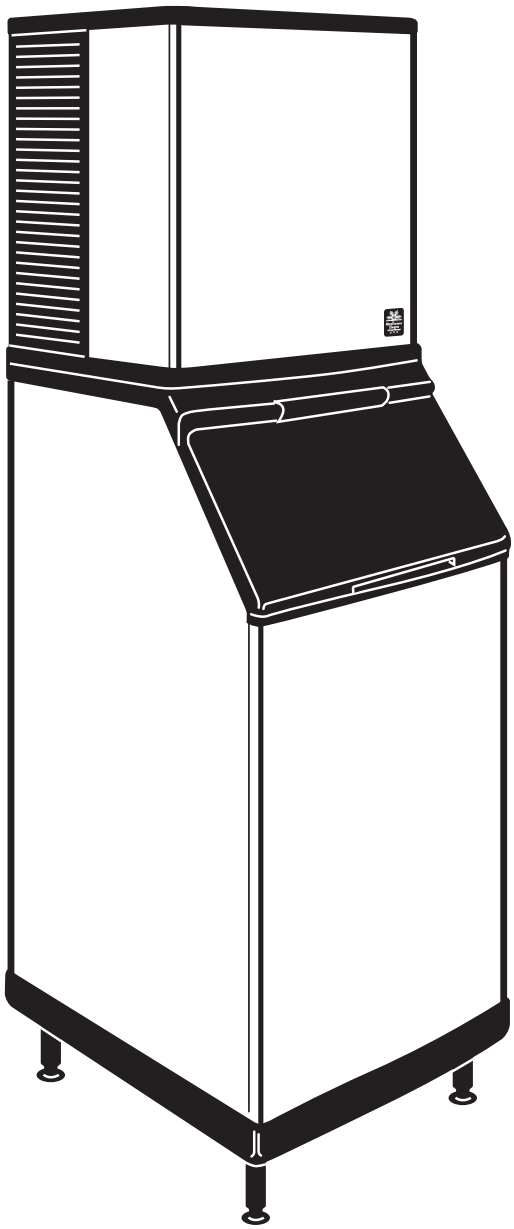
Manitowoc®



# Flake / Chiplet Model Ice Machines

## Flake Models QF0400/QF0800/ QF2300 with RFC2385

## Chiplet Models QC0700

# Installation, Use and Care Manual

Thank you for selecting a Manitowoc Ice Machine, the dependability leader in ice making equipment and related products. With proper installation, care and maintenance, your new Manitowoc Ice Machine will provide you with many years of reliable and economical performance.

Part Number 000002688
07/2007

## Safety Notices

When using or servicing a Flake / Chiplet Series Ice Machine, 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 ice machine.

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

**⚠ Warning**
**PERSONAL INJURY POTENTIAL**

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

**⚠ 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 ice machine. Be sure to read the Caution statement before proceeding, and work carefully.

## Procedural Notices

When using or servicing a Flake / Chiplet Series Ice Machine, 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 ice production and trouble-free operation of you Manitowoc Ice Machine.
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 Ice, Inc. We will be happy to provide assistance.

**Important**

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

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## General Information



## Section 2
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## Section 3
## Ice Machine Operation

## Section 4
## Ice Machine Sequence of Operation



## Section 5
## Before Calling Service

# Section 1
# General Information

## Model Numbers

This manual covers the following models:

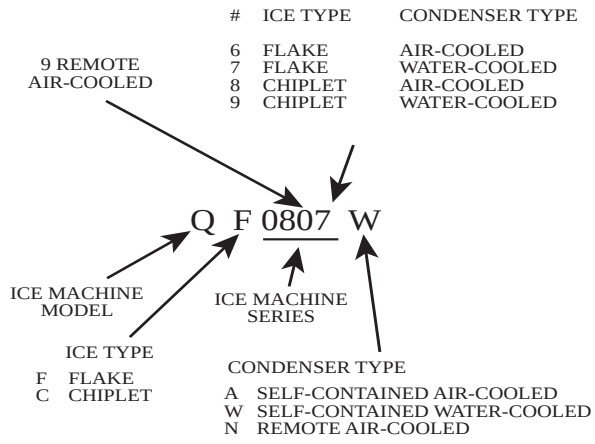
| | Flake Ice | Chiplet Ice | Condensing Unit |
|---|---|---|---|
| Undercounter Self-Contained Air-Cooled | QF0406A | NA | NA |
| Self-Contained Air-Cooled | QF0806A | QC0708A | NA |
| Self-Contained Water Cooled | QF0807W | QC0709W | NA |
| Remote Air-Cooled | QF2396N | NA | RFC2385 |

**⚠ Warning**

**PERSONAL INJURY POTENTIAL**

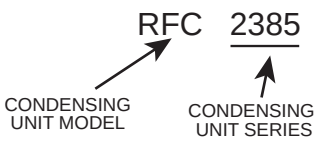
Do not operate equipment that has been misused, abused, neglected, damaged, or altered/modified from that of original manufactured specifications.

## How to Read a Model Number




SV3106

## Remote Condensing Unit




SV3107

## Accessories

### BIN CASTER

Replaces standard legs.

### ICE BAGGER

Maximize profits from bagged ice sales with this convenient accessory. This sturdy unit rests on the bin door frame, and adapts for left or right side filling.

### 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 0z. | 000000084 | 16 0z. | 94-0565-3 |
| | | 1 Gallon | 94-0581-3 |

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

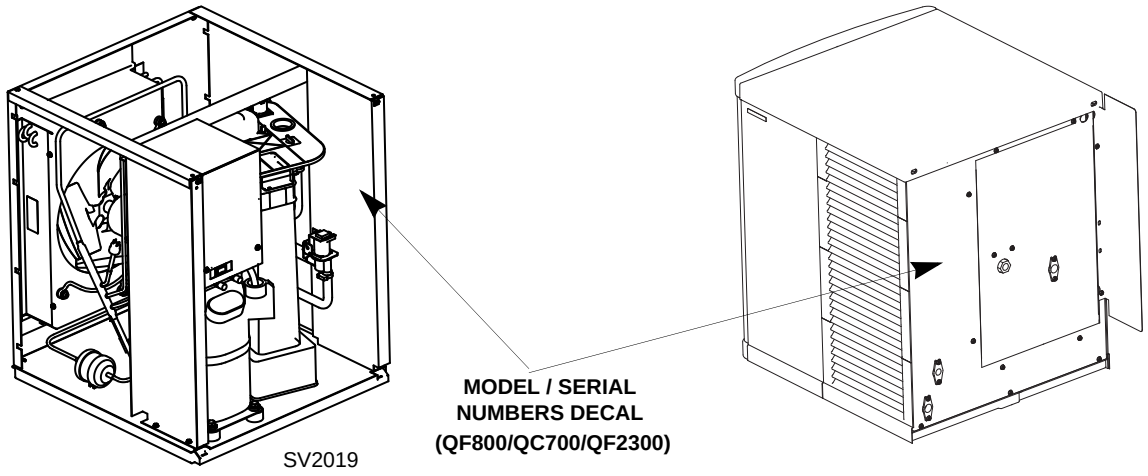
### BIN THERMOSTAT KIT

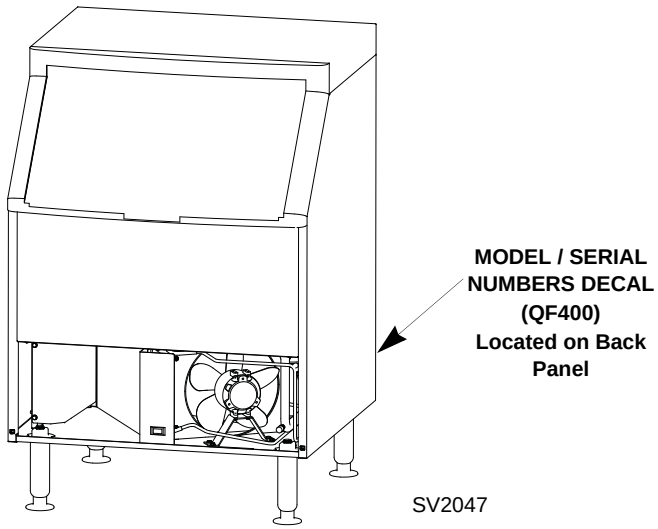
Bin thermostat kit K00363 is required on QF0400 ice machines using reverse osmosis or deionized water. Failure to install this kit will result in overfilling of the bin.

## Model/Serial Number Location

These numbers are required when requesting information from your local Manitowoc distributor, service representative, or Manitowoc Ice, Inc. 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 head section and condensing unit.




**Model/Serial Number Location**

| | |
|---|---|
| **Ice Machine** | |
| **Model Number** | |
| **Serial Number** | |

## Owner Warranty Registration Card

### GENERAL

The packet containing this manual also includes warranty information. Warranty coverage begins the day the ice machine is installed.

**Important**

Complete and mail the OWNER WARRANTY REGISTRATION CARD as soon as possible to validate the installation date.

If the OWNER WARRANTY REGISTRATION CARD is not returned, Manitowoc will use the date of sale to the Manitowoc Distributor as the first day of warranty coverage for your new ice machine.

## Commercial Warranty Coverage

### GENERAL

The following Warranty outline is provided for your convenience. For a detailed explanation, read the warranty bond shipped with each product.

Contact your local Manitowoc Distributor or Manitowoc Ice, Inc. if you need further warranty information.

### PARTS

1. Manitowoc warrants the ice machine against defects in materials and workmanship, under normal use and service for two (2) years from the date of original installation.
2. The compressor is covered by an additional three (3) year (five years total) warranty beginning on the date of the original installation.

### LABOR

1. Labor required to repair or replace defective components is covered for two (2) years from the date of original installation.

### EXCLUSIONS

The following items are not included in the ice machine's warranty coverage:

1. **Normal maintenance**, adjustments and cleaning as outlined in this manual.
2. Repairs due to unauthorized modifications to the ice machine or use of non-standard parts without prior written approval from Manitowoc Ice, Inc.
3. Damage caused by improper installation of the ice machine, electrical supply, water supply or drainage, or damage caused by floods, storms, or other acts of God.
4. **Premium labor rates** due to holidays, **overtime**, etc.; travel time; flat rate service call charges; mileage and miscellaneous tools and material charges not listed on the payment schedule. Additional labor charges resulting from the inaccessibility of equipment are also excluded.
5. Parts or assemblies subjected to misuse, abuse, neglect or accidents.
6. Damage or problems caused by installation, cleaning and/or maintenance procedures inconsistent with the technical instructions provided in this manual.

### AUTHORIZED WARRANTY SERVICE

To comply with the provisions of the warranty, a refrigeration service company qualified and authorized by a Manitowoc distributor, or a Contracted Service Representative must perform the warranty repair.

NOTE: If the dealer you purchased the ice machine from is not authorized to perform warranty service; contact your Manitowoc distributor or Manitowoc Ice, Inc. for the name of the nearest authorized service representative.

### SERVICE CALLS

Normal maintenance, adjustments and cleaning as outlined in this manual are not covered by the warranty. If you have followed the procedures listed in this manual, and the ice machine still does not perform properly, call your Local Distributor or the Service Department at Manitowoc Ice, Inc.

## RESIDENTIAL ICE MACHINE LIMITED WARRANTY

**WHAT DOES THIS LIMITED WARRANTY COVER?**
Subject to the exclusions and limitations below, Manitowoc Ice, Inc. ("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?**

| Product Covered | Warranty Period |
|---|---|
| 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 ICE, INC.
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.

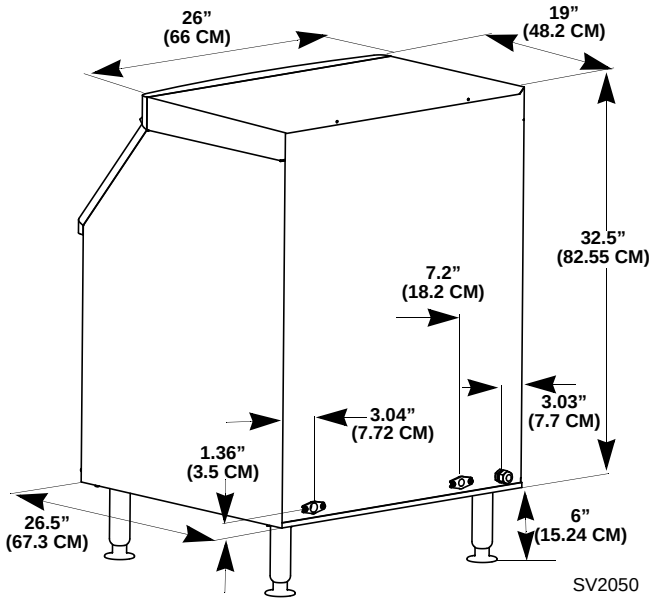
**REGISTRATION CARD**
To secure prompt and continuing warranty service, this warranty registration card must be completed and sent to Manitowoc within thirty (30) days from the sale date. Complete the registration card and send it to Manitowoc.

# 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 Ice, Inc. for information regarding start-up services.

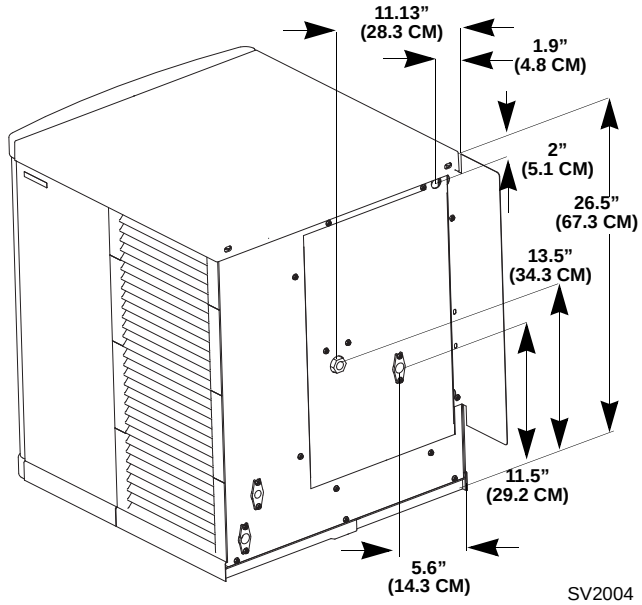
### QF400 AIR COOLED ICE MACHINE



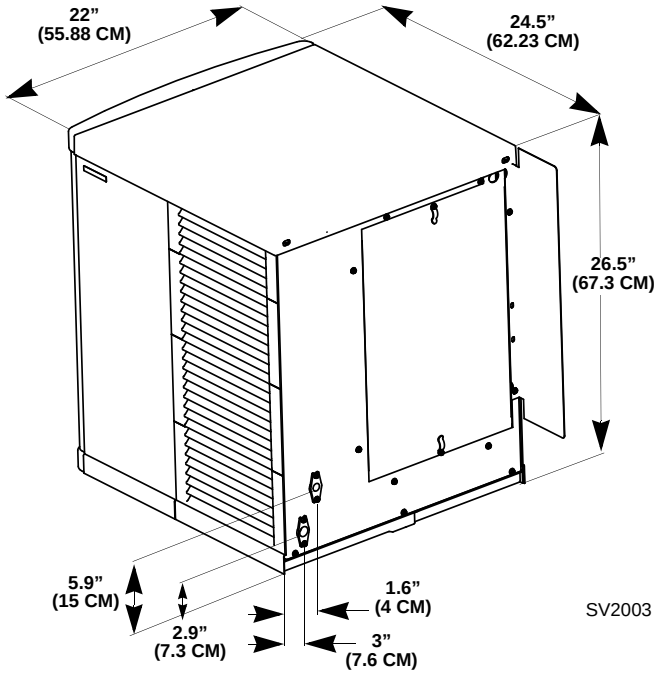

**Important**

Failure to follow these installation guidelines may affect warranty coverage.

### QC700/QF800 WATER COOLED ICE MACHINE

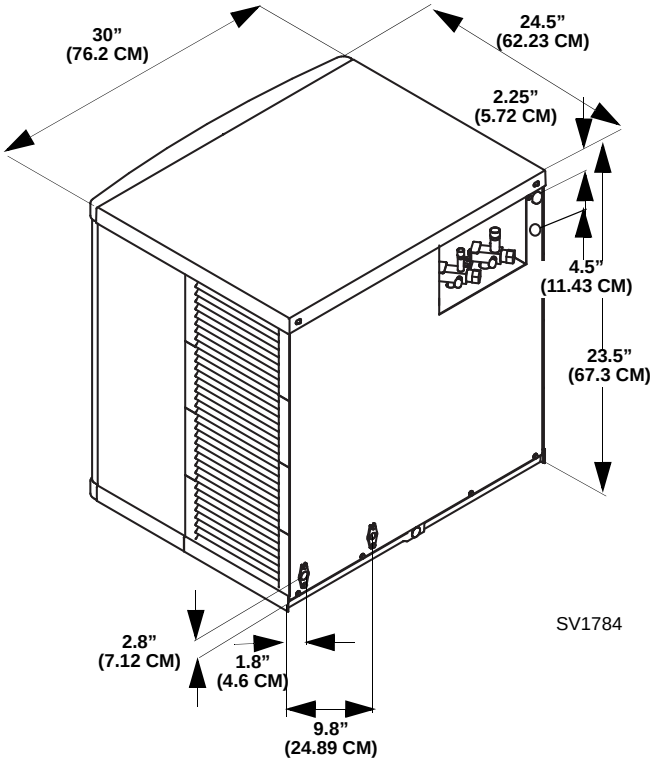


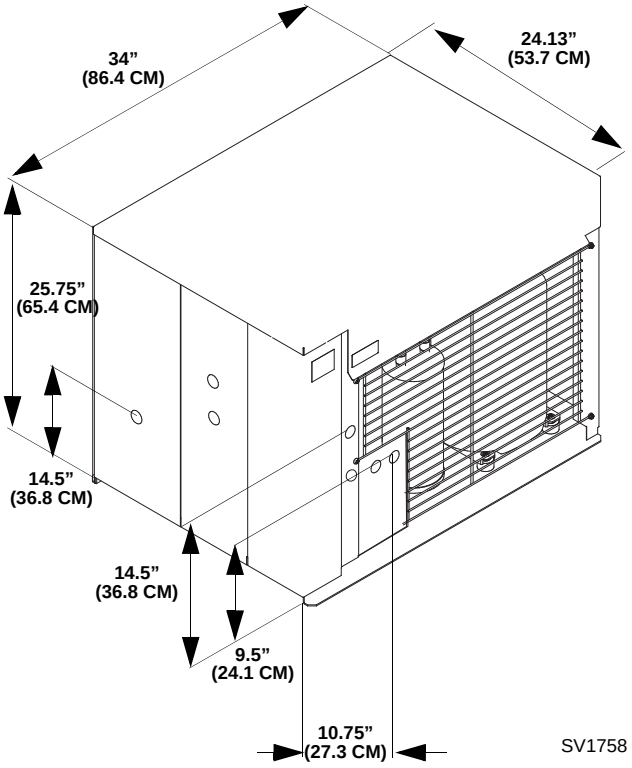

### QC700/QF800 AIR COOLED ICE MACHINE



## Ice Machine Head Section and Remote Condensing Unit Dimensions

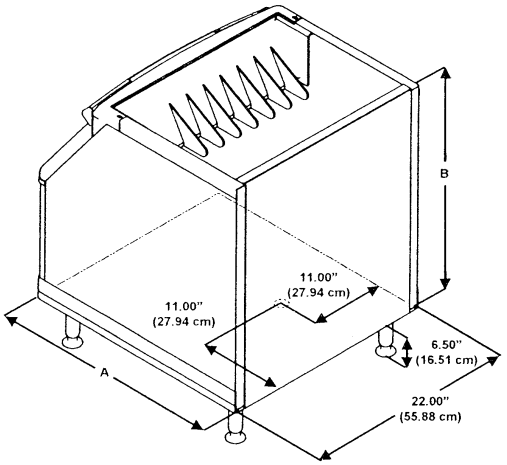
### QF2300 HEAD SECTION AND RFC2385 REMOTE CONDENSING UNIT



## Ice Storage Bin Dimensions

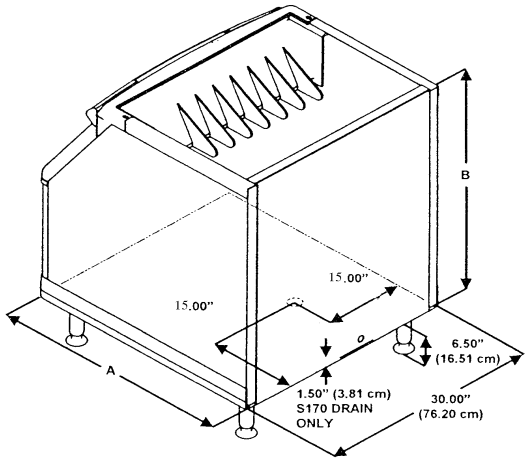
### 22 INCH (56 CM) ICE STORAGE BINS




SV1614

| Bin Model | Dimension A | Dimension B |
|---|---|---|
| B320 | 34.0 in (86.3 cm) | 32.0 in (81.3 cm) |
| B420 | 34.0 in (86.3 cm) | 44.0 in (111.7 cm) |

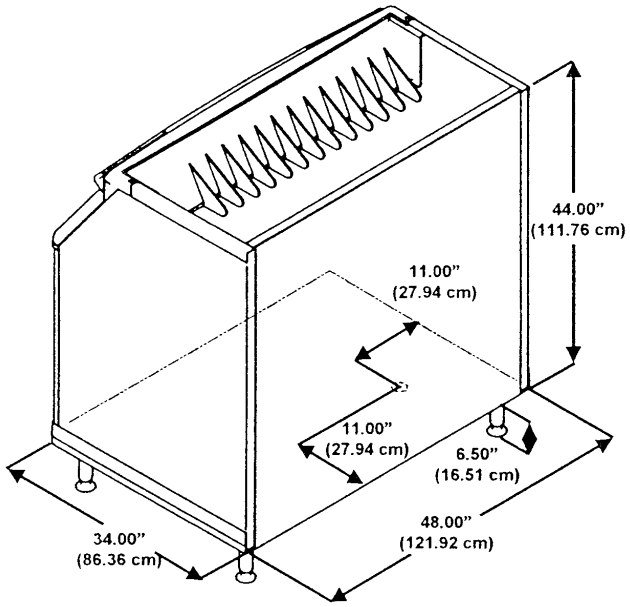
### 30 INCH (76 CM) ICE STORAGE BINS




SV1609

| Bin Model | Dimension A | Dimension B |
|---|---|---|
| B170 | 29.5 in (74.9 cm) | 19.1 in (48.5 cm) |
| B400 | 34.0 in (86.3 cm) | 32.0 in (81.3 cm) |
| B570 | 34.0 in (86.3 cm) | 44.0 in (111.7 cm) |

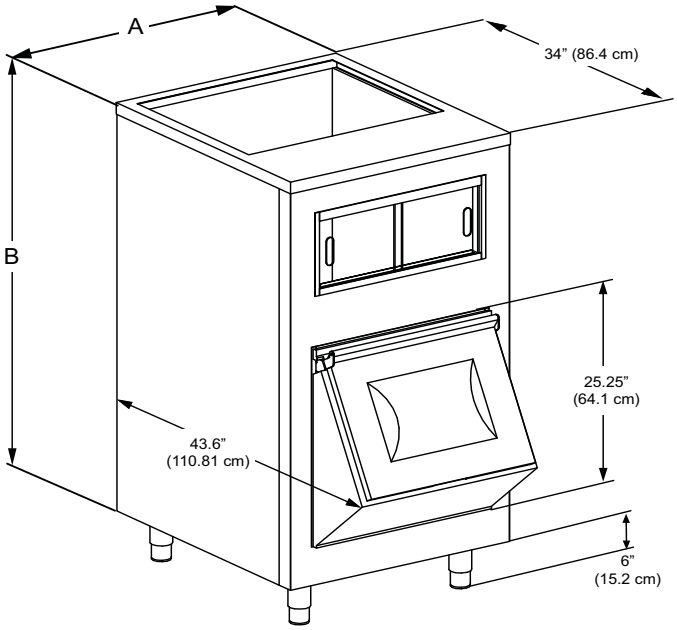
### 48 INCH (130 CM) ICE STORAGE BINS




**B970**

## Large Capacity Ice Storage Bin Dimensions

### 30 INCH (76 CM)




**⚠ Warning**

All Manitowoc ice machines require the ice storage system (bin, dispenser, etc.) to incorporate an ice deflector.

Manitowoc ice machines require adding Manitowoc Ice Deflector Kit when installing with non-Manitowoc ice storage systems.

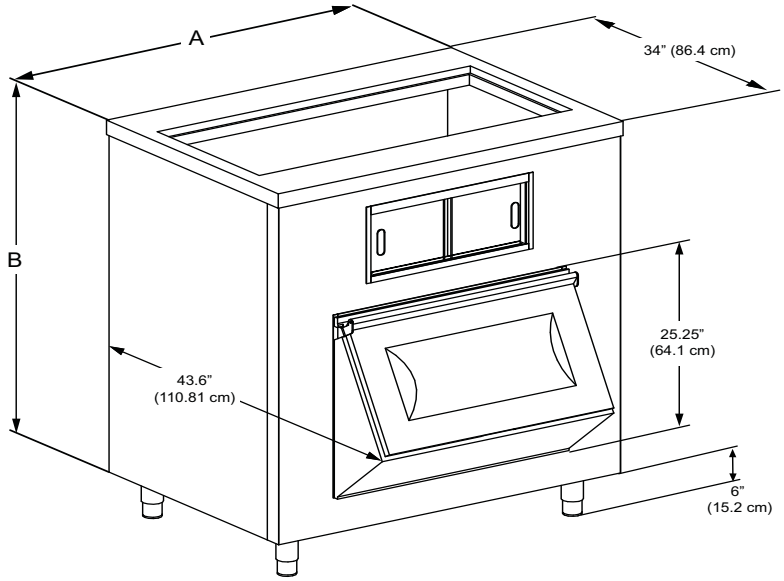
Prior to using a non-Manitowoc ice storage system with other Manitowoc ice machines, contact the manufacturer to assure their ice deflector is compatible with Manitowoc ice machines.

**⚠ Caution**

30" large capacity ice storage bins must be attached to the wall with the bracket provided with the bin.

| Bin Model | Dimension A (Width) | Dimension B (Height) |
|---|---|---|
| B750 | 30 in. (76.2 cm.) | 58 in. (147.3 cm.) |
| B1050 | 30 in. (76.2 cm.) | 78 in. (198.1 cm.) |
| The bin drain is exactly in the center of the bin. | | |

### 48 INCH (122 CM) & 60 INCH (152 CM)




| Bin Model | Dimension A (Width) | Dimension B (Height) |
|---|---|---|
| B1100 | 48 in. (121.9 cm.) | 55.0 in. (139.7 cm.) |
| B1400 | 60 in. (152.4 cm.) | 55.0 in. (139.7 cm.) |
| The bin drain is exactly in the center of the 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 45°F (7°C), but must not exceed 110°F (43.4°C).
- The water temperature must be at least 45°F (7°C), but must not exceed 90°F (32.2°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. QF400 airflow is in and out of the front of the ice machine. Refer to below for clearance requirements.

## Ice Machine Head Section Clearance Requirements

| QF400 | Self-Contained Air-Cooled | Self-Contained Water-Cooled |
|---|---|---|
| Top/Sides | 5” (12.7 mm) | NA |
| Back | 5” (12.7 mm) | NA |

| QC700/QF800 | Self-Contained Air-Cooled | Self-Contained Water-Cooled |
|---|---|---|
| Top/Sides | 8” (20.3 mm) | 5” (12.7 mm) |
| Back | 5” (12.7 mm) | 5” (12.7 mm) |

| QF2300 | Self-Contained Air-Cooled | Remote Air-Cooled |
|---|---|---|
| Top/Sides | NA | 5” (12.7 mm) |
| Back | NA | 5” (12.7 mm) |

**⚠ Caution**

The ice machine head section 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* |
|---|---|
| QF400 | 4000 |
| QC700 | 7800 |
| QF800 | 7800 |
| QF2300/RFC2385 | 21000 |
| *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. QF2300 ice machines add an insignificant amount of load to a conditioned space.

## Location of Remote Condensing Unit

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

- The air temperature must be at least -20°F (-28.9°C) but must not exceed 120°F (49°C).
- The location must not allow exhaust fan heat and/or grease to enter the condenser.
- The location must not obstruct airflow through or around the condensing unit. Refer to the chart below for clearance requirements.

**CONDENSING UNIT CLEARANCE REQUIREMENTS**

| Ice Machine Condensing Unit | |
|---|---|
| Top/Sides | There is no minimum clearance required, although 6” (12.7 cm) is recommended for efficient operation and servicing only. |
| Front/Back | 4’ (1.2 M) |

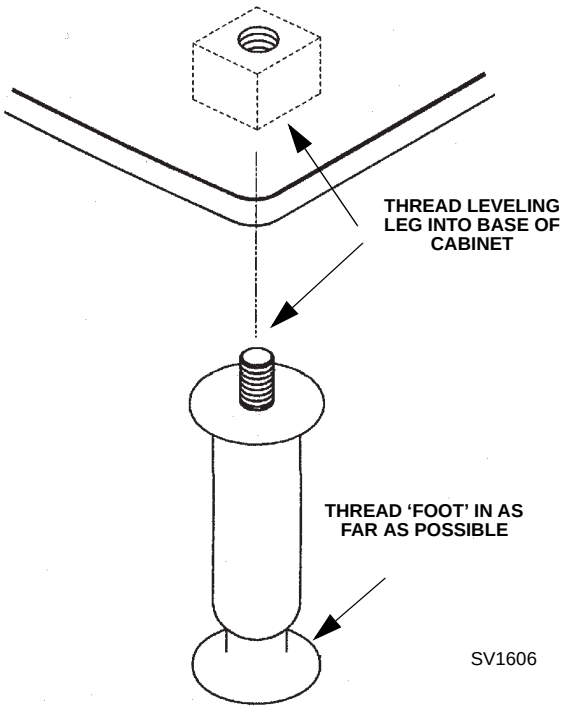
## Leveling the Ice Storage Bin

1. Screw the leveling legs onto the bottom of the bin.
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 bin into its final position.
4. Level the bin to assure that the bin door closes and seals properly. Use a level on top of the bin. Turn each foot as necessary to level the bin.
5. Inspect bin gasket prior to ice machine installation. (Manitowoc bins come with closed cell foam gasket installed along the top surface of the bin.)
6. Install ice machine on bin.

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



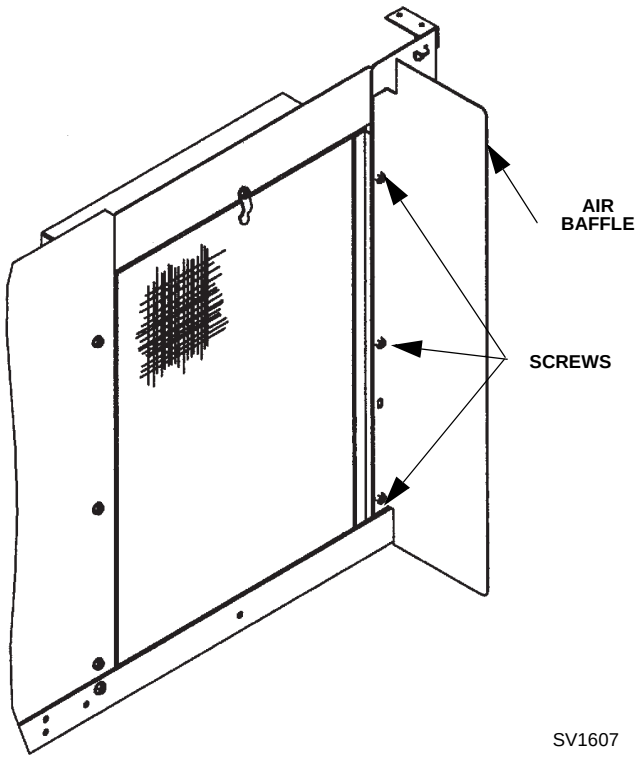

**Leveling Leg and Foot**

## Condenser Air Baffle

**(QC700/QF800 Air-Cooled Ice Machines Only)**

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

1. Remove the back panel screws next to the condenser.
2. Align the mounting holes in the air baffle with the screw holes and reinstall the screws.




**Air Baffle**

## 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 (GFIC)**

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 Ice, Inc. 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 (accept QuietQubes), 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).

**QF400 115/60/1 ice machines** are factory pre-wired with a power cord and 5-15P plug confirmation.

**QF400 230/50/1 ice machines** are factory pre-wired with a power cord, no plug is supplied.

**QF2300 with Remote Condensing Unit** the ice machine head section and remote condensing unit are wired independent of each other. A separate dedicated fuse/circuit breaker must be provided for each section. Circuit breakers must be H.A.C.R. rated (does not apply in Canada).

**⚠ Warning**

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

**TOTAL CIRCUIT AMPACITY**

**QF400 Only**

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.

**MINIMUM CIRCUIT AMPACITY**

**QC700/QF800/QF2300 Only**

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.) 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

### Ice Machine Head Section

| Ice Machine | Voltage Phase Cycle | Air-Cooled | | | Remote Air-Cooled | | Water Cooled | |
|---|---|---|---|---|---|---|---|---|
| | | Maximum Fuse/Circuit Breaker | Minimum Circuit Amps | Total Circuit Amps | Maximum Fuse/ Circuit Breaker | Minimum Circuit Amps | Maximum Fuse/Circuit Breaker | Minimum Circuit Amps |
| **QF400** Before Serial Number 110638713 | 115/1/60 | 15 | NA | 9.8 | NA | NA | NA | NA |
| | 230/1/50 | 15 | NA | 4.2 | NA | NA | NA | NA |
| **QF400** After Serial Number 110638713 | 115/1/60 | 15 | NA | 6.9 | NA | NA | NA | NA |
| | 230/1/50 | 15 | NA | 4.2 | NA | NA | NA | NA |
| **QC700** | 115/1/60 | 30 | 18.9 | NA | NA | NA | 30 | 17.9 |
| | 230/1/50 | 20 | 8.8 | NA | NA | NA | 20 | 8.4 |
| | 230/1/60 | 15 | 8.7 | NA | NA | NA | 15 | 8.3 |
| **QF800** | 115/1/60 | 30 | 18.9 | NA | NA | NA | 30 | 17.9 |
| | 230/1/50 | 20 | 8.8 | NA | NA | NA | 20 | 8.4 |
| | 230/1/60 | 15 | 8.7 | NA | NA | NA | 15 | 8.3 |
| **QF2300** | 115/1/60 | NA | NA | NA | 15 | 5.5 | NA | NA |
| | 230/1/50 | NA | NA | NA | NA | NA | NA | NA |
| | 230/1/60 | NA | NA | NA | NA | NA | NA | NA |
| Interconnecting wiring (115/60/1) is required between the ice machine and condensing unit to energize the contactor coil. | | | | | | | | |

### Remote Condensing Unit

| Condensing Unit | Voltage Phase Cycle | Maximum Fuse/Circuit Breaker | Minimum Circuit Amps |
|---|---|---|---|
| **RFC2385** | 208-230/1/60 | 30 | 18.5 |
| | 208-230/3/60 | 20 | 12.8 |

## 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.

## Ice Machine Head Section Electrical Wiring Connections

**⚠ Warning**

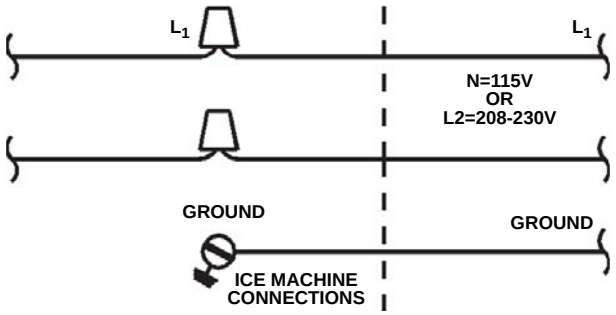
These diagrams are not intended to show proper wire routing, wire sizing, disconnects, etc., only the correct wire connections.

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

Though wire nuts are shown in the drawings, the ice machine field wiring connections may use either wire nuts or screw terminals.

### QC700C/QF800C ICE MACHINE HEAD SECTION

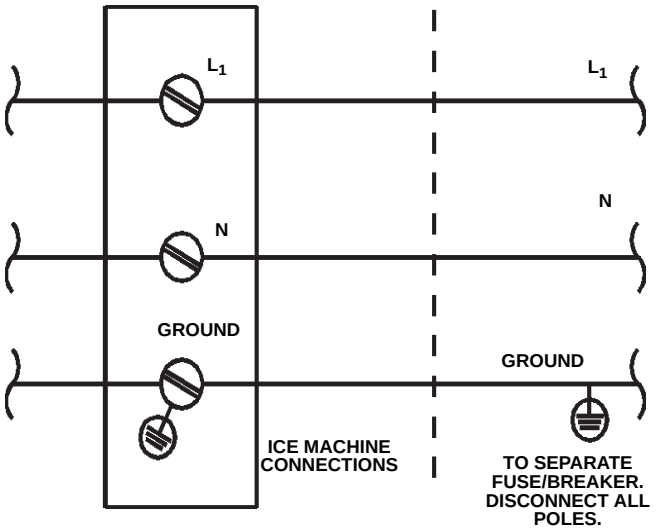
### 115/1/60 or 208-230/1/60




SV1258

### QC700C/QF800C ICE MACHINE HEAD SECTION

### 230/1/50

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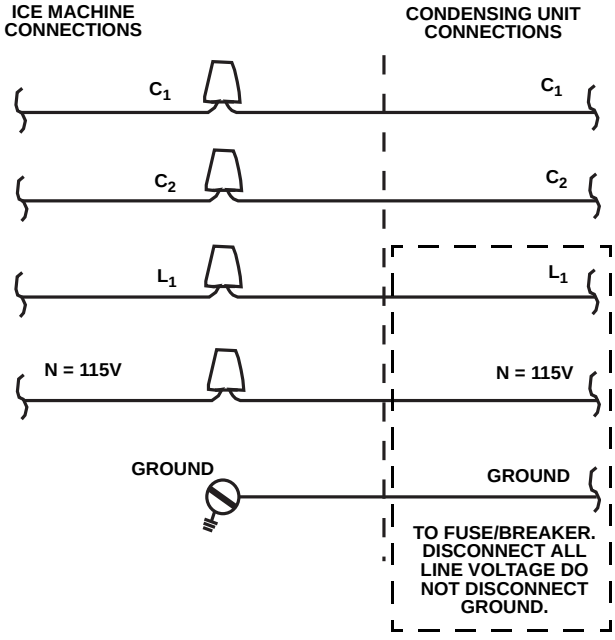
### QF2300 ICE MACHINE HEAD SECTION

### 115/60/1



## Remote Electrical Wiring Connections

**⚠ Warning**

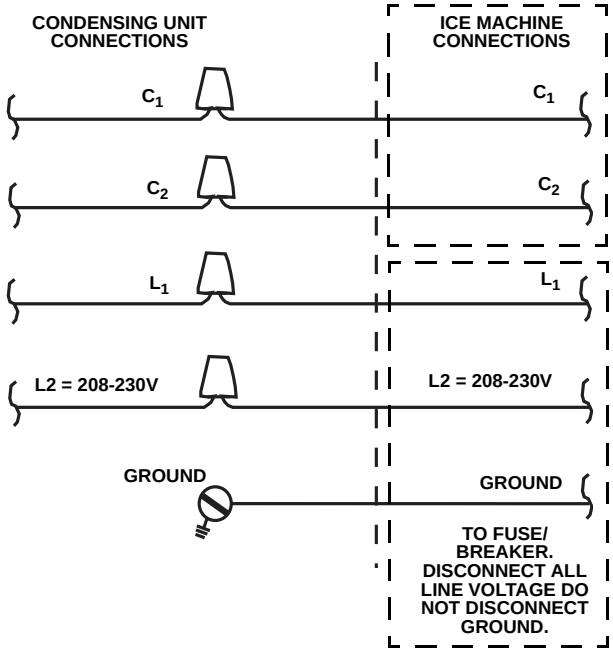
These diagrams are not intended to show proper wire routing, wire sizing, disconnects, etc., only the correct wire connections.

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

Though wire nuts are shown in the drawings, the ice machine field wiring connections may use either wire nuts or screw terminals.

### RFC2385 REMOTE CONDENSING UNIT

**208-230/1/60**



## 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.

**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.

### 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.

## 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 (32.2°C).
- Water flow through the condenser must not exceed 5 gallons (19 liters) per minute.
- Allow for a pressure drop of 7 psi (48 kPA) between the condenser water inlet and the outlet of the ice machine.
- Water exiting the condenser must no exceed 110°F (43.3°C).

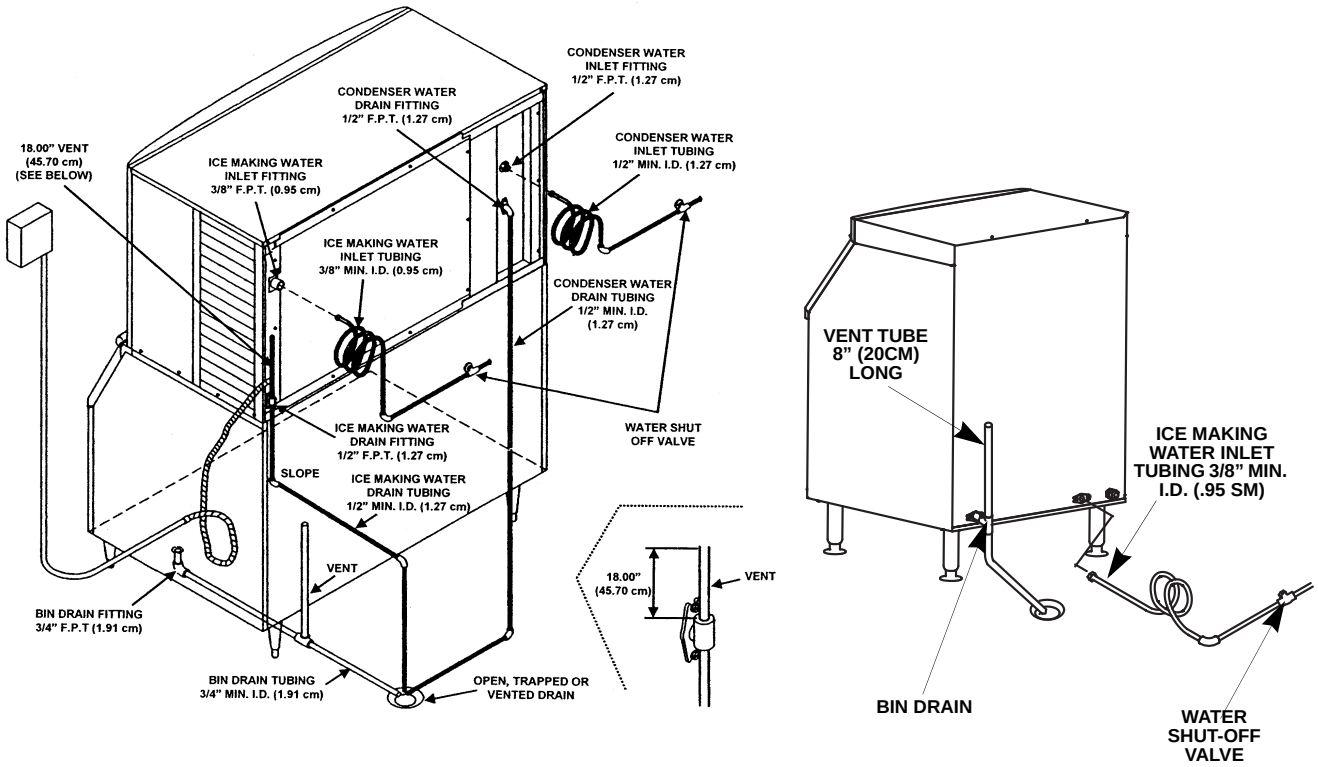
**Important**

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

## WATER SUPPLY AND DRAIN LINE SIZING/CONNECTIONS

**⚠ Caution**
Plumbing must conform to state and local codes.

| Location | Water Temperature | Water Pressure | Ice Machine Fitting | Tubing Size Up to Ice Machine Fitting |
|---|---|---|---|---|
| **Ice Making Water Inlet** | 45°F (6°C) Min.<br>90°F (32.2°C) Max. | 20 psi (137.9 kPA) Min.<br>80 psi (551.5 kPA) Max. | 3/8" Female Pipe Thread | 3/8" (9.5 mm) minimum inside diameter |
| **Condenser Water Inlet** | 33°F (0.6°C) Min.<br>90°F (32.2°C) Max. | 20 psi (137.9 kPA) Min.<br>150 psi (1034.2 kPA) Max. | 1/2" Female Pipe Thread | 1/2" (12.7 mm) minimum inside diameter |
| **Condenser Water Drain** | --- | --- | 1/2" Female Pipe Thread | 1/2" (12.7 mm) minimum inside diameter |
| **Bin Drain** | --- | --- | 3/4" Female Pipe Thread | 3/4" (19.1 mm) minimum inside diameter |
| **Large Capacity Bin Drain** | --- | --- | 1” Female Pipe Thread | 1” (25.4 mm) min. inside diameter |




**Typical Water Supply Drain Installation**

## Refrigeration System Installation

**(QF2300/RFC2385 ONLY)**

| QuietQube® Ice Machine | Remote Single Circuit Condenser | Line Set* |
|---|---|---|
| RFC2300 | RFC2385 | RC-20<br>RC-30<br>RC-50 |

| Line Set | Suction Line | Liquid Line | Insulation Thickness |
|---|---|---|---|
| RC 20/30/50 | 3/4 inch (19.1 mm) | 1/2 inch (12.7 mm) | 1/2" (13mm) Suction Line<br>1/4" (7mm) Liquid Line |

### USAGE WITH NON-MANITOWOC CONDENSING UNITS

Manitowoc Condensing Units are specifically designed for usage with a Manitowoc Flake/Chiplet Ice Machine Head Sections. Manitowoc Flake/Chiplet Ice Machines will not operate with non-Manitowoc condensing units.

**⚠ Warning**

Installation of a Remote Condensing Unit may require the use of special equipment for placement. Trained and qualified personnel are required for proper rigging and lifting.

**⚠ Caution**

The 60-month compressor warranty (including the 24-month labor replacement warranty) will not apply if the Manitowoc Ice Machine and remote Manitowoc Condensing Unit are not installed according to specifications. This 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 Manitowoc Ice, Inc.

### Factory Equipment Refrigeration Amounts

ICE MACHINE HEAD SECTION

Each ice machine head section ships from the factory with a R-404A refrigerant charge appropriate for line sets up to 50' in length (12.5 lbs.). The serial tag on the ice machine indicates the refrigerant charge. Additional refrigerant must be added for line set lengths between 50' and 100' (1.5 lbs.) see chart below.

| Series | Charge |
|---|---|
| QF2200/QF2300<br>RFC2085/<br>RFC2385 | 0' to 50' linesets 12.5 lbs (5.7 kg)<br>50' to 100' linesets 14.0 lbs (6.4 kg) |

**⚠ Caution**

Never add more than nameplate charge to the refrigeration system for any application.

**⚠ Warning**

**Potential Personal Injury Situation**

The ice machine head section contains the refrigerant charge. Installation and brazing 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.

REMOTE CONDENSING UNIT

Each condensing unit ships from the factory pressurized with 50/50 nitrogen helium mixture that must be removed during the installation process (approximately 20 psig).

REFRIGERATION LINE SETS/TRAPS KIT

Refrigeration Rated Tubing and Trap Kits are shipped capped with atmospheric pressure.

## Refrigeration Line Set Installation

### GENERAL

Refrigeration line set installations consist of vertical and horizontal line set distances between the ice machine and the condensing unit. The following guidelines, drawings and calculation methods must be followed to assure proper oil return and condensing unit/ice machine operation.

The refrigeration line set installer must be USA Government-Environmental Protection Agency (EPA) certified in proper refrigerant handling and servicing procedures.

**⚠ Warning**

Disconnect electrical power to the ice machine head section and the remote condensing unit before proceeding.

**⚠ Warning**

The ice machine head section contains refrigerant charge. The ice machine head section contains three (3) refrigeration valves that **must remain closed** until proper installation of the line set is completed.

**Step 1 Verify Ice Machine and Remote Condensing Unit Locations Are Within Guidelines.**

Prior to installation of the ice machine and remote condensing unit be sure that the distance between then is within the line set routing guidelines outlined in this manual.

**Roof/Wall Penetration**

If required, cut a 3-inch (76.2 mm) circular hole in the wall or roof for routing of refrigeration tubing. A qualified person must perform all roof penetrations.

**Step 2 Route Refrigeration Tubing**

Properly route refrigeration tubing between the ice machine head section and the remote condensing unit.

### A. LINE SET LENGTH

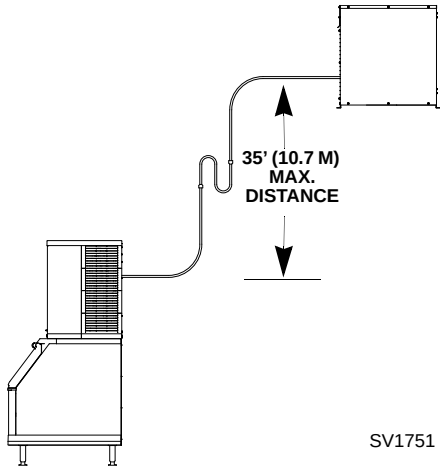
**100 feet (30.5 m) Length:** The maximum measured length the line set can be.

The receiver is designed to hold a charge sufficient to operate the ice machine in ambient temperatures between -20°F (-28.9°C) and 120°F (49°C), with line set lengths of up to 100 feet (30.5 m).

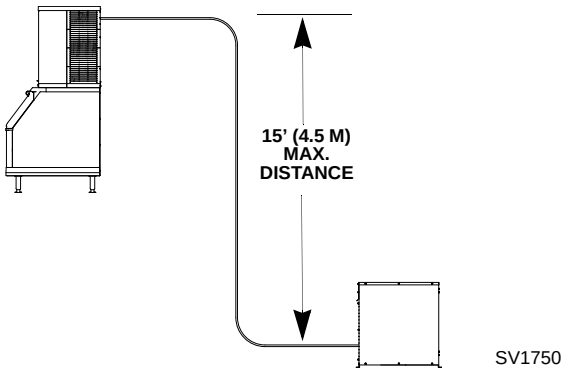
**Important**

The ice machines will not function with line sets greater than 100 feet (30.5 m). Do not attempt to go beyond this distance and add refrigerant charge to compensate!

### B. LINE SET RISE OR DROP




**35 feet (10.7 m) Rise:** The maximum distance the remote condensing unit can be above the ice machine.




**15 feet (4.5 m) Drop:** The maximum distance the remote condensing unit can be below the ice machine.

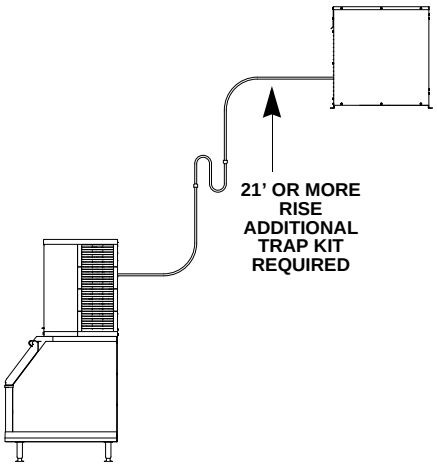
### C. SUCTION LINE OIL TRAPS

**⚠ Caution**

Do not form unwanted traps in refrigeration lines. Never coil excess refrigeration tubing.

**0 to 20 feet (0 to 6.1 m) Rise:** The ice machine head section has one oil trap built in which allows for a maximum condenser rise of 20 feet (6.1 m) without additional traps in the suction line.

**21 to 35 feet (6.4 to 10.7 m) Rise:** The suction line requires an additional Oil Trap ("S" type) to be installed. Install the trap as close as possible to midpoint between the ice machine head section and remote condensing unit. S-Trap Kits are available from Manitowoc (refer to chart).

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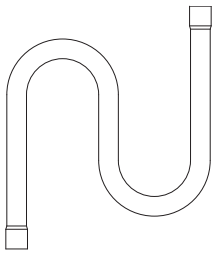


SV1760

**Manitowoc S-Trap Kit**

| Model | S-Trap Kit Number | Tubing Size |
|---|---|---|
| QF2300 | K00166 | 3/4 inch (19.1 mm) |

**Service Loop**

A service loop in the line set permits easy access to the ice machine for cleaning and service.

- **The supplied service loop is an installation requirement.**
- A service loop is not considered an oil trap.
- The service loop is not included when calculating length, rise or drop of the tubing run.
- Do not use hard rigid copper for the service loop.

**⚠ 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.

**Step 3 Lengthening or Reducing Line Set Lengths**

**⚠ Caution**

Do not form unwanted traps in refrigeration lines. Never coil excess refrigeration tubing.

When the line set required shortening or lengthening, do so before connecting the line set to the ice machine head section or the remote condensing unit.

*Continued on Next Page...*

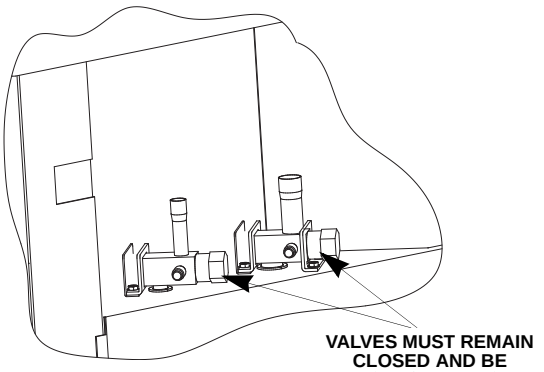
**Step 4 Connecting the line set.**

To prevent oxidation of the copper, purge line set and condensing unit with dry nitrogen while brazing.

**Connect The Line Set To The Ice Machine Head Section**

> **⚠ Warning**
> The ice machine head section contains refrigerant charge. The ice machine head section contains three (3) refrigeration valves that **must remain closed** until proper installation of the line sets is completed.

The line set shut off valves at the back of the ice machine must remain closed and be protected from heat during the brazing process. Wrap the valves in a wet rag or other type of heat sink prior to brazing. Cool braze joint with water immediately after brazing to prevent heat migration to the valve.




SV1757

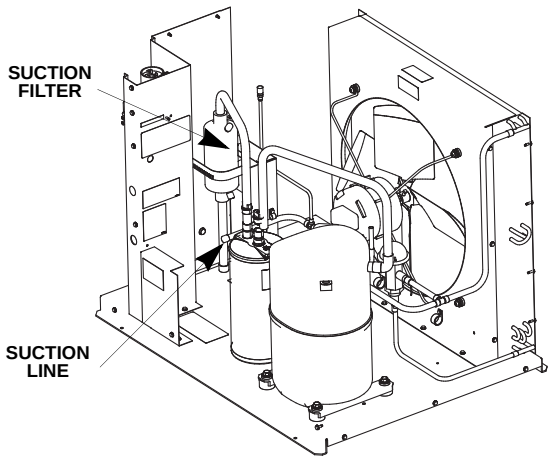
> **⚠ Warning**
> The condensing unit ships from the factory pressurized with a 50/50 mixture of nitrogen/helium. Bleed off pressure from both suction and liquid line access ports prior to cutting into refrigeration lines.

**Connect The Line Set To The Remote Condensing Unit**

The compressor oil rapidly absorbs moisture. **Be prepared** to complete line set installation and start your evacuation process in order to minimize the time the compressor is exposed to the atmosphere. (Maximum amount of time the system can be exposed to the atmosphere is 15 minutes).

The line set can be routed for entry through the front or left side of the condensing unit.

- Remove knockout for preferred location.
- Insert supplied plastic bushings in knockout holes to prevent tubing from contacting sheet metal.
- Use the supplied 90° elbows to route tubing.
- Cut the tubing ends of the suction and liquid lines and braze the line sets to the condensing unit.



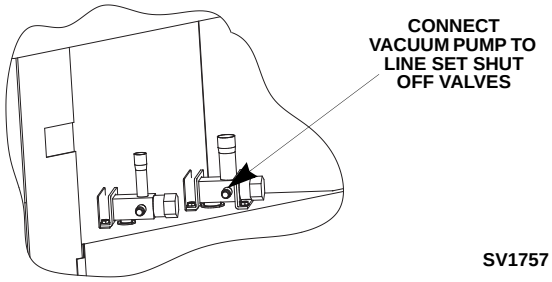

MINIMIZE THE TIME THE REFRIGERATION SYSTEM IS EXPOSED TO THE ATMOSPHERE (15 MINUTES MAXIMUM)

SV2100

### Step 5 Pressure Test and Evacuate The Line Set and Remote Condensing Unit

Schrader valve core removal tools that allow for removal and installation of the valve cores without removing manifold gauge set hoses are recommended to decrease the evacuation time.

Leave the line set shut off valves closed (front seated). Pressure test the line sets and remote condensing unit with 150 psig of dry nitrogen. Add nitrogen at the line set shut off valves located at the back of the ice machine. Complete the pressure test, verify no leaks are present and remove the nitrogen from the system before connecting the vacuum pump. Connect a vacuum pump to both of the line set shut off valves located at the back of the ice machine head section. Evacuate to 250 microns (or less). To completely evacuate the Remote condensing unit, continue the evacuation for 30 minutes after reaching the 500 micron point.

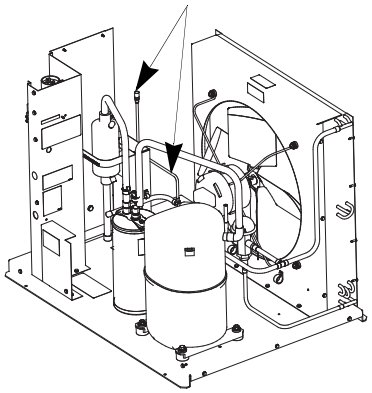



If required, the line set and condensing unit can be evacuated from the schrader valves located in the remote condensing unit. Schrader valve core removal tools (that allow for putting the cores back in without removing vacuum pump hoses) must be used if evacuating from the condensing unit side.

Isolate the vacuum pump from the line set shut off valves and/or condensing unit access ports prior to proceeding. Open refrigeration system shut off valves.

The suction line, liquid line and receiver service valves are closed during shipment and installation.

**ALTERNATE CONNECTIONS AT CONDENSING UNIT SCHRADER VALVES**



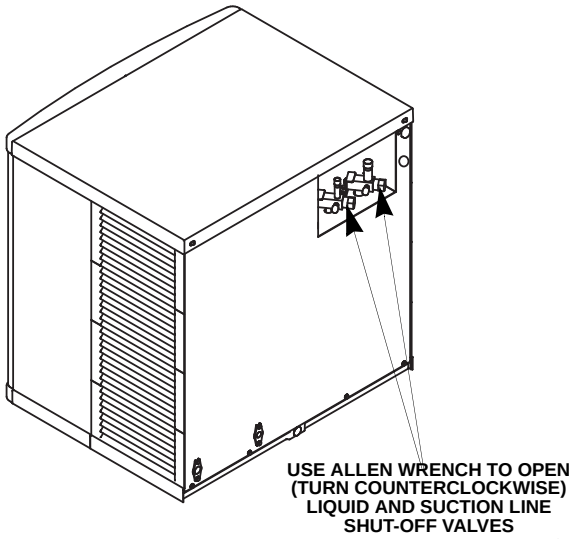

### Step 6 Open The Valves Prior To Starting The Ice Machine.

A. Slowly backseat (open-turn counterclockwise) the suction line shut off valve.

B. Slowly backseat (open-turn counterclockwise) the liquid line shut off valve.

C. Slowly backseat (open-turn counterclockwise) the receiver service valve.

NOTE: You will not hear refrigerant flow when the valves are opened. Refrigerant will not flow until the toggle switch is placed in the ice position and the liquid line solenoid valve opens.




**OPEN SUCTION AND LIQUID LINE SHUT OFF VALVES**

> **⚠ Caution**
>
> After opening suction, discharge and receiver service valves, refrigerant pressure will not be detected until the toggle switch is placed in the ICE position and the liquid line solenoid valve energizes.

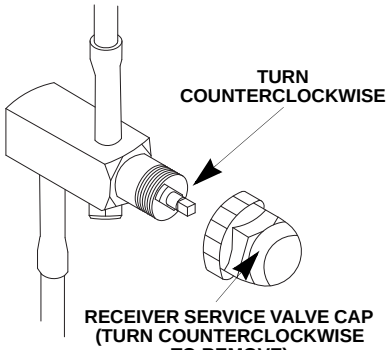
Verify O-ring in schrader valve caps are intact and reinstall on shut off valves to prevent refrigerant leakage.

Replace shut off valve access caps and torque to the following specifications.

**Torque Value's**

| | |
|---|---|
| Stem | 18-20 ft. lbs. |
| Caps | 12-15 ft. lbs. |
| Schrader Core | 1.5-3 in. lbs. |

Replace cap on receiver service valve and tighten.




**Open Receiver Service Valve**

There is a liquid line solenoid valve at the outlet of the receiver; refrigerant will not flow to the condensing unit until the ice machine head section is started. Connect power to both the ice machine head section and the Remote condensing unit. Place the ICE/OFF/CLEAN toggle switch into the ICE position, this will allow refrigerant to enter the line set and condensing unit.

**Important**

All refrigeration valve caps must be reinstalled to prevent future refrigeration leaks.

### Step 7 Leak Check The Refrigeration System

Leak check the new line set connections at the ice machine head section, condensing unit and S trap as well as all factory joints throughout the entire system. Disconnect power to the remote condensing unit. Place the ICE/OFF/CLEAN toggle switch into the ICE position. This allows the low side and high side pressures to equalize. Place the ICE/OFF/CLEAN toggle switch in the OFF position. Connect power to the remote condensing unit and allow system to pump down.

### Step 8 Insulation Requirements

To prevent condensation the entire suction line including the shut-off valve must be insulated. All insulation must be airtight and sealed at both ends.

The following insulation requirements prevent condensation at 90°F (32.2°C) ambient 70% Relative Humidity. If higher humidity is expected, increase insulation thickness.

The entire line set, including the suction service valve located on the back of the ice machine requires:

| Suction Line | Liquid Line | Min. Insulation Thickness |
|---|---|---|
| 3/4 inch (19.1 mm) | 1/2 inch (12.7 mm) | 1/2”(13mm) Suction Line<br>1/4” (7mm) Liquid Line |

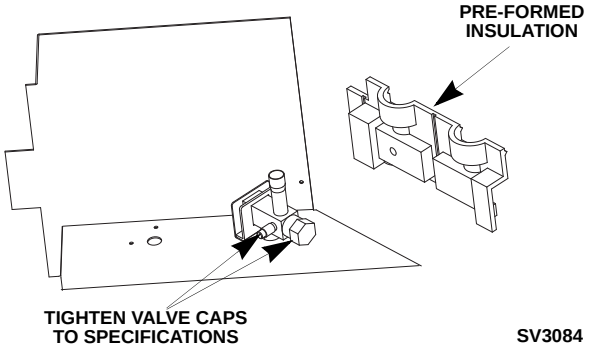
**Important**

To prevent condensation the entire suction line including the shut off valve must be insulated. All insulation must be airtight and sealed at both ends. The minimum requirements are for conditions at or below 70% humidity and 90°F (32.2°C) ambient. When higher humidity will be experienced, insulation wall thickness will need to be increased.

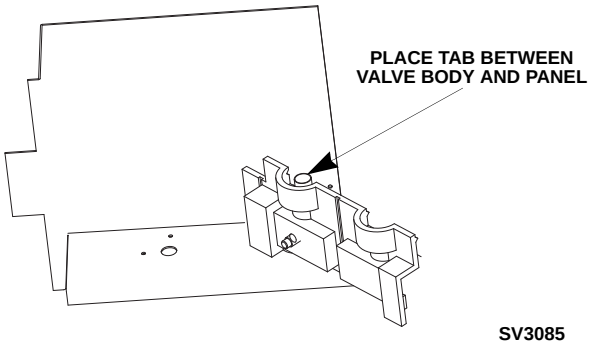
### Suction Shut Off Valve Insulation

The pre-formed suction shut-off valve insulation is located in the plastic bag taped to the water curtain.

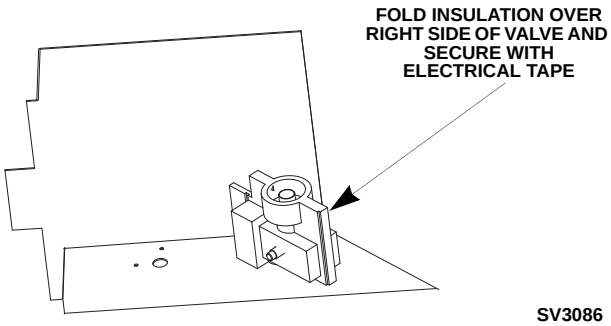
A. Verify valve and schrader caps are tightened to specifications (see Step 6).



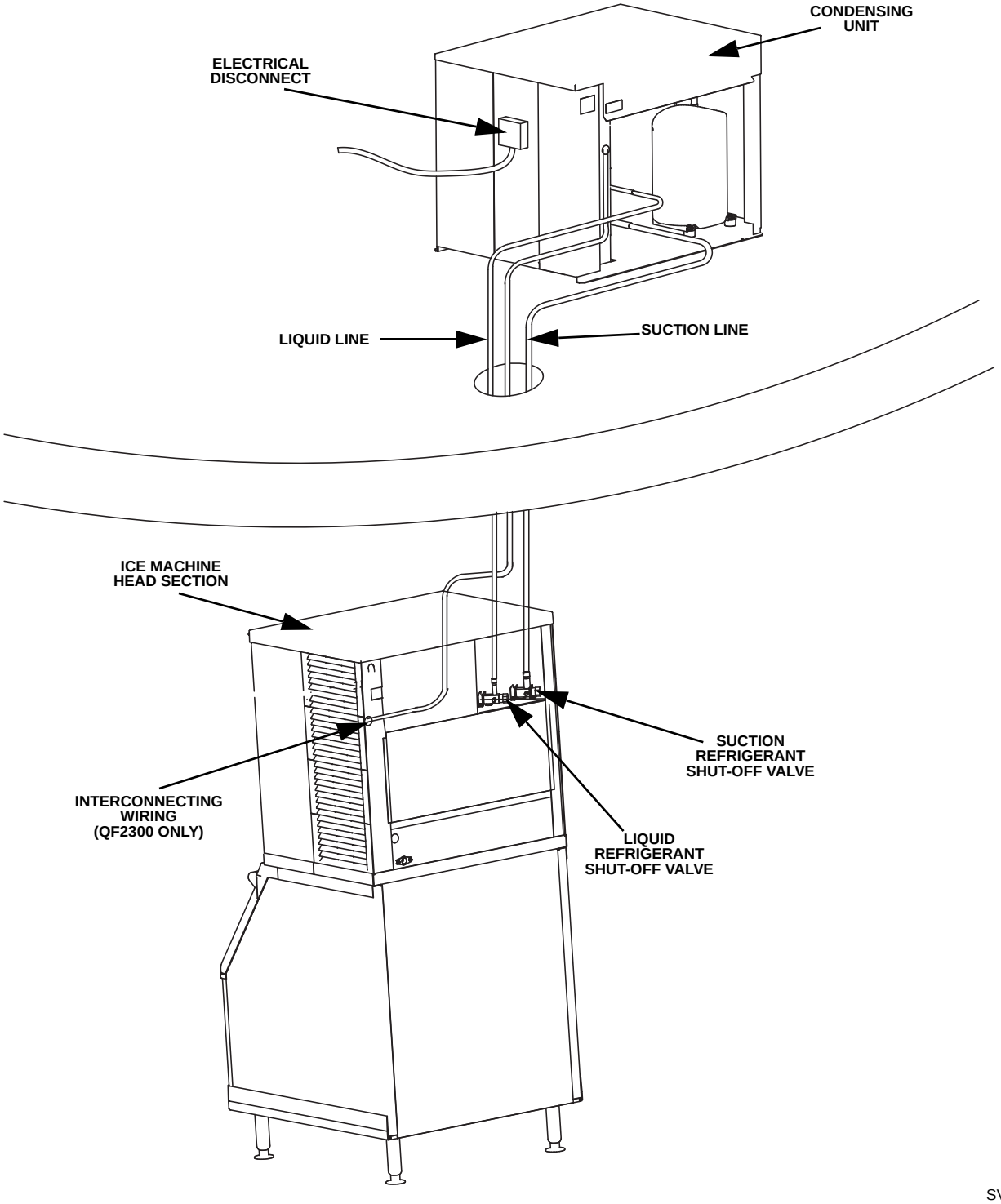

B. Place insulation over schrader valve cap and left side of valve. Position the tab between the mounting bracket and rear panel.




C. Fold insulation and hold against right hand side of valve while securing with electrical tape. Seal the line set insulation to the shut off valve insulation with electrical tape.



## TYPICAL REMOTE SYSTEM INSTALLATION



## Installation Checklist

- [ ] 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 the ice machine and bin drains separately vented?
- [ ] 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 behind front cover)

**REMOTE AIR-COOLED ONLY**

- [ ] Has the ice machine receiver service valve been opened 100%?
- [ ] Are the ice machine line set shut-off valves open 100%?
- [ ] Does the condenser fan motor operate properly after start-up?
- [ ] Have all the refrigeration fittings and joints been leak checked?
- [ ] Is the line set routed properly?
- [ ] Is a refrigeration oil trap (S-trap) installed?
- [ ] Have the refrigeration lines been insulated and secured properly to prevent vibration?
- [ ] Has the remote condensing unit been located where ambient temperatures will remain in the range of -20° to 120°F (-29° to 49°C)?
- [ ] Is the lineset length, rise and drop within guidelines?

## 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 obtained the proper water level.

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

**⚠ Warning**

**Potential Personal Injury Situation**

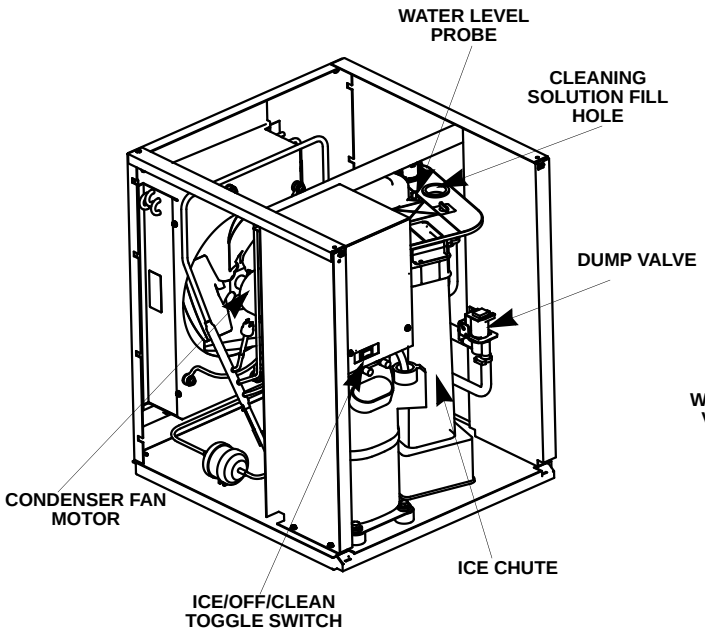
Do not operate equipment that has been misused. abused, neglected, damaged, or altered/modified from that of original manufactured specifications.

# Section 3
# Ice Machine Operation

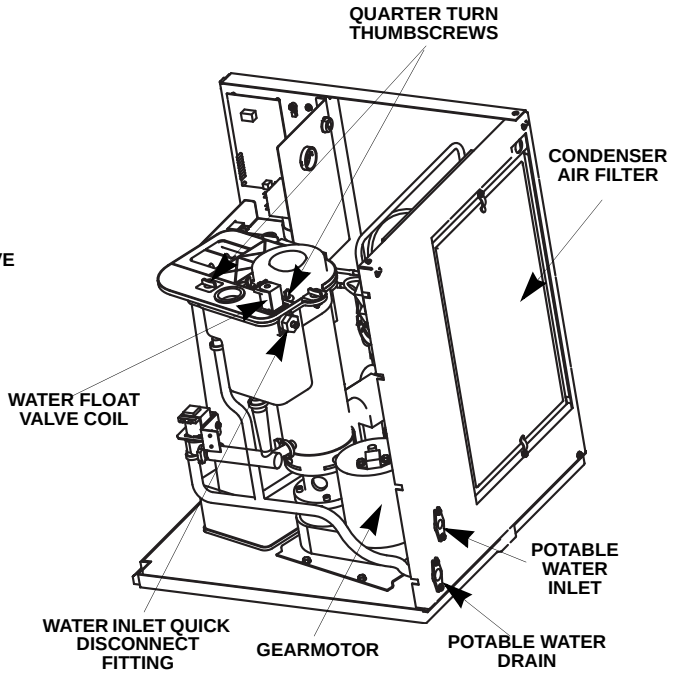
## Component Identification

### ICE MACHINE HEAD SECTION

### QC700/QF800

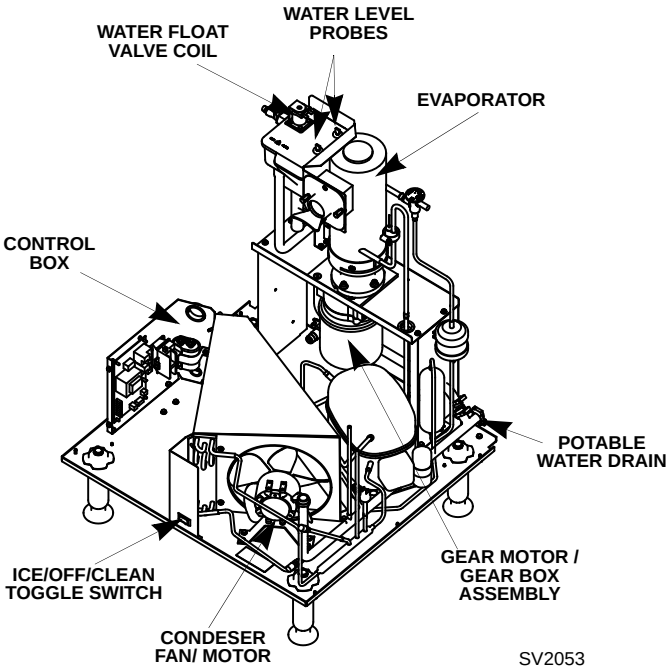



SV2019




SV2022

### QF400

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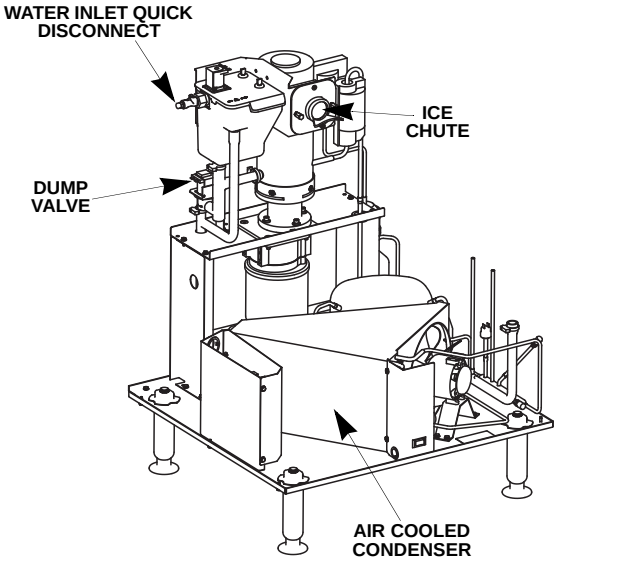
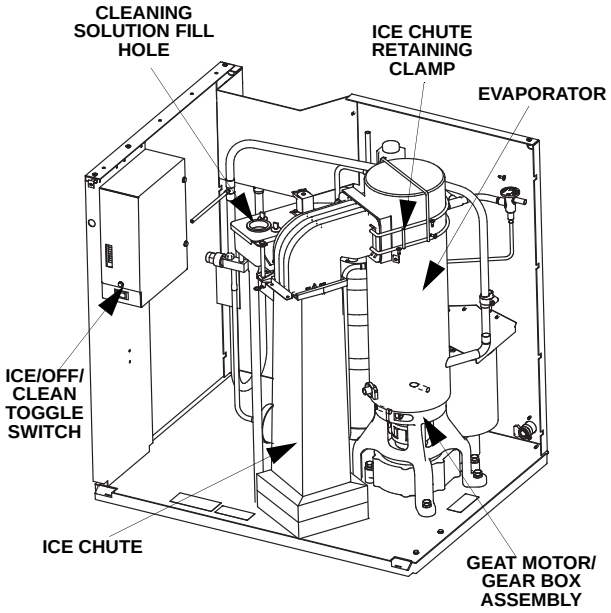
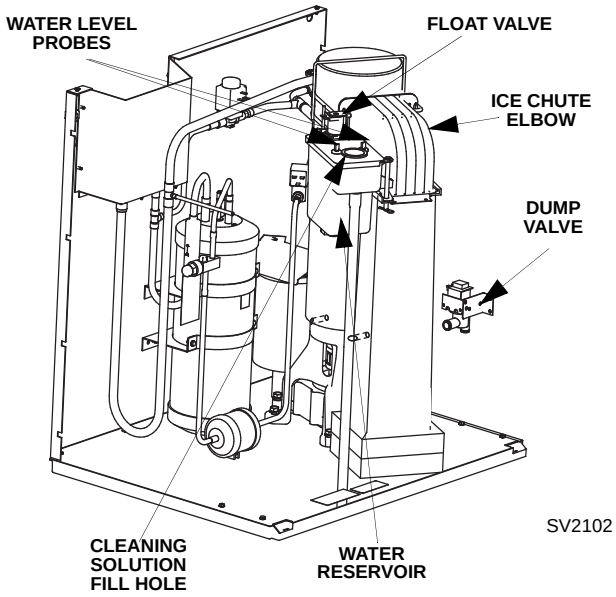
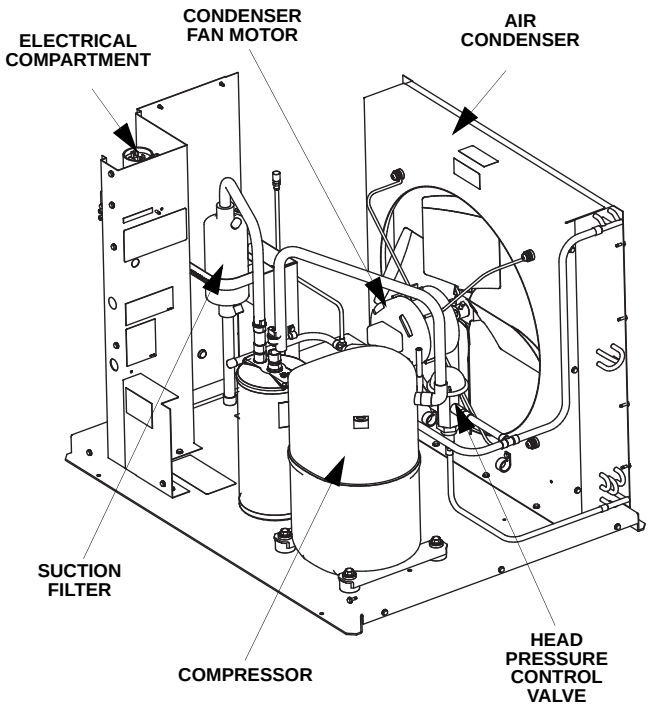



SV2044

## QF2300




**RFC2385 Remote Condensing Unit**

## 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

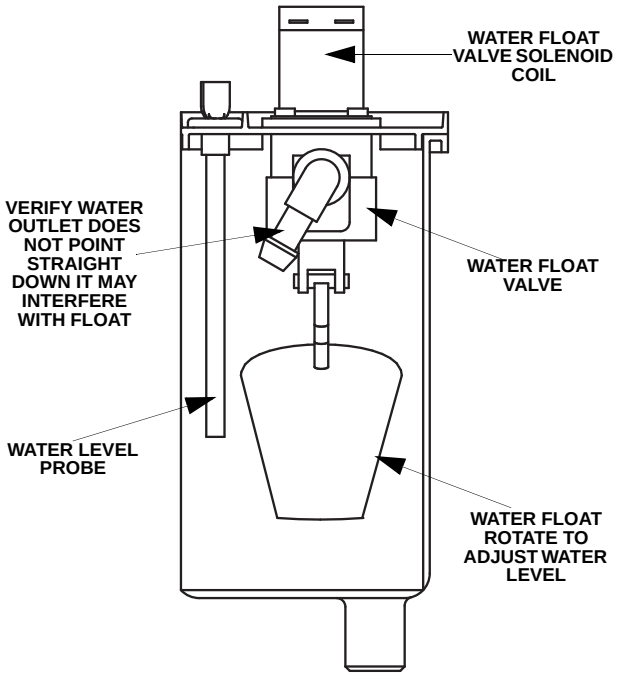
The float valve maintains the correct water level. The water level must allow the water level probes to maintain water contact throughout the freeze cycle. The water level is factory set and normally will not require adjustment. Check the water level during the freeze cycle. The water level is correct 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:

A. Rotate float clockwise to increase water level

B. Rotate float counterclockwise to decrease water level

C. Verify the outlet for the water float valve is at a 20 to 30 degree angle to prevent contact with the float.




SV2029

## 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**
Procedure starts on Page 3-6

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**
Procedure starts on Page 3-8

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**
Procedure starts on Page 3-10

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.

## CLEANING THE CONDENSER

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

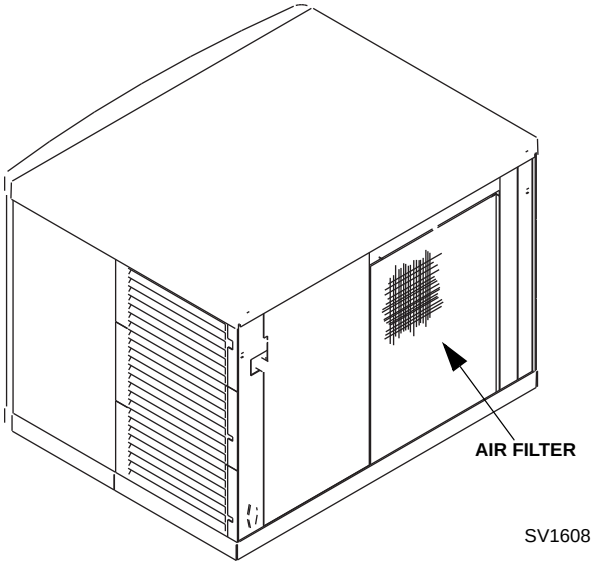
### Air-Cooled Condenser

(SELF-CONTAINED AND REMOTE MODELS)

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.

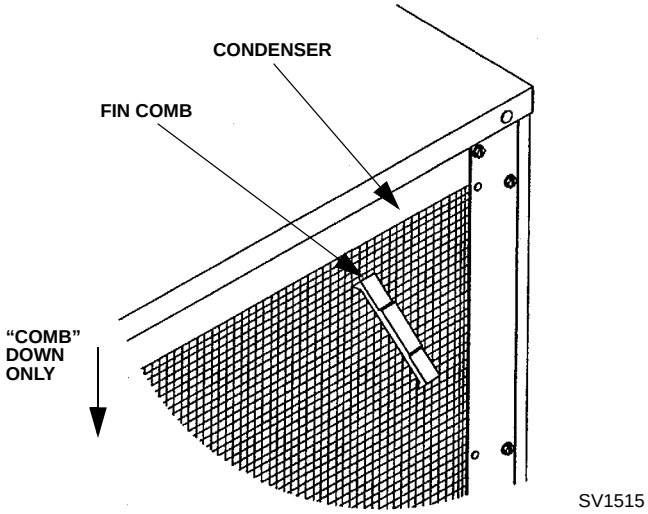
> **⚠ Caution**
> The condenser fins are sharp. Use care when cleaning them.

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.




**Self-Contained Air-Cooled Filter**

2. Clean the outside of the condenser (bottom of a remote 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.

### MANITOWOC'S CLEANING TECHNOLOGY

Manitowoc Flake/Chiplet 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 QC700/QF800/QF2300

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** Remove front and top covers and set the toggle switch to the OFF position.

**Step 2** To start a cleaning cycle, 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 3** Remove the 1 1/2" yellow plug from the top cover of the water reservoir. Wait about one minute or until the dump valve light de-energizes, then add the proper amount of Manitowoc Ice Machine Cleaner and re-install plug.

**Step 4** .The ice machine will automatically time out four 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.

| Model | Amount of Cleaner Part Number 000000084 |
|---|---|
| QC700/QF800/QF2300 | 3 ounces (90 ml) |

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 cleaning cycle is complete, the flush light will de-energize and ice making will start automatically

### PREVENTATIVE MAINTENANCE CLEANING PROCEDURE QF400

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** To start a cleaning cycle, 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 3** Wait about one minute or until the dump valve light de-energizes. Lift the front cover on the water reservoir and add the proper amount of Manitowoc Ice Machine Cleaner.

| Model | Amount of Cleaner Part Number 000000084 |
|---|---|
| QF400 | 3 ounces (90 ml) |

**Step 4** The ice machine will automatically time out four 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.

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 cleaning cycle is complete, the flush light will de-energize and ice making will start automatically

### CLEANING/SANITIZING PROCEDURE QC700/QF800/QF2300

Use Ice machine cleaner part number 000000084.

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

**Step 1** Remove front and top covers and set the toggle switch to the OFF position.

**Step 2** Remove all ice from the bin.

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

**Step 4** Remove the top cover from water reservoir.

**Step 5** 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 6** 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 7** To start cleaning, move the toggle switch to the ICE position.

**Step 8** 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 9** 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 10** Place the toggle switch in the Off position.

**Step 11** Disassemble the ice machine and hand clean all parts (refer to disassembly for cleaning/sanitizing).

**Step 12** Hand sanitize all parts (refer to disassembly for cleaning/sanitizing for procedure).

**Step 13** Remove and discard all ice produced during the cleaning process.

**Step 14** Reassemble ice machine.

**Step 15** Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.

**Step 16** Remove the top cover from water reservoir.

**Step 17** 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 18** Refer to chart and premix water and sanitizer.

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

**Step 19** To start sanitizing, move the toggle switch to the ICE position.

**Step 20** 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 21** 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 22** 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 23** Remove and discard all ice produced in the sanitizing process, then reassemble the ice machine and reconnect the water supply.

### CLEANING/SANITIZING PROCEDURE QF400

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.

**Step 4** Remove the top cover from water reservoir.

**Step 5** 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 6** 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 7** To start cleaning, move the toggle switch to the ICE position.

**Step 8** 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 9** 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 10** Place the toggle switch in the Off position.

**Step 11** Disassemble the ice machine and hand clean all parts (refer to disassembly for cleaning/sanitizing).

**Step 12** Hand sanitize all parts (refer to disassembly for cleaning/sanitizing for procedure).

**Step 13** Remove and discard all ice produced during the cleaning process.

**Step 14** Reassemble ice machine.

**Step 15** Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.

**Step 16** Remove the top cover from water reservoir.

**Step 17** 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 18** Refer to chart and premix water and sanitizer.

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

**Step 19** To start sanitizing, move the toggle switch to the ICE position.

**Step 20** 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 21** 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 22** 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 23** 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/CHIPLET ICE MACHINES QF400/QC700/QF800/QF2300**

**Step 1** Remove front and top covers, set the toggle switch to the OFF position.Remove all ice from the bin.

**Step 2** Remove front and top covers and set the toggle switch to the OFF position.

**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 000000084 only | |
|---|---|---|---|
| | | Cleaner | Water |
| QF400 | 48 oz (1.4 L) | 32 oz (0.94 L) | 16 oz (0.5 L) |
| QF800/ QC700 | 48 oz (1.4 L) | 32 oz (0.94 L) | 16 oz (0.5 L) |
| QF2300 | 72 oz (2.1 L) | 48 oz (1.4 L) | 24 oz (0.7 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. Remove the plug from the top cover of the water reservoir. Add the entire cleaner/water solution and re-install the plug.

**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<br>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<br>Part Number 94-0565-3 |

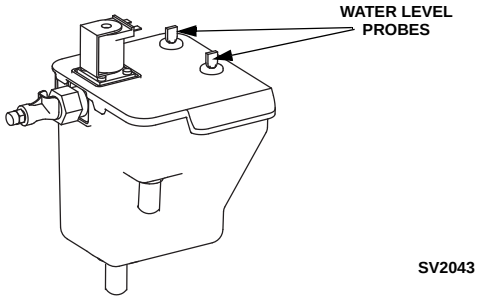
8. Soak the parts in the sanitizer /water solution for 10 minutes. Use the sanitizer/water solution and a sponge to sanitize all removed components and the inside of the bin. Do not rinse the sanitized parts.
9. Install the removed parts in the ice machine.
10. Turn on the water and electrical supply.

### Water Level Probe Removal

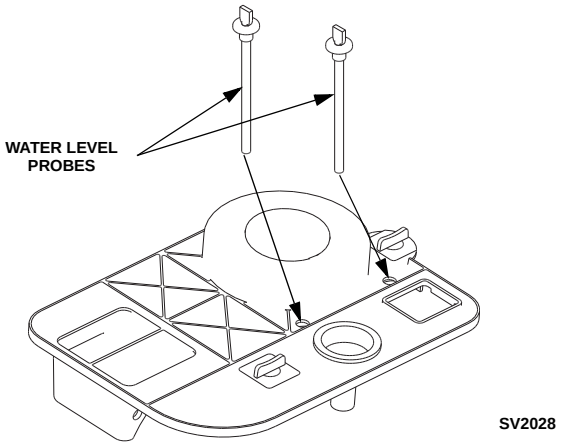
QF400/QC700/QF800/QF2300

#### Water Level Probe Removal

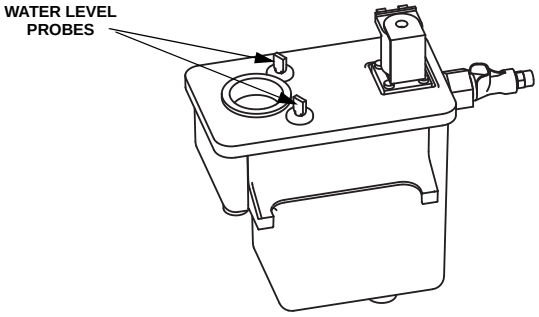
1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.
3. Pull up on water level probes to remove.
4. Disconnect wires from water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




**QF400**



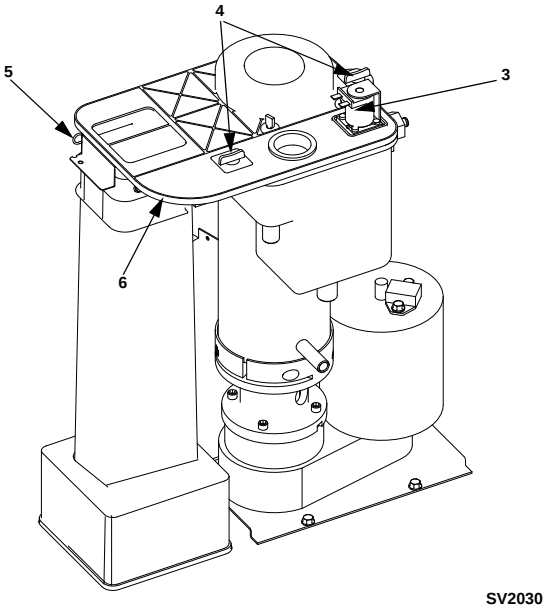

**QC700/QF800**




**QF2300**

### Water Reservoir Cover Removal

1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Remove water level probes.
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. QF0800/QC0700 ONLY Rotate quarter turn fasteners counterclockwise.
7. QF0800/QC0700 ONLY Remove cotter key and pin from ice chute.
8. Remove top cover from float reservoir.

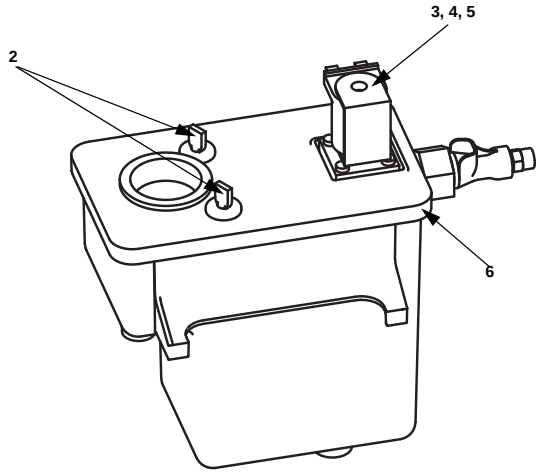



**QC700/QF800 Shown**

### Water Reservoir Cover Removal

QF2300

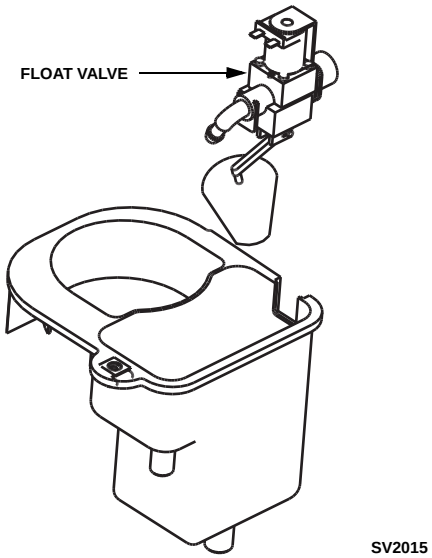
1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Remove water level probes.
3. Remove water float valve coil.
4. Depress coil and rotate 1/4 turn counterclockwise.
5. With coil wires attached, lift coil off enclosure tube.
6. Remove top cover from float reservoir.




**QF2300 Shown**

### Float Valve Removal

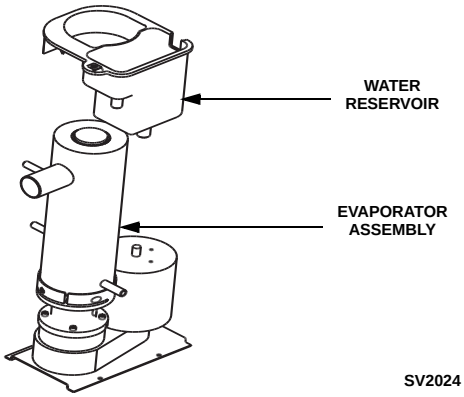
1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.
3. Remove water float valve coil.
4. Depress coil and rotate 1/4 turn counterclockwise.
5. With coil wires attached, lift coil off enclosure tube.
6. QF0800/QC0700/QF2300 ONLY Rotate quarter turn fasteners counterclockwise.
7. QF0800/QC0700 ONLY Remove cotter key and pin from ice chute.
8. Remove top cover from float reservoir.
9. Lift float valve out of float reservoir.




**QC700/QF800 Shown**

### Water Reservoir Removal

1. Place the toggle switch in the OFF position and turn off the water supply to the ice machine at the water service valve.
2. Disconnect water supply line at float valve quick disconnect by depressing stainless steel lever.
3. Place the toggle switch in the ICE position. The dump valve will open and the float reservoir will empty.
4. After the reservoir is empty, place the toggle switch in the OFF position and disconnect power to the ice machine at the service disconnect.
5. Remove water float valve coil.
   A. Depress coil and rotate 1/4 turn counterclockwise.
   B. With coil wires attached, lift coil off enclosure tube.
5. QF0800/QC0700 ONLY Rotate quarter turn fasteners counterclockwise.
6. QF0800/QC0700 ONLY Remove cotter key and pin from ice chute.
7. Remove top cover from float reservoir.
8. Lift float valve out of float reservoir.
9. Disconnect the drain lines from reservoir.
10. Lift reservoir off of evaporator assembly.

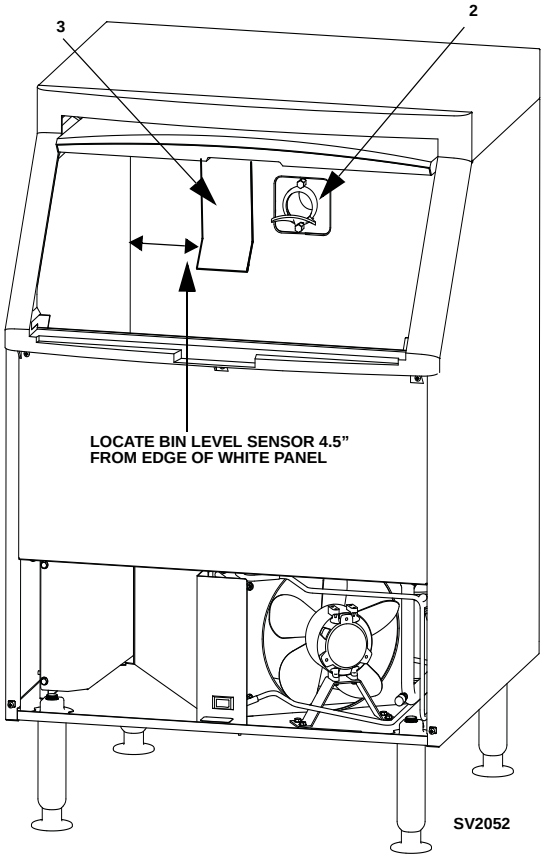



**QC700/QF800 Shown**

### Ice Diverter Removal

QF0400

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

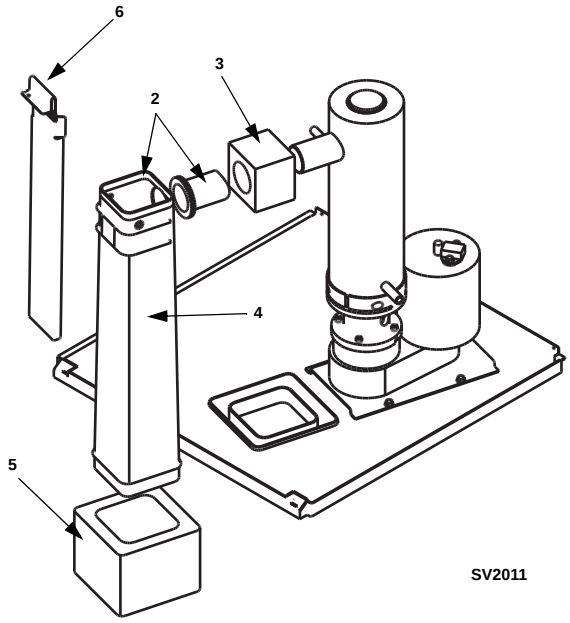


### Ice Chute Removal

QC700/QF800

1. Follow steps to remove float reservoir.
2. The ice chute and ice chute grommet will be removed as a unit. Pull forward on the top of the ice chute, and slide the ice chute and grommet off the end of the evaporator spout.
3. Remove evaporator spout insulation.
4. Lift ice chute out of the base.
5. Remove insulation from the bottom of the ice chute.
6. Remove bin level sensor (stainless steel plate) from ice chute. (Bin level sensor can be disconnected from the control board for complete removal from the ice machine.)

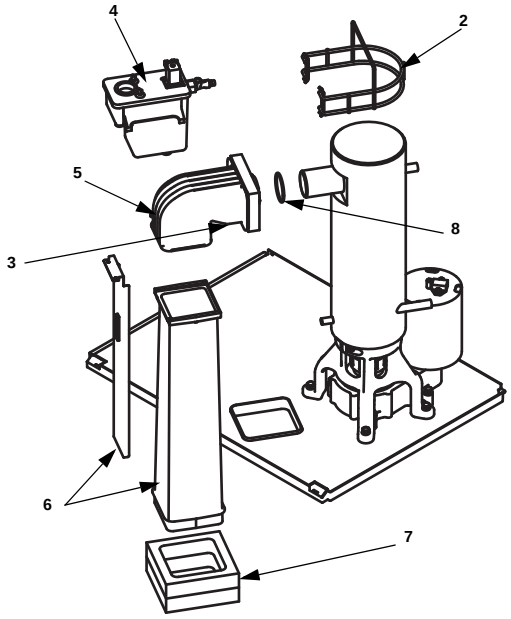
NOTE: Clean and sanitize the base and all ice chute components before reinstalling.




QF2300

1. Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.
2. Remove ice chute retaining clamp from top of evaporator.
3. Remove vinyl hose from ice chute spout.
4. Follow steps to remove water reservoir.
5. The ice chute elbow and the ice chute will be removed separately. Support the ice chute and pull forward on the elbow to remove.
6. Lift ice chute out of the base, tip bottom forward and remove bin level sensor (stainless steel plate) from the top of the ice chute. (Bin level sensor can be disconnected from the control board for complete removal from the ice machine.)
7. Remove insulation from ice chute elbow and ice chute base.
8. Remove evaporator spout o-ring.

NOTE: Clean and sanitize the base, spout and all ice chute components before re-installing.

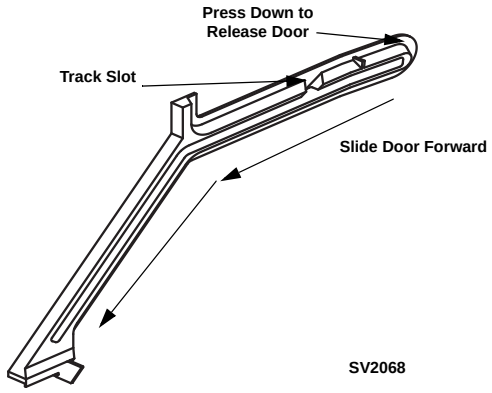


### Bin Door Removal

QF0400

Door removal allows easier access for cleaning and sanitizing.

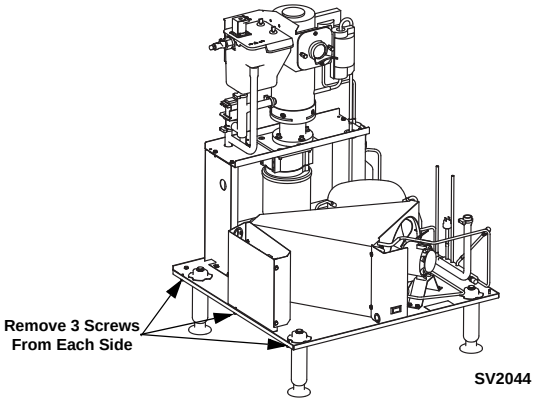
1. Disconnect the electrical power to the ice machine and remove ice from bin.
2. Grasp the rear of the bin door and pull bin door forward approximately 5”.
3. Slide bin door to the rear while applying upward pressure (the rear door pins will ride up into the track slot).
4. Slide the rear door pins 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.

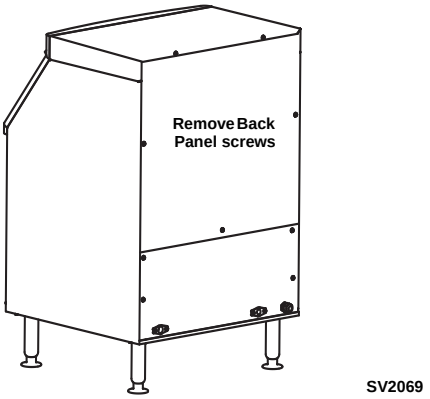



### Cabinet Removal

QF0400

1. Remove all ice from bin and disconnect power.
2. Remove thumbscrews and evaporator panel.
3. Remove three screws from the bottom of the left and right side of cabinet.
4. Remove nine screws from back panel.
5. Disconnect drain line clamp.
6. 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-clockwise1/4 turn.
3. Lift the coil assembly off the valve body.
4. Remove the spring, plunger, and nylon gasket from the valve body.
5. 

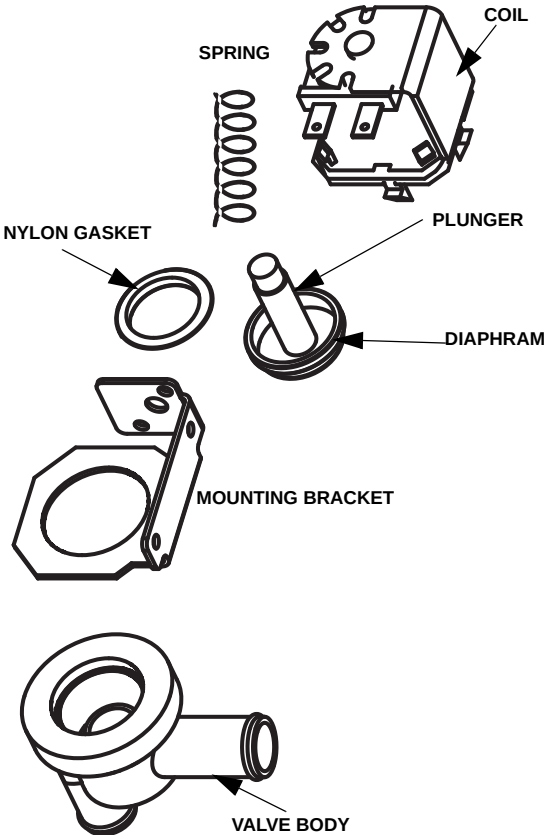
NOTE: At this point, the water dump valve can easily be cleaned. If complete removal is desired, continue with step 5.

**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**

## 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.

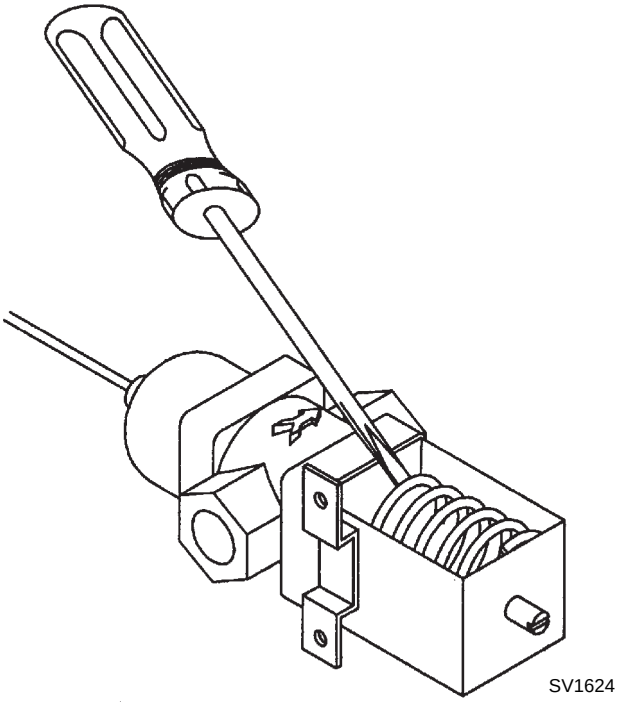
> **⚠ Caution**
> If water is allowed to remain in the ice machine in freezing temperatures, severe damage to some components could result. Damage of this nature is not covered by the warranty.

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.

### WATER COOLED CONDENSING UNIT

1. Perform steps 1-6 in previous column.
2. Disconnect the incoming water and drain lines from the water-cooled condenser.
3. Insert a large screwdriver between the bottom spring coils of the water regulating valve. Pry upward to open the valve.




**Pry Open the Water Regulating Valve**

4. Hold the valve open and blow compressed air through the condenser until no water remains.

# Section 4
# Ice Machine Sequence of Operation

## QF400/QC700/QF800

### 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

#### 1A. Flush

Immediately after placing the toggle switch into ICE, the dump valve solenoid, and gearbox are energized. After 45 seconds the dump valve de-energizes.

#### 1B. Water Fill

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

#### 3A. 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.

#### 3B. Water Drain

To allow water to drain from the evaporator, the dump valve energizes for 90 seconds, then de-energizes.

An 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.

### FLUSH SEQUENCE IN THE “ICE” POSITION

After the ice machine has run for 100 hours the ice machine will stop making ice and perform a flush sequence. The flush sequence will remove minerals that have settled in the bottom of the evaporator. The entire flush sequence lasts approximately 11 minutes, after which the ice machine automatically resumes ice making and the 100 hour counter in the control board resets to zero.

**NOTE:** 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.

## QF2300

### 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

#### 1A. Flush

Immediately after placing the toggle switch into ICE, the dump valve solenoid, and gearbox are energized. After 45 seconds the dump valve de-energizes.

#### 1B. Water Fill

After 45 seconds the water float valve solenoid is energized.

#### 2. Freeze Cycle

When water contacts the water level probe the liquid line solenoid valve, equalization valve, 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

#### 3A. 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 liquid line solenoid valve, equalization valve and compressor de-energizes.

To allow excess ice to run out, the gear motor and the water float valve solenoid remain energized for an additional 4 minutes, then de-energize.

#### 3B. Water Drain

To allow water to drain from the evaporator, the dump valve energizes for 90 seconds, then de-energizes.

An 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.

### FLUSH SEQUENCE IN THE “ICE” POSITION

After the ice machine has run for 100 hours the ice machine will stop making ice and perform a flush sequence. The flush sequence will remove minerals that have settled in the bottom of the evaporator. The entire flush sequence lasts approximately 11 minutes, after which the ice machine automatically resumes ice making and the 100 hour counter in the control board resets to zero.

**NOTE:** 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.

# 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. |
| Remotes Only | No electrical power to condensing unit | Replace the fuse/reset the breaker/turn on the main power switch. |
| 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. |
| Air-Cooled Models Only | 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
- QF400/QC700/QF800 Only - 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.

### Analyzing Why SafeGuards May Stop the Ice Machine

According to the refrigeration industry, a high percentage of compressor failure are the result of external causes. These can include flooding or starving expansion valves, dirty condensers, water loss to the ice machine, etc. SafeGuards protect the ice machine (primarily the compressor) from external failures by stopping ice machine operation before major component damage occurs.

Refrigeration and electrical component failures may also trip a safeguard. Eliminate all electrical components and external causes first. If it appears that the refrigeration system is causing the problem, use the charts, checklists, and other references to determine the cause.

NOTE: The following checklists are designed to assist the service technician in analysis. However, because there are many possible external problems, do not limit your diagnosis to only the items listed.

### 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 90 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.

*Note: There are two control boards, early version boards must remain open for 90 seconds before de-energizing.

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 ± 10% of nameplate voltage. |
| Ice frozen to auger/evaporator | Allow evaporator to thaw. |

### Temperature is Too High or Low QF400/QC700/QF800

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 CONFORMTIY

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

Representative of European Distributor:

Model and Serial No.

Applied EC Directives:

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

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)
EN55104 Electro Magnetic Compatability (Immunity)
EN378 -1 to -4 Refrigeration Plants

CE **

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08/25/03


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