Rapid Freeze® Ice Flaker

Owner's Manual for
Self-Contained Ice Flakers

1000-SCAE

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Engineering Guidelines

Location Requirements

FOR INDOOR USE ONLY

Howe 1000-SCAE Rapid Freeze Ice Flakers are designed to operate in ambient room temperatures between 70°F and 90°F.

Minimum Ambient Temperature	Maximum Ambient Temperature
70°F	90°F

The Ice Flaker warranty is void if it is installed in ambient room temperatures below 70°F.

A minimum of 1 foot clearance on all sides is required when installing the Howe 1000-SCAE Ice Flaker. This clearance is required for service access and efficient operation.

The Ice Flaker must be located above a sanitary sewer floor drain hub or trench drain to ensure proper drainage to the floor. Many designers slope floors to the sanitary sewer inlets to manage these wet areas.

If installing the Ice Flaker with a Howe Ice Bin, ensure that the bin is adequately secured to the floor so as to prevent the assembly from tipping when empty.

Water Supply Requirements

Water supply must be within the range of 45°F to 90°F.

Minimum Water Supply Temp.	Maximum Water Supply Temp.
45°F	90°F

The water supply pressure must be within a 15 PSIG to 60 PSIG range.

Minimum Water Pressure	Maximum Water Pressure
15 PSIG	60 PSIG

Straight Reverse Osmosis (RO) treated water should never be supplied to the Ice Flaker.

RO system treated water is aggressive toward metals and plated surfaces. In addition RO water will affect the life and integrity of rubber and plastic material Ice Flaker components. If only RO water is available, Post-RO treatment must be provided to raise pH and mineral content.

Generally, filtration of cold supply water is recommended. Howe offers a complete line of replaceable core cartridge filter treatment systems designed to improve ice quality and extend the life of the Ice Flaker.

This filtration will also reduce supply water related service problems if changed at least every six months or depending upon local water conditions.

A dedicated 1/2" ODS copper cold water supply should be located within 4 feet of the Ice Flaker complete with hand shut off valve.

A 3/8" OD copper tube should connect the field installed shut off valve with the Ice Flaker water inlet connection located at the rear of the machine.

Water Quality Requirements

Water chemistry has a significant impact on the operating efficiency, service requirements and life of your Howe ice flaker. The Howe filtration products help protect against a range of water-related problems and are recommended for all Howe ice flaker installations.

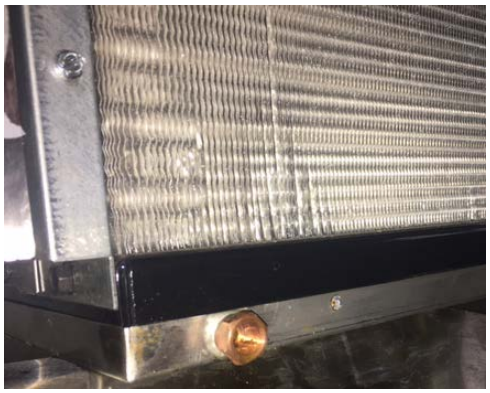
Howe Water Quality Guidelines

Characteristic (mg/l)	Acceptable Range
TDS	40 to 250
Hardness	35 to 125
Alkalinity	35 to 150
pH	7.0 to 8.5
Chloride	75 max
Iron	0.1 max
Chlorine	0.2 max

There are significant variations in water quality from one region to another. It is the responsibility of the owner/operator of the equipment to assure that the incoming water supply is within the Howe Water Quality Standard. If your water quality is outside the Standard additional water treatment may be required to comply with the standard. Damage to equipment caused by non-compliance with the Howe Water Quality Standard will not be covered by the Warranty.

Drain Water Piping Requirements

Water Sump overflow and low-point drain feed into the integrated condensate drain pan of the flaker. The drain pan then discharges through a ¼" female NPT connection on the rear face of the unit. It is recommended that the drain spout be piped directly to a floor sanitary sewer hub or trench drain.



Code authorities having jurisdiction may dictate other indirect water connection requirements.

Electrical Requirements

A dedicated 2 pole, 208-230 volt, 60 Hz power supply from a field furnished and installed disconnect switch should be connected to Terminals L1, L2, and the provided Grounding Lug on the reverse of the machine. See nameplate of equipment for Electrical Specifications.

Enclosure Removal and Reinstallation

Field Removal of the Stainless Steel Enclosure Panels

WARNING: Never lift the flaker by the enclosure panels as they are designed to be removable and may come loose under such conditions.

The Front, Top, Right Side, and Left Side enclosure panels for the Howe 1000-SCAE flaker are designed to be easily removed in the field for initial installation/adjustment and to allow for service access should the need arise. The Drain Pan and Back panel (containing electrical and water service bulkheads) are fixed more permanently and likely will never need to be removed for the life of the machine. Should such an extenuating circumstance arise, contact Howe Customer Service for more information.

CAUTION: It is recommended that gloves are worn when handling the panels to protect from any sharp edges.

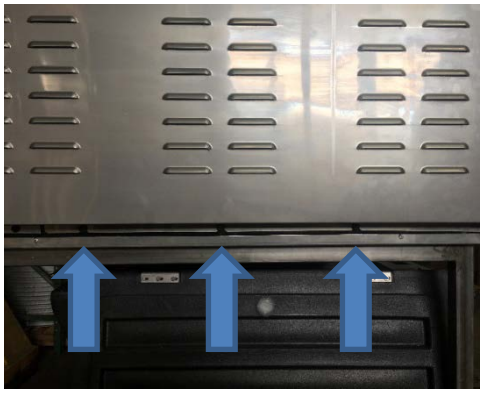
Most routine service and diagnostic tasks should only require removal of the Front enclosure panel. The panel is hung from the leading edge of the Top panel and secured to the base of the machine by a 3/8" head bolt centrally located beneath the finger well. Loosen this bolt in place to free the Front panel. It is not necessary to remove the bolt entirely.

With the 3/8" bolt loosened, the Front panel can be lifted away. Use the finger well to lift the panel straight up at least 1 inch before pulling the panel away from the machine.

Once the Front panel is removed, the top panel can simply be lifted away from the unit. Lift the panel straight up at least 3 inches before pulling it away from the machine. It may be helpful to nudge the leading edge of the Top panel free of the Left Side and Right Side panels before lifting.

The Left Side and Right Side panels are each secured by three 3/8" bolts along the base of the machine, as well as three 5/16" sheetmetal screws, connecting the Side panels to the Back panel. For removal of each Side panel, first remove the three 5/16" sheetmetal screws.

Next, loosen the three 3/8” bolts located along the base of the machine. It is not necessary to remove these bolts entirely.



With the sheetmetal screws removed, and the 3/8” bolts loosened, the panel can be lifted from the machine. Lift the panel straight up 1-2 inches before pulling the panel away from the machine.

Field Placement of the Stainless Steel Enclosure Panels

To reinstall the enclosure panels for the Howe 1000-SCAE flaker, simply perform the reverse of the steps for removal. The Left Side and Right Side panels must be secured to the machine before the Top panel can be set in place. The Top panel must be set in place before the Front panel can be reinstalled.

Field Installation

Inspection

Upon receipt, check all items against the bill of lading to make sure all crates and cartons are accounted for.

Any shortage or damages should be reported to the delivering carrier. Damaged material becomes the delivering carrier's responsibility and should not be returned to the manufacturer unless prior approval is given.

Take care not to damage equipment when uncrating or upon installation – in particular, the tube-fin condensing coil on the rear of the unit.

Safety Information and Guidelines

Only qualified service technicians should attempt to install, service, or maintain the Ice Flaker.

Make sure all power sources are disconnected before any service work is done to the Ice Flaker. All field wiring must conform to the requirements of the equipment and all applicable local codes and national codes.

When installing, it is recommended using a fork truck to lift from the bottom of the drain pan. The full weight of the machine, once removed from its shipping crate, the machine weighs approximately 500 lb.

Regardless of method, the unit should never be lifted directly over any personnel and all appendages should be kept clear of the footprint of the machine until it is at rest.

The Top, Front, and two Side Panels should be removed to better see the position of the flaker.

Never lift the flaker by the enclosure panels as they are designed to be removable and may come loose under such conditions.

Field Wiring

All field wiring must be in compliance with local and national codes. Use only copper conductors of the appropriate size.

All internal wiring is pre-installed from the factory.

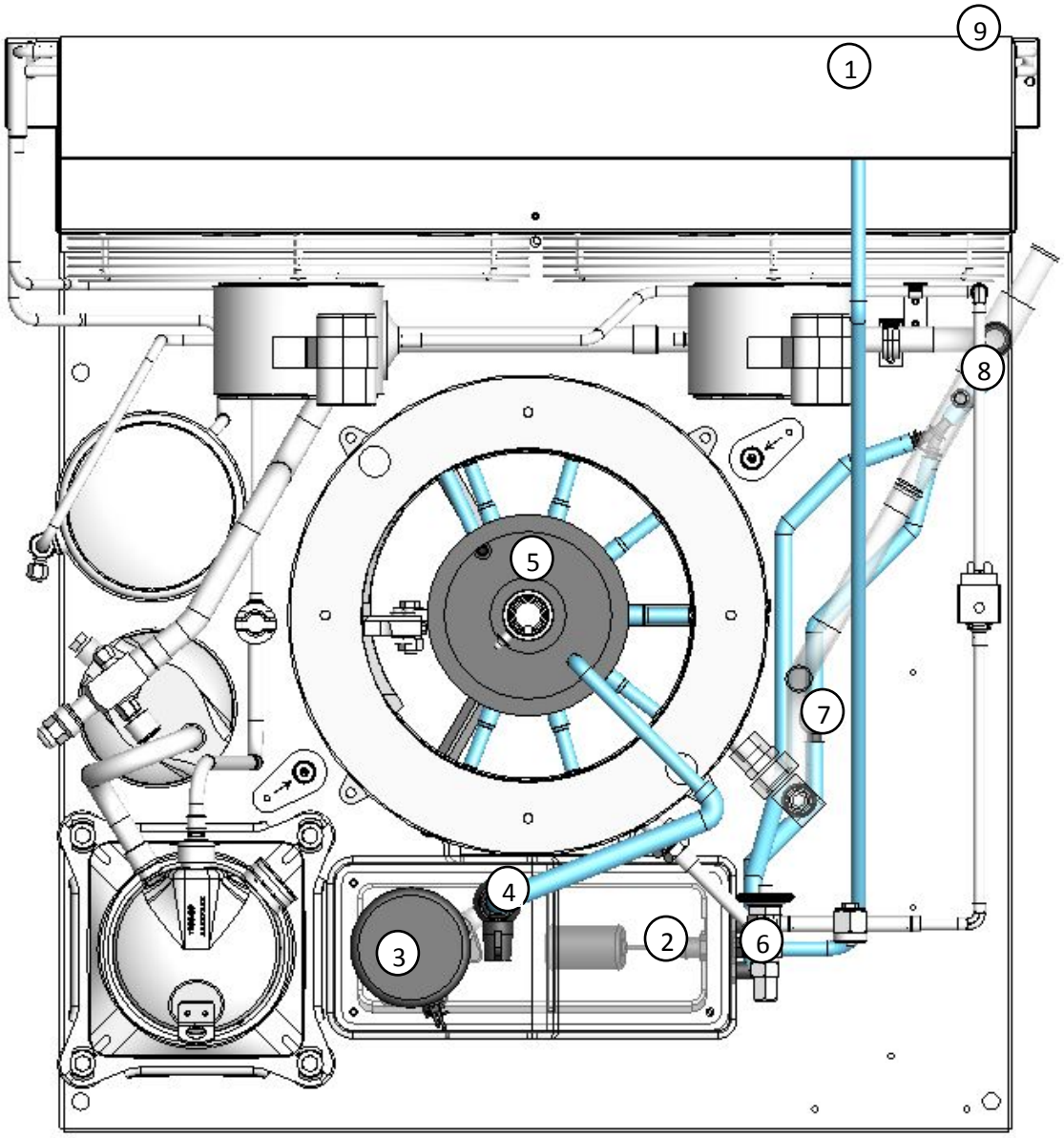
Connect 208-230V/1/60 power to the terminals marked “L1” and “L2” in the Junction Box on the rear of the flaker. Use the provided Grounding terminal on the Terminal Strip to properly ground the incoming power.

Installation Checklist

1. **Has the ambient temperature been verified between 70°F – 90°F?**
   (see Location Requirements p.3)
2. **Has the incoming water temperature been verified between 45°F – 90°F?**
   (see Water Supply Requirements p.3)
3. **Has the water supply pressure been verified between 20 PSIG and 60 PSIG?**
   (see Water Supply Requirements p.3)
4. **Has the filtered water supply been verified as not RO water?**
   (see Water Supply Requirements 3)
5. **Has the Ice Flaker been located near a floor sanitary sewer drain?**
   (see Drain Water Piping Requirements p.4)
6. **Is there a dedicated 208-230 Volt electric power supply connected to the unit? Measure line voltage to confirm. The acceptable voltage range is 190-250 Volts.**
   (see Electrical Requirements p.4)

Start Up and Operation

Water Operation



1. Water Inlet Connection
2. Float Valve
3. Water Pump
4. Water Regulating Valve
5. Water Distribution Pan & Side Spout
6. Sump Connections
7. Stop Valve
8. Condensate Drain Outlet
9. Sump Drain Outlet

Water Inlet

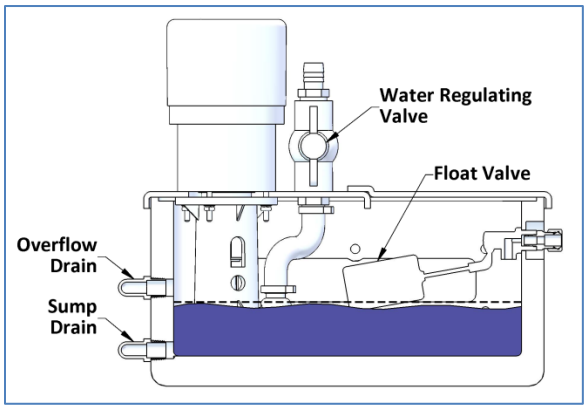
The supply water feed for the Ice Flaker must be connected here. A shut-off valve should be field installed before this connection.

The Ice Flaker requires a minimum water pressure of 15 PSIG and a maximum of 60 PSIG.

Float Valve

The water level in the Water Sump is regulated by the Float Valve.

The water level should always be below the opening on the side of the Water Sump.



Section View of Water Sump

Water should never be allowed to flow from the Water Sump back through the opening and into the Bottom Casting.

Adjust the water level by loosening the wing nut connecting the float arm and valve arm and adjusting each arm as needed. Additional fine adjustment can be done by rotating the float head.

Water Pump

The Water Pump drives the water in a continuous flow through the system.

The Water Pump inlet should be submerged at all times. Air should never be pulled into the intake.

Overflow Drain

The higher of the two drain connections on the Water Sump is the Overflow Drain.

If water is exiting the Water Sump through the Overflow Drain, the water level is too high and the Float Valve needs to be adjusted.

Sump Drain

The lower of the two is the Sump Drain. It is used to flush the Water Sump of all liquid.

Stop Valve

The stop valve attached to the Sump Drain fitting should always be closed during normal operation.

The stop valve should only be opened during cleaning or emptying of the Water Sump.

Excess condensate and all overflow water from the Water Sump will be discharged into the built-in drain pan and directed to the external drain connection on the back of the unit.

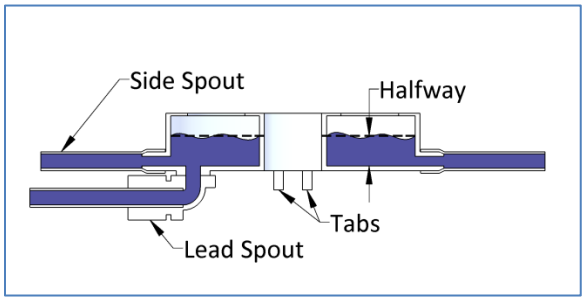
Water Distribution Pan

The Water Distribution Pan circulates the water fed from the Water Pump down the walls of the Evaporator.

There are two small plastic tabs on the bottom of the Water Distribution Pan. These tabs should straddle the wing of the Ice Blade to prevent it from rotating.

The tube exiting the Water Distribution Pan from the bottom is the Lead Spout. It must always be flowing with water during normal operation and pointing perpendicular to the evaporator surface.

Do not plug or cap the bottom Lead Spout.



Section View of Water Distribution Pan

Water level in the Water Distribution Pan should be about halfway full. The Side Spouts should never be starved of water.

Water Regulating Valve

Adjust the water level in the Water Distribution Pan by opening or closing the Water Regulating Valve located directly above the Water Sump.

Only adjust the Water Regulating Valve after the Ice Flaker has been producing ice for at least 10 minutes.

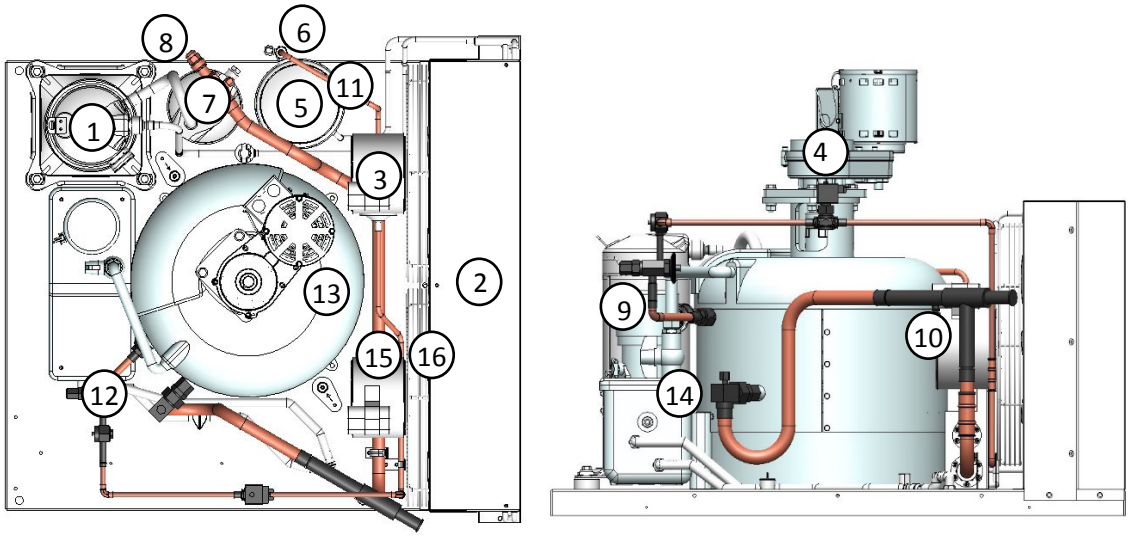
Condensate Drain & Sump Drain Outlets

Any water or moisture that has formed on the Ice Flaker or inside the enclosure will flow out through the Condensate Drain Outlet.

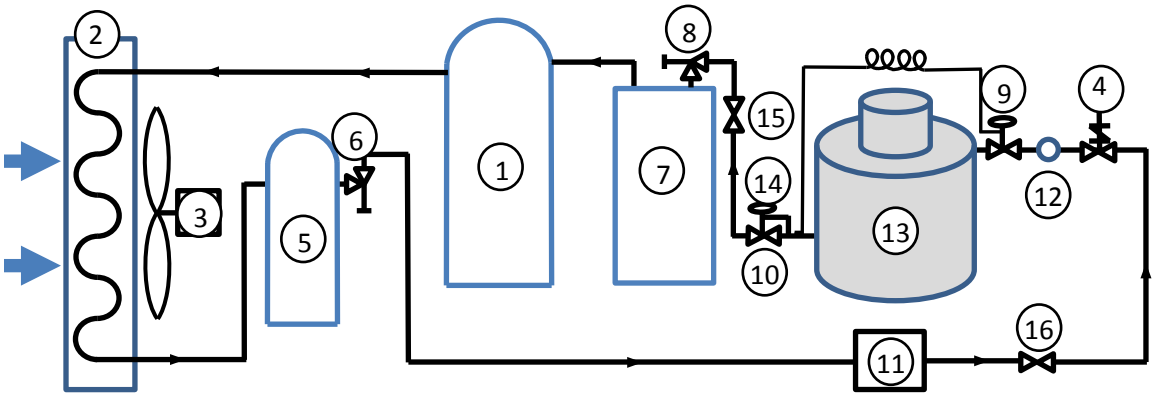
Water exiting the enclosure during cleaning or emptying of the Water Sump will do so through the Sump Drain Outlet.

Both of these drain outlets must connect to a floor drain. Make sure they are clear from restrictions and flow freely.

Self-Contained Refrigeration System



*Piping insulation not shown



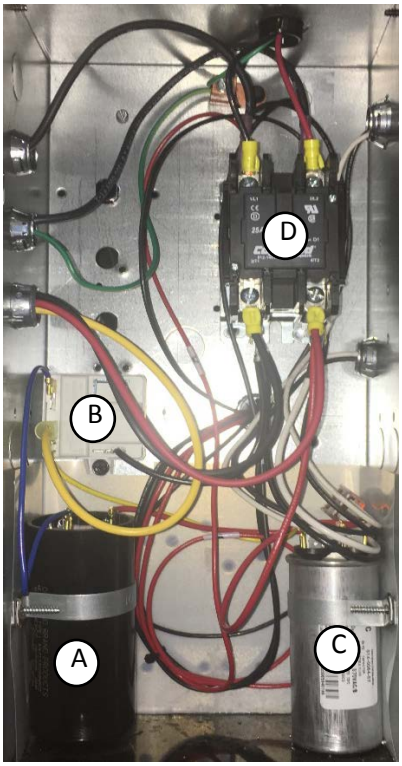
1. Scroll Compressor
2. Condenser Coil
3. Condenser Fan Motor
4. Liquid Line Solenoid Valve
5. Refrigerant Receiver
6. Receiver Outlet Service Valve
7. Suction Accumulator
8. Accumulator Inlet Service Valve
9. Thermostatic Expansion Valve (TXV)
10. Evaporator Pressure Regulating Valve (EPR)
11. Liquid Line Filter Drier
12. Moisture Indicator/Sight Glass
13. Evaporator Drum
14. Schrader Valve
15. Block Valve with Schrader Valve
16. Block Valve with Schrader Valve

Refrigeration System Description

The HOWE self-contained air-cooled R-404A refrigeration system is factory pre-charged, operated, and is ready for use. See the Self Contained Air Cooled Refrigeration System schematic on page 12 of this manual.

A sealed hermetic Scroll Compressor ① equipped with a 208-230 Volt, single phase, and Capacitor Start-Capacitor Run motor with inherent internal line break motor protection is the heart of the system. An air cooled condenser constructed of aluminum cross fins on a copper tube coil ② is equipped with two 14 inch diameter fans each with a direct drive permanent split capacitor open air over motor ③ with automatic reset thermal overload internal protection. Additional refrigeration system components include a refrigerant Liquid Line Solenoid Valve ④, Liquid Refrigerant Receiver ⑤ with an Outlet Service Valve ⑥ equipped with a High pressure service gauge port. Also, for compressor protection there is a Suction Accumulator ⑦which is equipped with an Inlet Service Valve ⑧ and Low pressure service gauge port. The adjustable Thermostatic Expansion Valve ⑨ and the adjustable Evaporator Pressure Regulator Valve ⑩ are factory pre-set for general use. A Liquid Line Filter Drier ⑪and a Moisture & Liquid Indicator Sight Glass ⑫ completes the refrigerant piping circuit.

A non-adjustable High Pressure Cut-Out switch and a non-adjustable Low Pressure Transducer are connected and controlled by the Howe Digital Touchscreen Controller. See the Wiring Schematics located in the back of this manual. Compressor electrical components contained in the Compressor Electrical Component Enclosure are the Start Capacitor [A], Start Relay [B], Run Capacitor [C], and Contactor [D] depicted in the photo below. A 40 Watt external band type Crankcase Heater is also installed to provide additional Compressor protection during the refrigeration OFF-CYCLE.



Sequence of Operation

To start the flaker the rocker switch is placed in the ON position and the green ON indication lamp will illuminate. The Controller will then be ready for commands. When commanded to run, the Liquid line Solenoid Valve ④ is energized by the Controller, increasing the system pressure to the Cut-In pressure of 23 PSIG which closes the R3 contacts. When closed, the Compressor/Fan Contactor holding coil will then energize the Compressor ① and both air cooled condenser fan motors ③.

The energized open Liquid Line Solenoid Valve ④ allows liquid refrigerant to flow to the Thermostatic Expansion Valve ⑨ which is the flow metering device that creates a large pressure drop from the High Pressure side of

the system to the low pressure side of the system (Evaporator/ Water Freezing Surface⑬). Heat contained in the circulating water which cascades across the freezing surface of the flaker is transferred to the vaporizing refrigerant within the Evaporator⑬ and the low pressure vapor exits and then flows through the Evaporator Pressure Regulating Valve ⑩.

Heat is continuously removed from the circulating water until freezing occurs on the freezing surface and the ice temperature is further reduced down to about 20°F. As the thickness of the ice growth on the freezing surface increases the rotating Ice Blade shatters the ice thereby harvesting flakes which fall through the drop zone below. The Evaporator Pressure Regulating Valve ⑩ maintains the Evaporator pressure between 31 and 34 PSIG, depending upon installation conditions. The refrigerant vapor then enters the Suction Accumulator ⑦ which insures only vapor and no liquid refrigerant returns to the Compressor ①.

The Compressor ① compresses the low temperature vapor and raises the refrigerant temperature and pressure to create the High Pressure side of the system. The superheated refrigerant is discharged to the Air Cooled Condenser Coil ② where heat from the high temperature refrigerant within the coil is transferred through copper tubing to the cooler ambient air temperature circulated across the exterior surface of the tubes and aluminum fins. Heat is rejected by the Condenser Fans ③ and the refrigerant vapor condenses back to the liquid state. The liquid refrigerant then flows to the Refrigerant Receiver ⑤ to be recirculated to the Thermostatic Expansion Valve ⑨. The cycle is then repeated.

Once the harvested ice has accumulated to the elevation of the Photoeye Sensors and the beam is blocked for 15 seconds, the Controller Off-Delay Cycle will begin. The Controller will then close the Liquid Line Solenoid Valve which will begin the refrigerant Pump-Down cycle.

The Pump Down cycle is required to ensure that all liquid refrigerant has been evacuated from the Low Side of the system. When the solenoid valve is closed, the compressor and cooling fans continue running until Cut-Out pressure (5 PSIG) is reached and are then de-energized. The Water Pump and Drive Motor will continue to run until the factory-set Pump Down interval (90 seconds total) expires.

Pre-Start up Refrigeration System Checklist

1. Confirm the 208-230 volt single phase power supply to the Howe flaker is switched OFF at the branch circuit breaker and/or the sight disconnect switch near the Howe flaker. Measure voltage at the flaker terminal strip terminals L1 and L2 to confirm there is no applied voltage.
2. Confirm the flaker rocker switch is in the OFF position.
3. Open (Backseat) the Liquid Receiver Outlet Service Valve and the Suction Accumulator Inlet Service Valve. This will allow the refrigerant charge which was manually pumped down at the Howe factory for shipping to enter the system however the Liquid Line Solenoid will remain de-energized or closed at this time.
4. Visually inspect the Moisture & Liquid Indicator and confirm the indicator element is GREEN which indicates the system refrigerant condition is DRY. If the indicator element is not GREEN or DRY notify the Howe Service Department at (773)235-0200.
5. The Howe flaker rocker switch must remain in the OFF position and switch ON the 208-230 Volt single phase power supply to the Howe flaker. Measure voltage at the terminal strip terminals L1 and L2 to confirm voltage is applied.
6. **This will energize the 40 Watt Crankcase Heater which must remain on for a duration of 12 hours before attempting to Start-Up the refrigeration system by switching ON the Howe Flaker rocker switch.**
7. Confirm the heater amperage draw is about 0.2 amperes. Use a handheld Infrared thermometer to confirm the heating element is thermally hot.

Evaporator Pressure Setting

Model	Temperature	R-404A
1000-SCAE	0°F	33 PSI

Evaporator Pressure Regulator (EPR)

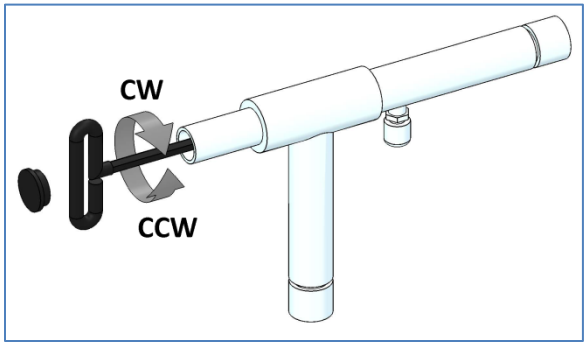
EPR valves will be factory set, however, different applications may require the correct setting be verified.

The EPR will hold the suction temperature at the proper level, allowing for minor adjustments to be made using the Thermostatic Expansion Valve (TXV).

Even though the suction temperature at the Evaporator is correct, the TXV may still be underfeeding or overfeeding.

To read EPR setting install service manifold at the Pressure Tap of the Evaporator or at the inlet of the EPR. Alternatively, the Evaporator pressure is displayed on the Touchscreen Display whenever the machine is in Machine Running condition.

For Angle Style EPR, remove end cap and adjust using a 1/4" hex wrench.



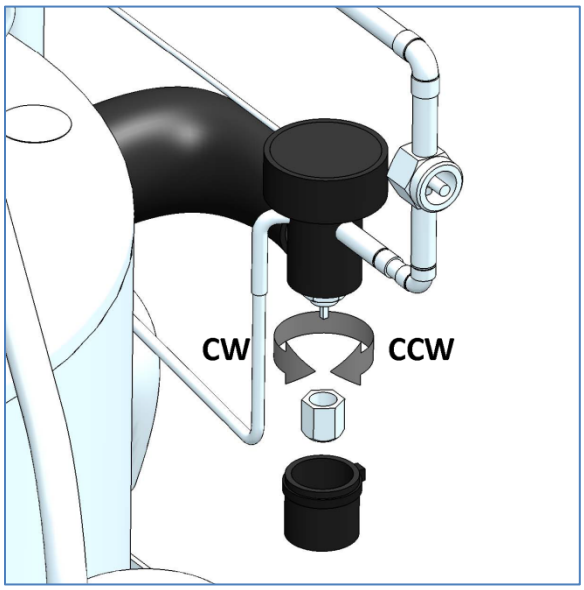
To increase the pressure setting, rotate clockwise.

To decrease the pressure setting, rotate counter-clockwise.

If EPR fails to regulate pressure properly it must be repaired or replaced.

Thermostatic Expansion Valve (TXV)

Always adjust the EPR prior to adjusting the TXV.



Superheat is not a reliable method of adjusting TXV on Ice Flaker. TXV must be adjusted while visually inspecting the Evaporator's freezing surface.

To increase the refrigerant feed of the TXV, rotate stem counterclockwise.

To decrease the refrigerant feed of the TXV, rotate stem clockwise.

Adjusting Refrigeration to the Ice Flaker

1. Visually inspect the frost pattern on the freezing surface of the Evaporator.

   If the TXV is underfeeding, the top of the frost pattern will be a milky white color and the bottom will be clear, soft, and not harvest properly.

TXV Underfeeding

2. If the TXV is not underfeeding, close the TXV by 1/4 of a turn and wait 5 minutes.

3. Visually inspect the frost pattern of the Evaporator.

4. Repeat steps #2 and #3 until underfeeding can be seen at the very bottom of the Evaporator.

5. Now, open the TXV by 1/4 of a turn and wait 5 minutes.

6. Repeat step #5 until the entire frost pattern of the Evaporator becomes milky white and harvests completely.

7. Confirm correct EPR setting.

Solenoid Valve

The Solenoid Valve controls the flow of liquid refrigerant to the Evaporator.

The Solenoid Valve should energize immediately upon starting the Ice Flaker.

Sight Glass

The Sight Glass provides a quick way to visually check that the Ice Flaker is being provided with constant liquid refrigerant and that there is no moisture in the system.

There should never be bubbles in the Sight Glass. This indicates a flashing or inconsistent liquid feed.

The moisture indicator in the middle of the Sight Glass should always be green.

- Green – Dry
- Yellow – Wet

Fan Cycling Control

Both condensing unit fans should run automatically whenever the Compressor is running.

Field Capacity Check

The Ice Flaker is a continuous production machine and makes ice at a steady rate once stabilized.

A Capacity Check confirms the Ice Flaker and refrigeration settings are correct.

1. Choose an appropriately sized container and weigh it while empty.

Container Weight _____ Lbs.

2. Run the Ice Flaker for 10 minutes.
3. Position the container below the opening of the Ice Flaker.
4. Catch the falling ice in the container for exactly 15 minutes. Be sure that the container catches all of the ice.
5. Weigh the ice and the container together in pounds using an accurate scale. Do not drain before weighing.

Measured Weight _____ Lbs.

6. Subtract the weight of the container.

Measured Weight		(from #5)
- Container Weight	-	(from #1)
= Calculated Weight	=	Lbs.

7. Calculate the capacity by multiplying the calculated weight by 96.

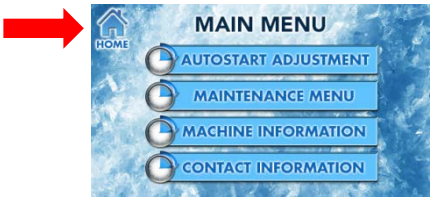
Calculated Weight		(from #6)
x 96	x 96	
= Capacity	=	Lbs. per 24 hrs.

8. Compare the number with the rated capacity of the Ice Flaker. Keep in mind temperatures outside the rated conditions will have an effect on the capacity.

Howe Digital Touchscreen Controller

The Howe Digital Touchscreen Controller is shipped pre-wired and pre-programmed for your application from the factory. Upon startup, some adjustment of the TX and EPR valves may be necessary depending on your installation. When supplied power, the Main Power Switch can be flipped to the ON position to illuminate the controller and ready the device for further commands. The Main Power Switch alone will never turn on the Ice Flaker Head.

When at rest, the controller will default to the Home Screen. The Home Screen indicates the time remaining until the programmable Autostart is reached and the current Status of the machine. The Autostart feature is disabled with factory default settings, displaying "--:--:--" time until Autostart. When navigating the Menus of the controller, the Home Screen can be reached at any time by clicking the HOME icon in the upper left corner of the display.



While navigating away from the Home Screen, if the display is at rest for longer than 15 seconds, the Controller will automatically return to the most recent screen displayed. This will continue to occur until the display receives input from the operator or the Home Screen is reached.

Getting Started

When initially installed and powered ON, the end user should set the Local Time and Autostart Adjustment parameters found in the Menus of the Controller.

To set the Local Time:

1. Press the MAIN MENU button on the Hold Screen.

2. Press the MAINTENANCE MENU button within the Main Menu.

3. Press the SET LOCAL TIME button within the Maintenance Menu.

4. Using the arrows found to the right of the dialog boxes, set your Local Time and Date and press DONE.

When complete, the Controller will revert to the Home Screen.

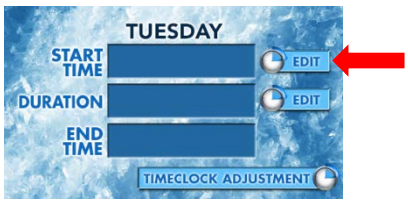
To adjust Autostart function

1. Press the MAIN MENU button on the Hold Screen.

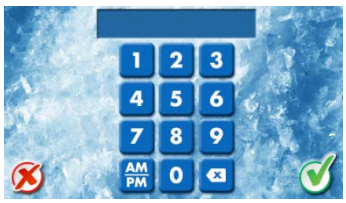
2. Press the AUTOSTART ADJUSTMENT button within the Main Menu.

3. Press the day of the week you would like to adjust.

4. Press the EDIT buttons to set Start Time and Run Time for that day.



5. Use the keypad to set Start Time and Run Time for that day. Press the green ✓ when complete. Repeat for each day as necessary.

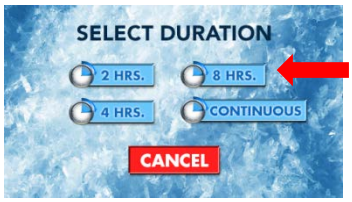


For Normal Operation, there are two ways the controller can command the Flaker to begin producing Ice.

1. *The START NOW button on the Home Screen.*

   When pressed, this acts button as a manual override to the in-built Automatic Start Timer and can be used to begin producing ice whenever the machine is in READY status.

   Once pressed, the controller will prompt you for a run time. Select desired duration and the flaker will immediately begin generating ice.



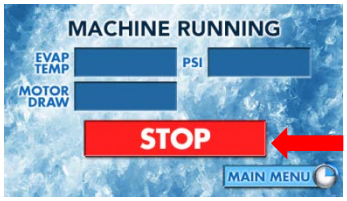
2. *The Autostart time is reached, as displayed on the Home Screen.*

   The Autostart feature is a field-programmable Internal Clock Timer that can be used to set daily start and run times for the Flaker. Each day of the week can be programmed with a unique Autostart time and Run Time length. The Autostart feature is disabled with factory default settings, displaying "--:--:--" time until Autostart.

Under Normal Conditions, there are three ways that the controller can command the Flaker to stop producing ice and go into Pump Down condition.

1. *Manual Stop.*

   At any time during regular operation, the machine can be commanded to stop producing ice, interrupting the internal Autostart feature. Press the STOP button on the Machine Running screen. Once manually interrupted, the Autostart function for that day is considered expired.



2. *Autostart/Manual Duration expires.*

   When the machine has met the field-programmed timer duration, the machine will automatically begin Pump Down sequence.

3. *Photoeyes interrupted/Bin Full condition.*

   Machine will automatically begin the Pump Down sequence when the photoeyes cannot 'see' one another – typically indicating the Ice Bin has been filled. If the Ice Bin is emptied and the Autostart timer has not expired, the machine will automatically begin producing ice again until either of the conditions are met.

When the Flaker initiates a Stop/Pumpdown cycle under any of the above-listed circumstances, three things will occur:

a. Solenoid will be de-energized, cutting off liquid refrigerant to the expansion valve.
b. The Compressor and Fans will continue to run until factory-set "Cut-Out" pressure is achieved (evacuating the suction side of refrigerant).
c. The Main Drive Motor and Water Pump will continue to run for 90 seconds to ensure the flaker is cleared of ice before the next run cycle.

Alarms and Alarm History

There are a number of factory-programmed Alarms included within the Howe Digital Touchscreen Controller that will display an ALARM screen under specific undesirable conditions – indicating specifically what condition triggered the Alarm. If an ALARM screen is displayed, a capable Refrigerant Technician should investigate the problem immediately. To continue to operate the machine, press the OK acknowledgement icon in the corner of the ALARM screen.

When acknowledged, all Alarm conditions will be saved and can be reviewed in the ALARM HISTORY screen, available in under the MAINTENANCE MENU. To access the ALARM HISTORY:

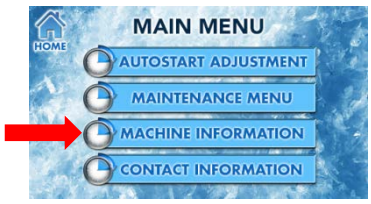
1. *Press the MAIN MENU button.*

2. *Press the MAINTENANCE MENU.*

3. *Press the ALARM HISTORY button to access the Alarm History screen.*

Preventative Maintenance and Automatic Clean Cycle

The Howe Digital Touchscreen Controller has an internal clock that records Running Hours and informs the operator when a PM Service is due. Total Run Hours can be found in the MACHINE INFORMATION Screen under the Main Menu.



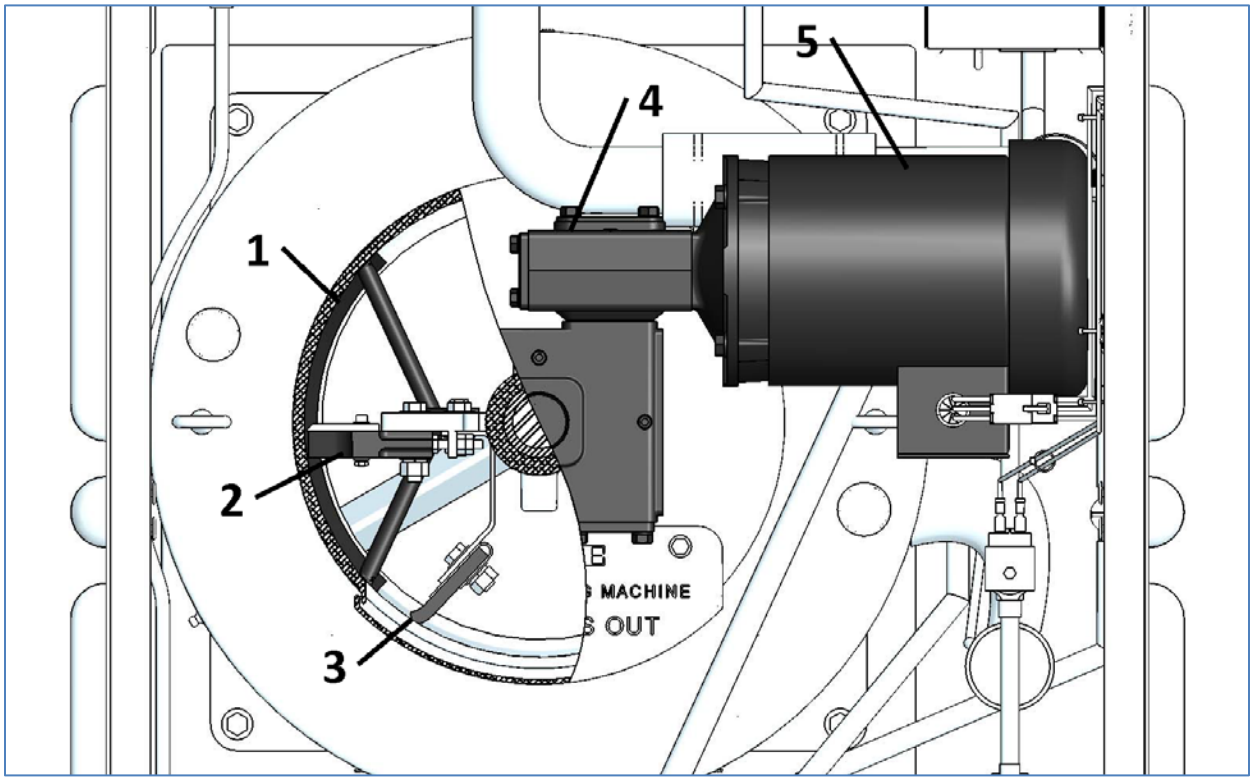
When a PM Service is nearly due, an automatic ATTENTION screen will appear, indicating the specifics of the PM Service that is due. Please refer to the Howe product Installation and Service Manual for how to conduct the PM. Only qualified Refrigeration Technicians should perform the PM Service. To continue to operate the machine, press the OK acknowledgement icon in the corner of the ATTENTION screen. Acknowledgement of the PM notification will be recorded in the ALARM HISTORY screen, found in the MAINTENANCE MENU.

When performing the Descaling and Sanitizing Preventative Maintenance service, please consult the product Owner's Service Manual for more information to ensure that no cleaning solution contaminates otherwise usable ice that may be stored beneath the Flaker. To access the Automatic Cleaning Cycle within the controller, follow the steps below:

1. *Press the MAINTENANCE MENU button within the Main Menu.*

2. Press the AUTOMATIC CLEAN CYCLE button within the Maintenance Menu. The Machine will begin its cleaning cycle for 30 minutes and indicate time remaining on the cycle.

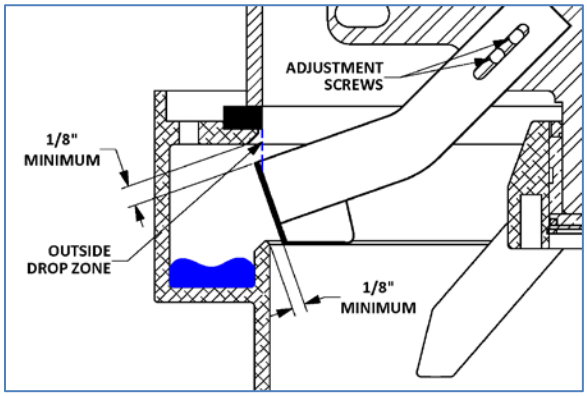
Mechanical Operation



1. Ice Deflector
2. Ice Blade
3. Squeegee
4. Speed Reducer
5. Drive Motor

Ice Deflector

The Ice Deflector prevents ice from dropping into the water return trough.



A properly installed Ice Deflector should have the top outer edge positioned outside of the ice drop zone to ensure all falling ice will hit the Ice Deflector.

There should be a minimum 1/8” clearance between the top of the Ice Deflector and the aluminum lip of the Bottom Casting under the Evaporator.

There should also be a minimum 1/8” clearance between the outer edge of the Ice Deflector and the Bottom Casting.

The Ice Deflector should never touch the Ice Deflector Scraper or the Bottom Casting.

Ice Blade

The Ice Blade shatters the ice formed on the Evaporator freezing surface as the Main Shaft rotates.

Ice harvesting problems are often caused by improper refrigeration settings. Adjusting the Ice Blade should be a last resort after all other means have been expended.

Gear Motor

The Gear Motor is a drive motor and speed reducer combined into one single unit.

You should never try to remove the motor or open the housing of the Gear Motor.

Sleeve Bearings

Ice Flakers have two Sleeve Bearings on the Main Shaft located in the Top Casting and the Bottom Casting.

Over time, normal usage can cause these bearings to wear.

Worn bearings can result in ice harvesting problems and even damage to the Evaporator.

Improper refrigeration setting and lack of maintenance can cause the Sleeve Bearings to wear faster than normal.

Please contact Howe to receive the Sleeve Bearing Replacement Instructions for your model Ice Flaker.

Start-Up Checklist

1. **Have you followed the Pre-Start up Refrigeration System Checklist?**
   (see Pre-Start up Refrigeration System Checklist p.15)
2. **Is the operating water level in the Water Sump correct?**
   (see Float Valve p.10)
3. **Is the operating water level in the Water Distribution Pan correct?**
   (see Water Distribution Pan p.11)
4. **Is the Stop Valve on Sump Drain connection closed?**
   (see Stop Valve p.10)
5. **Is the Suction Temperature at the Evaporator correct?**
   (see Evaporator Pressure Setting p.16)
6. **Have you visually inspected the freezing surface of the Evaporator?**
   (see Adjusting Refrigeration to the Ice Flaker p.17)
7. **Have you run a Field Capacity Check?**
   (see Field Capacity Check p.18)
8. **Have you completed and returned the Ice Flaker warranty registration?**

Maintenance

Preventative Maintenance Schedule

	Page Number	Every 6 Months	Every 12 Months
Ensure Float Valve is unclogged and flowing freely	3	•	
Clean and Sanitize Ice Flaker	30	•	
Replace Water Filter Cartridge	33	•	
Run a Field Capacity Check	18		•
Check Main Shaft for movement and Sleeve Bearing wear	27		•
Lubricate Sleeve Bearings	32		•

Cleaning Procedure

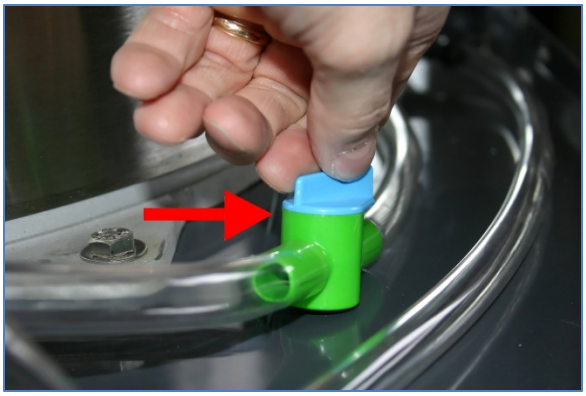
To keep the evaporator in peak performance, the Ice Flaker should be cleaned every 6 months or as the touchscreen controller dictates.

Only use cleaning solutions that are labeled as "Nickel-Safe".

1. Turn the Power Switch "Off" at the Ice Flaker Control Panel.

2. Remove all ice from Ice Bin.

3. Close water supply at shut-off valve.



4. Open Ice Flaker Stop Valve to allow water to exit from Water Sump. Afterwards close Stop Valve to prevent loss of solution.

5. Prepare approved cleaning solution by following manufacturer's instructions.

6. Pour cleaning solution into Water Sump to a level just below the side opening.

7. Initiate the AUTOMATIC CLEAN CYCLE found within the controller menus.

8. After cleaning, drain solution as shown in Step 4 except keep Stop Valve open.

9. Fill Water Sump with fresh water. Initiate the AUTOMATIC CLEAN CYCLE found within the controller menus. This will flush cleaning solution from Ice Flaker while it is being drained.

10. Continue filling Water Sump with fresh water until all cleaning solution is flushed out.

Sanitizing Procedure

1. Mix 16 oz. of household bleach with 2 gallons of warm water (90°F – 115°F).

2. Pour solution into the Water Sump to the normal operating level, then re-circulate the sanitizing solution by using the preprogrammed AUTOMATIC CLEAN CYCLE feature found in the Controller Menus.

3. Drain solution and rinse thoroughly with fresh water at least twice, following the technique described in Cleaning Procedure #9.

4. After the Ice Flaker is thoroughly rinsed, return to normal operation by opening water supply valve, re-adjusting Off-Delay Setting, and restoring refrigeration by turning the Power Switch back to “On”.

Alternate Method: Substitute an approved sanitizer designed for general use in food dispensing equipment in Step 1. Mix sanitizing solution according to instructions on the bottle.

Lubrication

Gear Motor Lubrication

The Gear Motor is permanently lubricated and does not normally require re-lubrication.

Sleeve Bearing Lubrication

The bearings should be greased annually using USDA approved food grade edible grease.

Typically, only one squirt of the grease gun is required or until you feel resistance on the pump.

Use caution to ensure the bearings is not over-greased.

Over-greasing may “pop” the seal out of its normal position.

If over-greased and the seal is popped out of position, the excess grease will need to be removed prior to re-installing the seal.

If seal is damaged due to over-greasing it may need to be replaced.

Water Filtration

The purpose of water filtration is to keep the Ice Flaker clean and operating efficiently.

The value to the user is reduced operating cost due to less maintenance, improved performance and a greater return on investment as result of extended asset life.

There are three primary categories of contaminants that damage and cause the Ice Flaker to operate inefficiently. They are listed here in order of importance with regard to impact.

1. Scale
2. Sediment
3. Chlorine

Scale

Scale or fouling is the accumulation of unwanted material on solid surfaces to the detriment of function. Scale is primarily made up of calcium and magnesium hardness compounds.

It's estimated that scale is responsible for 70% of unscheduled maintenance, inefficient operation, and down time.

Scale forms on wetted surfaces, accumulates in tubing and fittings and interferes with operation.

Sediment

The formation of scale from dissolved minerals is made worse by sediment.

Sediment is suspended particles of dirt, silt and other fine particulate matter that act as a catalyst for scale to form.

Sediment can be detrimental to the condition and performance of the Ice Flaker. Particulates cause added wear on parts and can clog valves and impede flow.

The effects of scale and sediment can be very destructive to the Ice Flaker.

Chlorine

Chlorine is the most common disinfectant used to kill pathogenic organisms in order to make our water safe to drink. However, residual free chlorine in water can contribute to pitting, rust and corrosion of stainless steel.

If not removed from water, chlorine mixes with moisture in the Ice Flaker and Ice bin to form a mild hydrochloric acid. This acid can cause surface rust to form on stainless steel surfaces in one to two years.

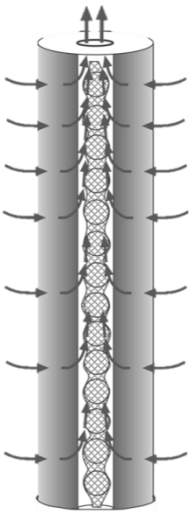
Howe Water Filters

Howe offers a complete line of water treatment systems designed to extend the life and performance of the Ice Flaker.

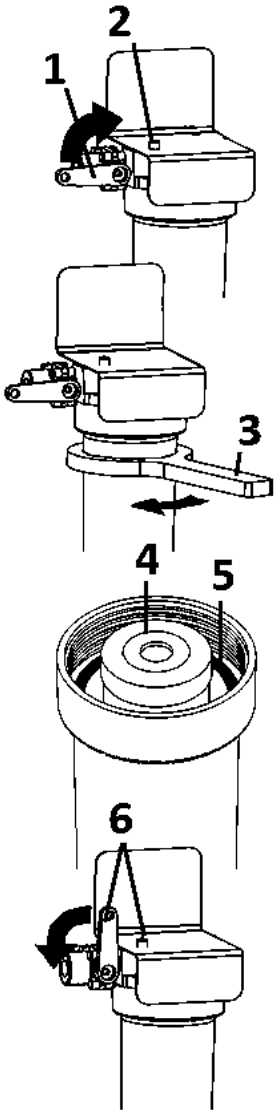
Howe Water Filters inhibit the formation of scale and provides additional corrosion protection.

They remove 95% of all dirt, rust, and sediment larger than 5 microns.

They reduce chlorine to less than 2 PPM to guard against corrosion and improve ice quality.



Water Filter Cartridge Replacement

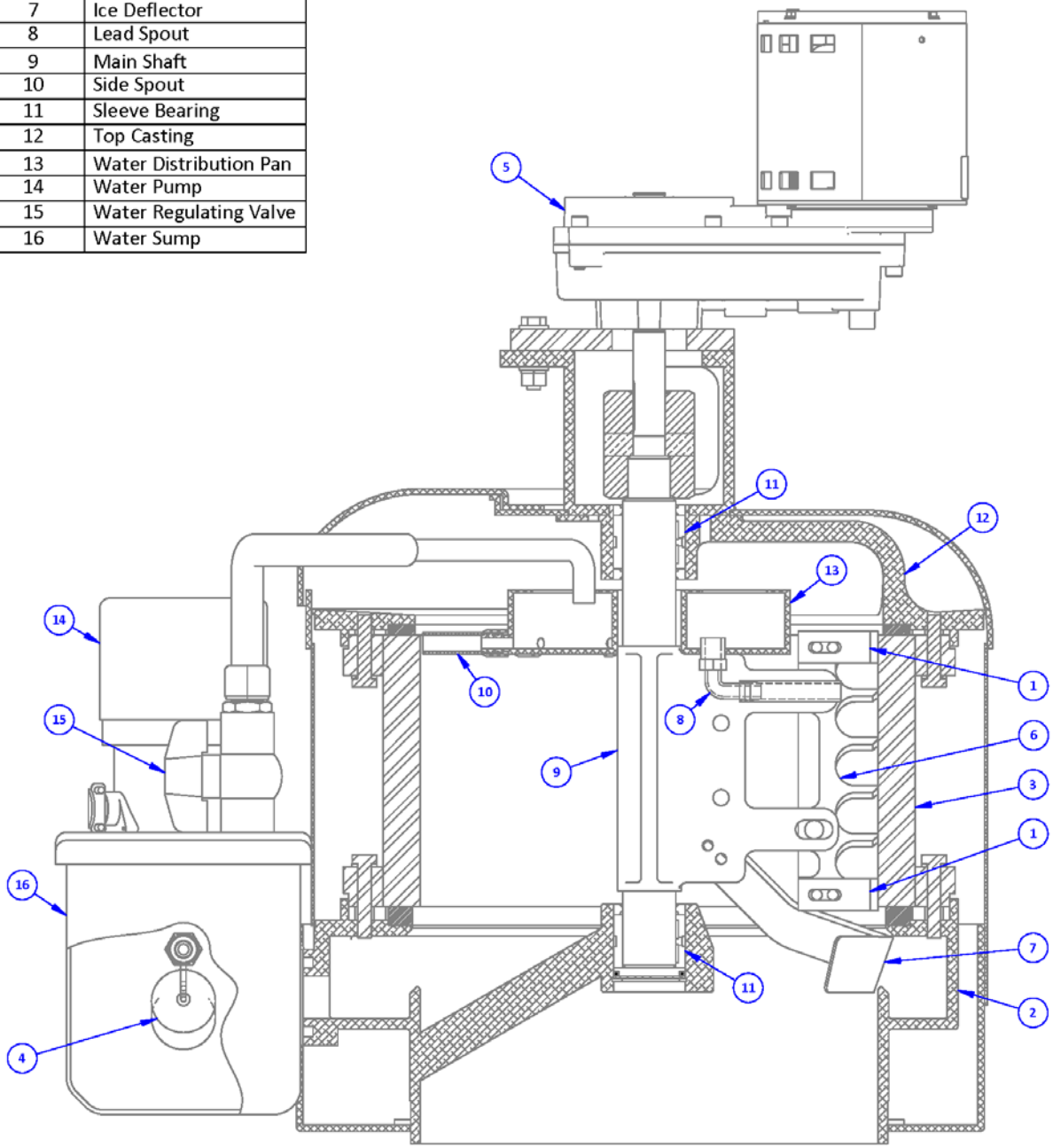


1. Turn off water filtration system by closing ball valve.
2. Press the red button to release pressure.
3. Remove housing(s) – use filter wrench if necessary. Clean housings with warm water. If desired, disinfect housings using 1/2 teaspoon of household bleach in a bowl of water. Let stand 5 minutes, and then discard.
4. Insert new cartridges into filter housings. Match cartridge model numbers to model numbers on bracket.
5. Make certain the O-ring is properly positioned and reinstall filter housing (hand tighten only).
6. Slightly open the inlet ball valve; push the red pressure relief button to release trapped air until a small amount of water comes out – release the red button and fully open the ball valve.
7. Turn connected equipment back on.

Appendix

Cut View – 1000-RLE

Item No.	Part Description
1	Auxiliary Ice Scraper
2	Bottom Casting
3	Evaporator
4	Float Valve
5	Gear Motor
6	Ice Blade
7	Ice Deflector
8	Lead Spout
9	Main Shaft
10	Side Spout
11	Sleeve Bearing
12	Top Casting
13	Water Distribution Pan
14	Water Pump
15	Water Regulating Valve
16	Water Sump



Wiring Diagram – Ice Flaker

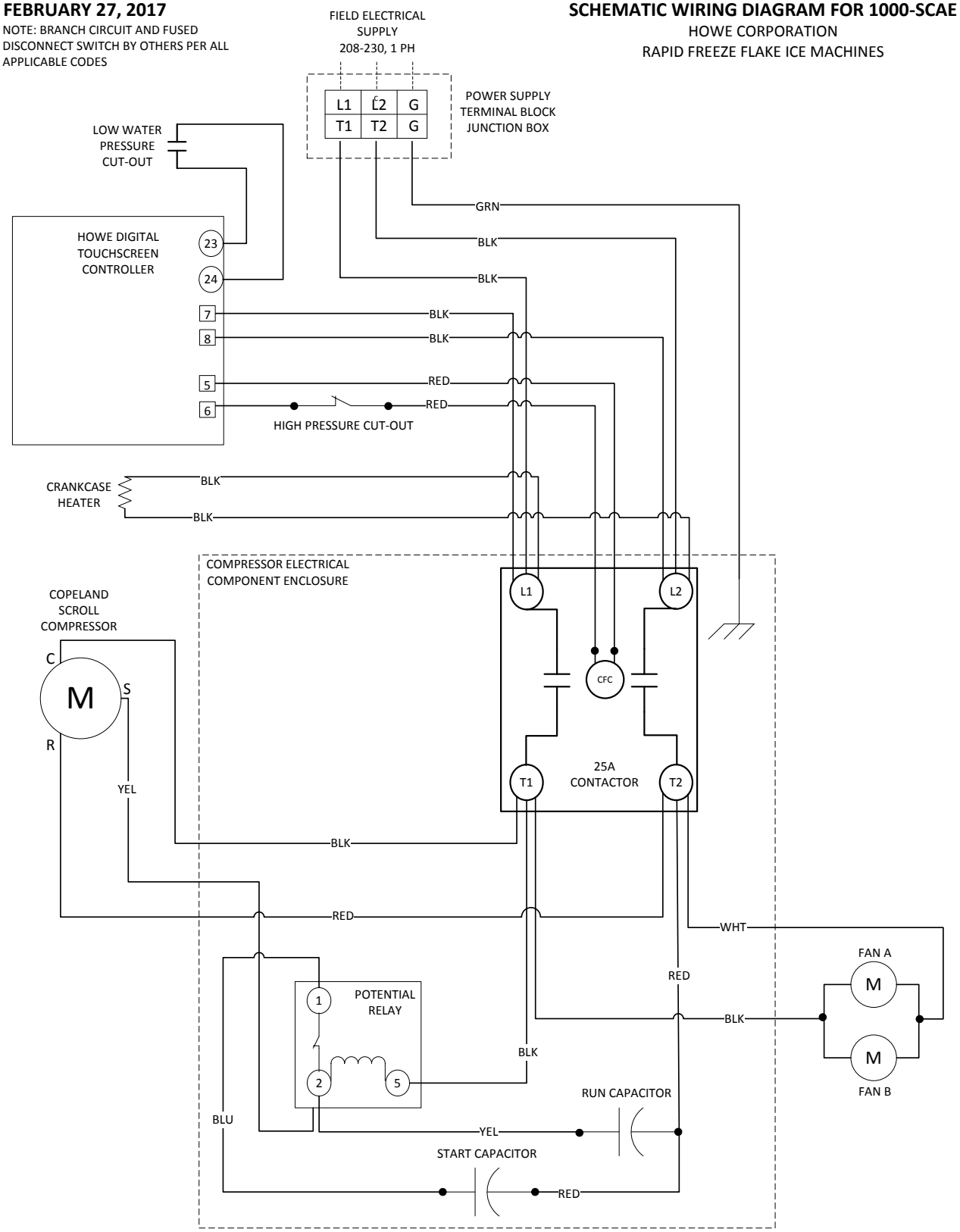
FEBRUARY 27, 2017

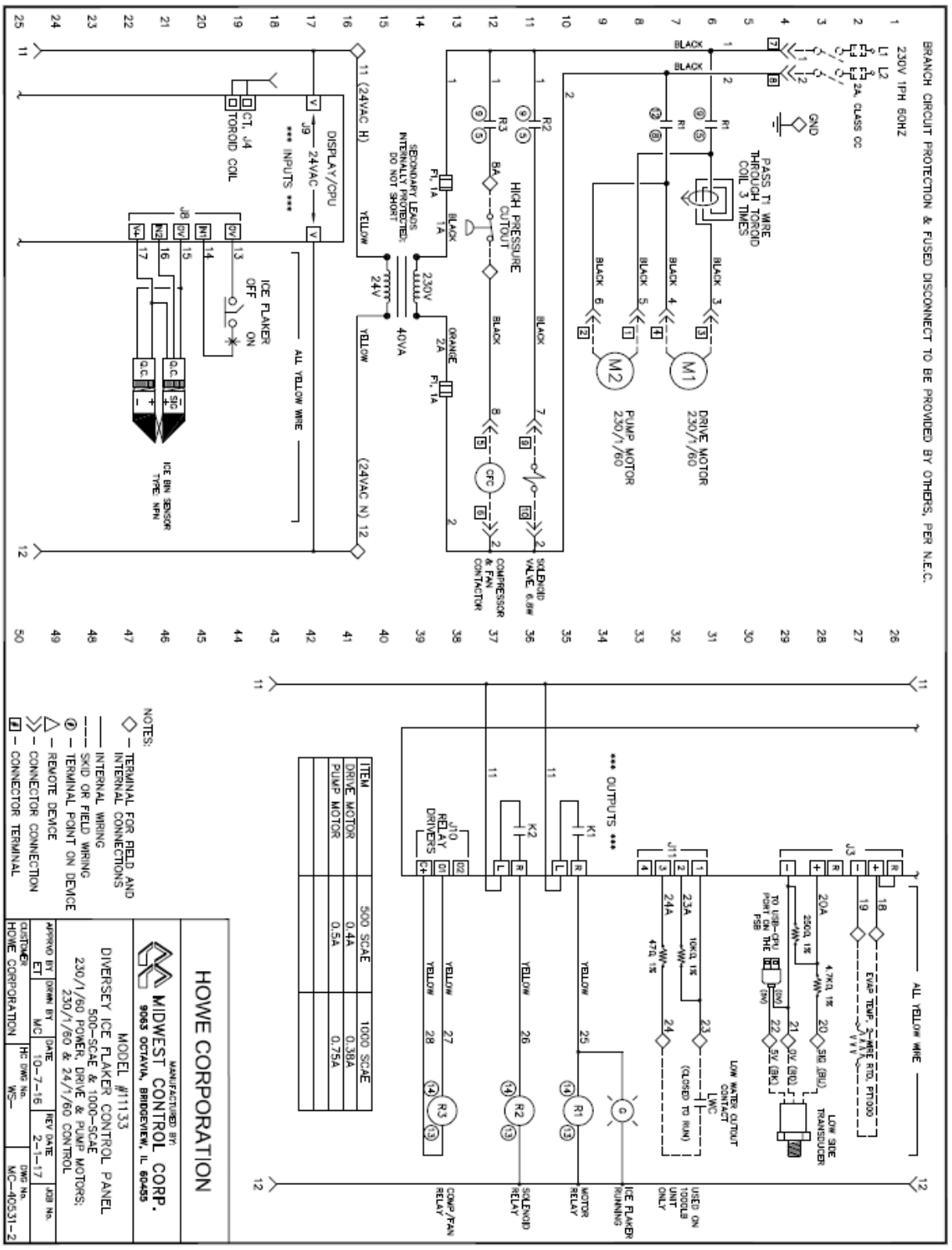
NOTE: BRANCH CIRCUIT AND FUSED DISCONNECT SWITCH BY OTHERS PER ALL APPLICABLE CODES

SCHEMATIC WIRING DIAGRAM FOR 1000-SCAE

HOWE CORPORATION

RAPID FREEZE FLAKE ICE MACHINES




BRANCH CIRCUIT PROTECTION & FUSED DISCONNECT TO BE PROVIDED BY OTHERS, PER N.E.C.
230V 1PH 60HZ
L1 L2
2A, CLASS CC
GND
PASS T1 WIRE THROUGH TOROID COIL 3 TIMES
BLACK
HIGH PRESSURE CUTOUT
DRIVE MOTOR 230/1/60
PUMP MOTOR 230/1/60
SECONDARY LEADS INTERNALLY PROTECTED; DO NOT SHORT
F1, 1A
230V
24V
40VA
ORANGE
YELLOW
ALL YELLOW WIRE
SOLENOID VALVE, 6.8W
COMPRESSOR & FAN CONTACTOR
DISPLAY/CPU
24VAC
*** INPUTS ***
CT, J4
TOROID COIL
ICE FLAKER OFF ON
ICE BIN SENSOR TYPE: NPN
(24VAC H)
(24VAC N) 12
*** OUTPUTS ***
EVAP TEMP. 2-WIRE RTD, PT1000
LOW SIDE TRANSDUCER
LOW WATER CUTOUT CONTACT
LWC
(CLOSED TO RUN)
USED ON 1000LB UNIT ONLY
ICE FLAKER RUNNING
MOTOR RELAY
SOLENOID RELAY
COMP/FAN RELAY
J10 RELAY DRIVERS
ITEM
DRIVE MOTOR
PUMP MOTOR
500 SCAE
0.4A
0.5A
1000 SCAE
0.38A
0.75A
NOTES:
◇ – TERMINAL FOR FIELD AND INTERNAL CONNECTIONS
—— INTERNAL WIRING
– – – SKID OR FIELD WIRING
Ⓐ – TERMINAL POINT ON DEVICE
△ – REMOTE DEVICE
≫ – CONNECTOR CONNECTION
▣ – CONNECTOR TERMINAL
HOWE CORPORATION
MANUFACTURED BY:
MIDWEST CONTROL CORP.
9063 OCTAVIA, BRIDGEVIEW, IL 60455
MODEL #11133
DIVERSEY ICE FLAKER CONTROL PANEL
500-SCAE & 1000-SCAE
230/1/60 POWER, DRIVE & PUMP MOTORS;
230/1/60 & 24/1/60 CONTROL
APPROVED BY: ET
DRAWN BY: MC
DATE: 10-7-16
REV DATE: 2-1-17
CUSTOMER: HOWE CORPORATION
HC DWG No.: WS-
DWG No.: MC-40531-2