

# **KOOLAIRE®**

## **K, KP & KT Models Air/Water/Remote Condenser Modular Ice Machines**

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### **Technician's Handbook**





# Safety Notices

## **Read these precautions to prevent personal injury:**

- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, injury or death.
- Routine adjustments and maintenance procedures outlined in this manual are not covered by the warranty.
- Proper installation, care and maintenance are essential for maximum performance and trouble-free operation of your equipment.
- Visit our website [www.kool-aire.com](http://www.kool-aire.com) for manual updates, translations, or contact information for service agents in your area.
- This equipment contains high voltage electricity and refrigerant charge. Installation and repairs are to be performed by properly trained technicians aware of the dangers of dealing with high voltage electricity and refrigerant under pressure. The technician must also be certified in proper refrigerant handling and servicing procedures. All lockout and tag out procedures must be followed when working on this equipment.
- This equipment is intended for indoor use only. Do not install or operate this equipment in outdoor areas.
- As you work on this equipment, be sure to pay close attention to the safety notices in this handbook. Disregarding the notices may lead to serious injury and/or damage to the equipment.

## Definitions

### **DANGER**

Indicates a hazardous situation that, if not avoided, will result in death or serious injury. This applies to the most extreme situations.

### **Warning**

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

### **Caution**

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

### **Notice**

Indicates information considered important, but not hazard-related (e.g. messages relating to property damage)

NOTE: Indicates useful, extra information about the procedure you are performing.

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

## **Warning**

**Follow these electrical requirements during installation of this equipment.**

- All field wiring must conform to all applicable codes of the authority having jurisdiction. It is the responsibility of the end user to provide the disconnect means to satisfy local codes. Refer to rating plate for proper voltage.
- This appliance must be grounded.
- This equipment must be positioned so that the plug is accessible unless other means for disconnection from the power supply (e.g., circuit breaker or disconnect switch) is provided.
- Check all wiring connections, including factory terminals, before operation. Connections can become loose during shipment and installation.

## **DANGER**

Do not operate equipment that has been misused, abused, neglected, damaged, or altered/modified from that of original manufactured specifications. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision concerning use of the appliance by a person responsible for their safety. Do not allow children to play with, clean or maintain this appliance without proper supervision.

## **Warning**

**Follow these precautions to prevent personal injury during installation of this equipment:**

- Installation must comply with all applicable equipment fire and health codes with the authority having jurisdiction.
- Connect to a potable water supply only.
- To avoid instability the installation area must be capable of supporting the combined weight of the equipment and product. Additionally the equipment must be level side to side and front to back.
- Remove all removable panels before lifting and installing and use appropriate safety equipment during installation and servicing. Two or more people are required to lift or move this appliance to prevent tipping and/or injury.
- Do not damage the refrigeration circuit when installing, maintaining or servicing the unit.
- This equipment contains refrigerant charge. Installation of the line sets must be performed by a properly trained and EPA certified refrigeration technician aware of the dangers of dealing with refrigerant charged equipment.
- Ice machines require a deflector when installed on an ice storage bin. Prior to using a non-OEM ice storage system with this ice machine, contact the bin manufacturer to assure their ice deflector is compatible.
- Prior to installing a non-OEM ice storage system with this ice machine, follow the manufacturers installation procedures and verify the location and installation meets the local/national mechanical codes and stability requirements.

## **Warning**

**Follow these precautions to prevent personal injury while operating or maintaining this equipment.**

- Refer to nameplate to identify the type of refrigerant in your equipment.
- Only trained and qualified personnel aware of the dangers are allowed to work on the equipment.
- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, injury or death.
- Crush/Pinch Hazard. Keep hands clear of moving components. Components can move without warning unless power is disconnected and all potential energy is removed.
- Moisture collecting on the floor will create a slippery surface. Clean up any water on the floor immediately to prevent a slip hazard.
- Never use sharp objects or tools to remove ice or frost. Do not use mechanical devices or other means to accelerate the defrosting process.
- When using cleaning fluids or chemicals, rubber gloves and eye protection (and/or face shield) must be worn.
- Objects placed or dropped in the bin can affect human health and safety. Locate and remove any objects immediately.

## **DANGER**

### **Follow these precautions to prevent personal injury during use and maintenance of this equipment:**

- It is the responsibility of the equipment owner to perform a Personal Protective Equipment Hazard Assessment to ensure adequate protection during maintenance procedures.
- Do Not Store Or Use Gasoline Or Other Flammable Vapors Or Liquids In The Vicinity Of This Or Any Other Appliance. Never use flammable oil soaked cloths or combustible cleaning solutions for cleaning.
- All covers and access panels must be in place and properly secured when operating this equipment.
- Risk of fire/shock. All minimum clearances must be maintained. Do not obstruct vents or openings.
- Failure to disconnect power at the main power supply disconnect could result in serious injury or death. The power switch DOES NOT disconnect all incoming power.
- All utility connections and fixtures must be maintained in accordance with the authority having jurisdiction.
- Turn off and lockout all utilities (gas, electric, water) according to approved practices during maintenance or servicing.
- Do not store or use electrical appliances inside the ice machine or ice storage areas.

## **DANGER**

**Follow these flammable refrigeration system requirements during installation, use or repair of this equipment:**

- Refer to nameplate - Ice machine models may contain up to 500 grams of R290 (propane) refrigerant. R290 (propane) is flammable in concentrations of air between approximately 2.1% and 9.5% by volume (LEL lower explosion limit and UEL upper explosion limit). An ignition source at a temperature higher than 470°C is needed for a combustion to occur. Refer to nameplate to identify the type of refrigerant in your equipment.
- To minimize the risk of ignition due to improper installation, replacement parts or service procedures, only refrigeration technicians with flammable refrigerant training who are aware of the dangers of dealing with high voltage electricity and refrigerant under pressure are allowed to work on this equipment.
- All replacement parts must be like components obtained from the equipment manufacturers authorized replacement part network.
- This equipment must be installed in accordance with the ASHRAE 15 Safety Standard for Refrigeration Systems.
- This equipment can not be installed in corridors or hallways of public buildings.
- Installation must comply with all applicable equipment fire and health codes with the authority having jurisdiction.

## DANGER

**Follow these flammable refrigeration system requirements during installation, use or repair of this equipment:**

- Minimum room size may be required; refer to ice machine label.
- Multiple R290 units can be installed in a single room but their cumulative refrigerant charge must be considered when determining safe room size.
- All lockout and tag out procedures must be followed when working on this equipment.
- This equipment contains high voltage electricity and refrigerant charge. Shorting electrical wires to refrigeration tubing may result in an explosion. All electrical power must be disconnected from the system before servicing the system. Refrigerant leaks, can result in serious injury or death from explosion, fire, or contact with refrigerant or lubricant mists.
- Do not damage the refrigeration circuit when installing, maintaining or servicing the unit. Never use sharp objects or tools to remove ice or frost. Do not use mechanical devices or other means to accelerate the defrosting process.
- Well-ventilated areas are recommended for installation and storage.
- Leak pressure, leak hole size, wind speed, and the presence of objects like furniture within the room can also affect the concentration and distribution of R290 during a leak.

## DANGER

### **Follow these precautions to prevent personal injury during use and maintenance of this equipment:**

- Units with two power cords must be plugged into individual branch circuits. During movement, cleaning or repair it is necessary to unplug both power cords.
- Never use a high-pressure water jet for cleaning on the interior or exterior of this unit. Do not use power cleaning equipment, steel wool, scrapers or wire brushes on stainless steel or painted surfaces.
- Two or more people are required to move this equipment to prevent tipping.
- Locking the front casters after moving is the owner's and operator's responsibility. When casters are installed, the mass of this unit will allow it to move uncontrolled on an inclined surface. These units must be tethered/secured to comply with all applicable codes.
- The on-site supervisor is responsible for ensuring that operators are made aware of the inherent dangers of operating this equipment.
- Do not operate any appliance with a damaged cord or plug. All repairs must be performed by a qualified service company.

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# General Information

## Model Numbers

This manual covers the following models:

### KP MODELS

| Self-Contained Air-Cooled | Self-Contained Water-Cooled |
|---------------------------|-----------------------------|
| KDP0300A                  | ----                        |
| KYP0300A                  | ----                        |
| KDP0400A                  | KDP0400W                    |
| KYP0400A                  | KYP0400W                    |
| KDP0420A                  | KDP0420W                    |
| KYP0420A                  | KYP0420W                    |
| KDP0500A                  | KDP0500W                    |
| KYP0500A                  | KYP0500W                    |
| KDP0700A                  | KDP0700W                    |
| KYP0700A                  | KYP0700W                    |
| KDP1000A                  | KDP1000W                    |
| KYP1000A                  | KYP1000W                    |

### KT MODELS

| Self-Contained Air-Cooled | Self-Contained Water-Cooled | Remote   |
|---------------------------|-----------------------------|----------|
| KDT0300A                  | ----                        | ----     |
| KYT0300A                  | ----                        | ----     |
| KDT0400A                  | KDT0400W                    | ----     |
| KYT0400A                  | KYT0400W                    | ----     |
| KDT0420A                  | KDT0420W                    | ----     |
| KYT0420A                  | KYT0420W                    | ----     |
| KDT0500A                  | KDT0500W                    | ----     |
| KYT0500A                  | KYT0500W                    | ----     |
| KDT0700A                  | KDT0700W                    | ----     |
| KYT0700A                  | KYT0700W                    | ----     |
| KDT1000A                  | KDT1000W                    | KDT1000N |
| KYT1000A                  | KYT1000W                    | KYT1000N |
| KDT1700A                  | KDT1700W                    | KYT1700N |
| KYT1700A                  | KYT1700W                    | KDT1700N |

## K MODELS

| Self-Contained<br>Air-Cooled | Self-Contained<br>Water-Cooled | Remote  |
|------------------------------|--------------------------------|---------|
| KD0250A                      | ----                           | ----    |
| KY0250A                      | ----                           | ----    |
| KD0350A                      | KD0350W                        | ----    |
| KY0350A                      | KY0350W                        | ----    |
| KD0420A                      | KD0420W                        | ----    |
| KY0420A                      | KY0420W                        | ----    |
| KD0500A                      | KD0500W                        | ----    |
| KY0500A                      | KY0500W                        | ----    |
| KD0600A                      | KD0600W                        | ----    |
| KY0600A                      | KY0600W                        | ----    |
| KD1000A                      | KD1000W                        | KY1000N |
| KY1000A                      | KY1000W                        | KD1000N |
| KD1350A                      | KD1350W                        | KY1350N |
| KY1350A                      | KY1350W                        | KD1350N |
| KD1800A                      | KD1800W                        | KY1800N |
| KY1800A                      | KY1800W                        | KD1800N |

## Ice Machine Warranty Information

### Warranty

For warranty information visit:

[www.kool-aire.com/Service/Warranty](http://www.kool-aire.com/Service/Warranty)

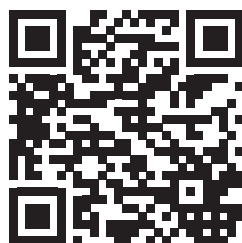
- Warranty Coverage Information
- Warranty Registration
- Warranty Verification

Warranty coverage begins the day the ice machine is installed.

### Warranty Registration

Completing the warranty registration process is a quick and easy way to protect your investment.

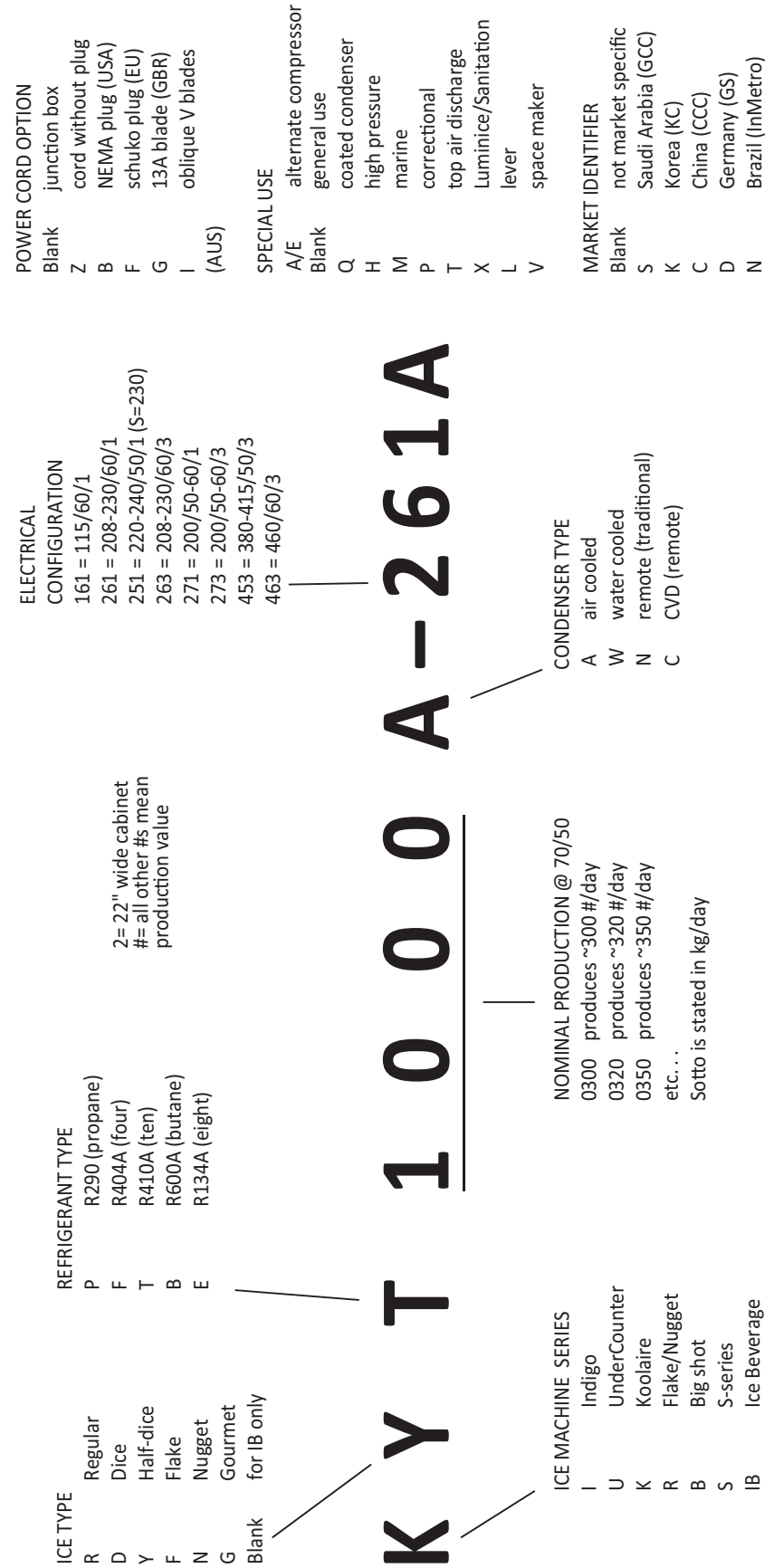
Scan the QR code with your smart device or enter the link in a web browser to complete your warranty registration.



[www.kool-aire.com/Service/Warranty](http://www.kool-aire.com/Service/Warranty)

Registering your product insures warranty coverage and streamlines the process if any warranty work is required.

# How to Read a Model Number



# Installation

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## 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 indoors and free of airborne and other contaminants.
- Air temperature: Must be at least 35°F (2°C) but must not exceed 110°F (43.4°C).
- The location must not be near heat-generating equipment or in direct sunlight and protected from weather.
- 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 (condenser air flow is in the back and out the sides). Refer to the chart for clearance requirements.
- The ice machine must be protected if it will be subjected to temperatures below 32°F (0°C). Failure caused by exposure to freezing temperatures is not covered by the warranty.
- All utilities must be within 6 feet (2 m) of the unit for installation and serviceability.

## Ice Machine Clearance Requirements

### **Warning**

Do not obstruct ice machine vents or openings.

| <b>KP0300</b> | <b>Self-Contained<br/>Air-Cooled</b> | <b>Self-Contained<br/>Water-Cooled</b> |
|---------------|--------------------------------------|----------------------------------------|
| Top/Sides     | 16" (40.6 cm)                        | n/a                                    |
| Back          | 5" (12.7 cm)*                        | n/a                                    |

| <b>KT0300<br/>KP0420</b> | <b>Self-Contained<br/>Air-Cooled</b> | <b>Self-Contained<br/>Water-Cooled</b> |
|--------------------------|--------------------------------------|----------------------------------------|
| Top/Sides                | 12" (30.5 cm)                        | n/a                                    |
| Back                     | 5" (12.7 cm)*                        | n/a                                    |

| <b>KT0400/KP0400<br/>KT0420<br/>KP0500/KT0500<br/>KP0700/KT0700<br/>KP1000/KT1000<br/>KT1700</b> | <b>Self-Contained<br/>Air-Cooled</b> | <b>Water-Cooled<br/>and Remote</b> |
|--------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|
| Top/Sides                                                                                        | 8" (20.3 cm)                         | 8" (20.3 cm)                       |
| Back                                                                                             | 5" (12.7 cm)                         | 5" (12.7 cm)                       |

| <b>K0250</b> | <b>Self-Contained<br/>Air-Cooled</b> | <b>Self-Contained<br/>Water-Cooled</b> |
|--------------|--------------------------------------|----------------------------------------|
| Top/Sides    | 12" (30.5 cm)                        | n/a                                    |
| Back         | 5" (12.7 cm)*                        | n/a                                    |

| <b>K0350 - K0420<br/>K0500 - K0600<br/>K1000 - K1350<br/>K1800</b> | <b>Self-Contained<br/>Air-Cooled</b> | <b>Water-Cooled<br/>and Remote</b> |
|--------------------------------------------------------------------|--------------------------------------|------------------------------------|
| Top/Sides                                                          | 8" (20.3 cm)                         | 8" (20.3 cm)                       |
| Back                                                               | 5" (12.7 cm)                         | 5" (12.7 cm)                       |

### **Caution**

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

## Minimum Room Size

### R290 ONLY

In order to avoid the creation of a flammable gas-air mixture if a leak in the refrigeration system occurs, the size of the room in which the machine may be installed depends on the amount of refrigerant used.

The ice machines listed below cannot be installed in hallways, public corridors, public lobbies, evacuation routes and/or small spaces.

| Model  | Minimum Room Size<br>sq ft (sq m) |                                |
|--------|-----------------------------------|--------------------------------|
|        | Self-Contained<br>Air-Cooled      | Self-Contained<br>Water-Cooled |
| KP0300 | 77.5 sq ft (7.2 sq m)             | ---                            |
| KP0400 | 87.0 sq ft (8.1 sq m)             | 77.5 sq ft (7.2 sq m)          |
| KP0420 |                                   |                                |
| KP0500 | 77.5 sq ft (7.2 sq m)             | 93 sq ft (8.6 sq m)            |
| KP0700 | 159 sq ft (14.8 sq m)             | 159 sq ft (14.8 sq m)          |
| KP1000 | 206 sq ft (19.1 sq m)             | 206 sq ft (19.1 sq m)          |

## Refrigerant Charge

### R290 ONLY

| Model  | Self-Contained<br>Air-Cooled | Self-Contained<br>Water-Cooled |
|--------|------------------------------|--------------------------------|
| KP0300 | 5.3 oz (150 g)               | ---                            |
| KP0400 | 5.9 oz (170 g)               | 5.3 oz (150 g)                 |
| KP0420 |                              |                                |
| KP0500 | 5.3 oz (150 g)               | 6.5 oz (180 g)                 |
| KP0700 | 10.9 oz (310 g)              |                                |
| KP1000 | 14.1 oz (400 g)              |                                |

Multiple R290 units can be installed in a single room, but their cumulative refrigerant charge needs to be considered when determining the safe room size.

## Ice Machine Heat of Rejection

| Series<br>Ice Machine | Heat of Rejection <sup>1</sup> |       |
|-----------------------|--------------------------------|-------|
|                       | Air Conditioning <sup>2</sup>  | Peak  |
| KP0300                | 5120                           | 6160  |
| KP0400                | 7515                           | 8905  |
| KP0420                | 7516                           | 8906  |
| KP0500                | 7515                           | 8905  |
| KP0700                | 9470                           | 11510 |
| KP1000                | 14080                          | 16340 |

| Series<br>Ice Machine | Heat of Rejection <sup>1</sup> |       |
|-----------------------|--------------------------------|-------|
|                       | Air Conditioning <sup>2</sup>  | Peak  |
| KT0300                | 4600                           | 5450  |
| KT0400                | 3800                           | 6000  |
| KT0420                | 5400                           | 6300  |
| KT0500                | 5300                           | 6100  |
| KT0700                | 12400                          | 13900 |
| KT1000 60 Hz          | 15400                          | 17100 |
| KT1000 50 Hz          | 14600                          | 16200 |
| KT1700                | 24700                          | 29000 |

| Series<br>Ice Machine | Heat of Rejection <sup>1</sup> |       |
|-----------------------|--------------------------------|-------|
|                       | Air Conditioning <sup>2</sup>  | Peak  |
| K0250                 | 4600                           | 5450  |
| K0350                 | 3800                           | 6000  |
| K0420                 | 5400                           | 6300  |
| K0500                 | 5300                           | 6100  |
| K0600                 | 9000                           | 13900 |
| K1000                 | 17000                          | 20700 |
| K1350                 | 23900                          | 29000 |
| K1800                 | 29800                          | 34700 |

1 BTU/Hour

2 Because the heat of rejection varies during the ice making cycle, the figure shown is an average.

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

## Leveling the Ice Machine

1. The leveling legs must be screwed into the bottom of the bin as far as possible.

### **Caution**

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

2. Move the bin into its final position.
3. Use a level on top of the bin. Adjust each foot as necessary and level from front to back and side to side.

## Electrical Requirements

### Voltage

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

### Fuse/Circuit Breaker

A separate electrical disconnect, which disconnects all poles and has 1/8" (3 mm) contact separation, must be provided for fixed wiring. Circuit breakers must be H.A.C.R. rated in USA.

### Total Circuit Ampacity

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

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

Refer to ice machine data plate, for electrical requirements. The ice machine data plate information overrides all other published data.

#### **Warning**

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

#### **Warning**

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

### Minimum Power Cord Specifications

| Maximum Breaker Size | Minimum Wire Size | Maximum Length of Power Cord |
|----------------------|-------------------|------------------------------|
| 15 amp               | 14 gauge          | 6 feet (1.83 m)              |
| 20 amp               | 12 gauge          | 6 feet (1.83 m)              |
| 30 amp               | 10 gauge          | 6 feet (1.83 m)              |
| 40 amp               | 8 gauge           | 6 feet (1.83 m)              |

#### **Warning**

Temporary electrical installations of more than 600 volts may be used only during periods of tests, emergencies, or construction-like activities.

Temporary wiring must be removed immediately upon completion of the project or purpose for which the wiring was installed.

## Water Service/Drains

### WATER SUPPLY

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

#### **Caution**

Do not apply heat to water inlet valve or water drain fittings. Heating will damage the nonmetallic connector. Do not over tighten fittings. Two turns after hand tight is the maximum.

#### **Warning**

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

### WATER INLET LINES

Follow these guidelines to install water inlet lines:

- Do not connect the ice machine to a hot water supply. Be sure all hot water restrictors installed for other equipment are working. (Check valves on sink faucets, dishwashers, etc.)
- If water pressure exceeds the maximum recommended pressure, 80 psig (5.5 bar) obtain a water pressure regulator from your Koolaire distributor.
- Install a water shut-off valve for ice making potable water.
- Insulate water inlet lines to prevent condensation.
- If you are installing a water filter system, refer to the Installation Instructions supplied with the filter system for ice making water inlet connections.

#### **Caution**

Plumbing must conform to state and local codes

## **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.
- Install a tee at the ice machine drain outlet and install an 18.0" (46 cm) vent above the drain line.
- Insulate drain lines to prevent condensation.
- Vent the bin and ice machine drain to the atmosphere. Do not vent the condenser drain on water-cooled models.

## **COOLING TOWER APPLICATIONS**

### **Water Cooled Models Only**

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 rejected, and the pressure drop through the condenser and water valves (inlet to 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 psig (0.48 bar) between the condenser water inlet and the outlet of the ice machine.
- Water exiting the condenser must not exceed 110°F (43.3°C).

## WATER SUPPLY AND DRAIN LINE SIZING/ CONNECTIONS

| Location                      | Water Temperature                       | Water Pressure                                  | Ice Machine Fitting                 | Tubing Size Up to Ice Machine Fitting |
|-------------------------------|-----------------------------------------|-------------------------------------------------|-------------------------------------|---------------------------------------|
| <b>Ice Making Water Inlet</b> | 35°F (2°C) min.<br>90°F (32.2°C) max.   | 20 psi (1.38 bar) min.<br>80 psi (5.5 bar) max. | 3/8" (9.5 mm)<br>Female Pipe Thread | 3/8" (9.5 mm) min. inside diameter    |
| <b>Ice Making Water Drain</b> | —                                       | —                                               | 1/2" (12 mm)<br>Female Pipe Thread  | 1/2" (12 mm) min. inside diameter     |
| <b>Condenser Water Inlet</b>  | 33°F (0.6°C) min.<br>90°F (32.2°C) max. | 20 psi (1.38 bar) min.<br>275 psi (19 bar) max. | 3/8" (9.5 mm)<br>Female Pipe Thread | 3/8" (9.5 mm) min. inside diameter    |
| <b>Condenser Water Drain</b>  | —                                       | —                                               | 1/2" (12 mm)<br>Female Pipe Thread  | 1/2" (12 mm) min. inside diameter     |

## REMOTE CONDENSER KT MODELS

| Ice Machine | Remote Single Circuit Condenser | Line Set*                                    |
|-------------|---------------------------------|----------------------------------------------|
| KT1000      | JCT1200                         | RT-20R-R410A<br>RT-35R-R410A<br>RT-50R-R410A |
| KT1700      | JCT1500                         | RL-20R-R410A<br>RL-35R-R410A<br>RL-50R-R410A |

| *Line Set | Discharge Line | Liquid Line     |
|-----------|----------------|-----------------|
| RT        | 1/2" (1.27 cm) | 5/16" (0.79 cm) |
| RL        | 1/2" (1.27 cm) | 3/8" (0.95 cm)  |

NOTE: All line sets must be insulated with 1/4" wall thickness Armaflex.

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

### Notice

Condensers must be mounted horizontally with the fan motor on top with nothing obstructing it. There must be at least a 16" (41 cm) clearance from the bottom for air intake.

## Additional Refrigerant Charge For 51' to 100' Line Sets

| Ice Machine | Condenser | Additional Amount of Refrigerant To Be Added To The Nameplate Charge |
|-------------|-----------|----------------------------------------------------------------------|
| KT1000      | JCT1200   | 2 lbs - 907g                                                         |
| KT1700      | JCT1500   | 2 lbs - 907g                                                         |

## REMOTE CONDENSER K MODELS

| Ice Machine    | Remote Single Circuit Condenser | Line Set*                                    |
|----------------|---------------------------------|----------------------------------------------|
| K1000          | KC1000                          | RTK-20-R410A<br>RTK-35-R410A<br>RTK-50-R410A |
| K1350<br>K1800 | KC1350                          | RLK-20-R410A<br>RLK-35-R410A<br>RLK-50-R410A |

| *Line Set | Discharge Line | Liquid Line     |
|-----------|----------------|-----------------|
| RTK       | 1/2" (1.27 cm) | 5/16" (0.79 cm) |
| RLK       | 1/2" (1.27 cm) | 3/8" (0.95 cm)  |

NOTE: All line sets must be insulated with 1/4" wall thickness Armaflex.

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

### Notice

Condensers must be mounted horizontally with the fan motor on top with nothing obstructing it. There must be at least a 16" (41 cm) clearance from the bottom for air intake.

## Additional Refrigerant Charge For 51' to 100' Line Sets

| Ice Machine    | Condenser | Additional Amount of Refrigerant To Be Added To The Nameplate Charge |
|----------------|-----------|----------------------------------------------------------------------|
| K1000          | KC1000    | 2 lbs - 907g                                                         |
| K1350<br>K1800 | KC1350    | 2 lbs - 907g<br>2 lbs - 907g                                         |

## Calculating Allowable Lineset Distance

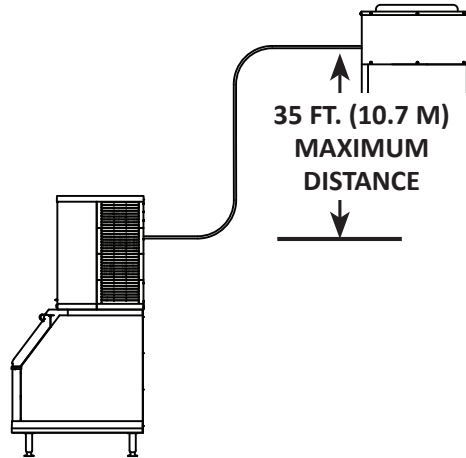
### Line Set Length

The maximum length is 100' (30.5 m).

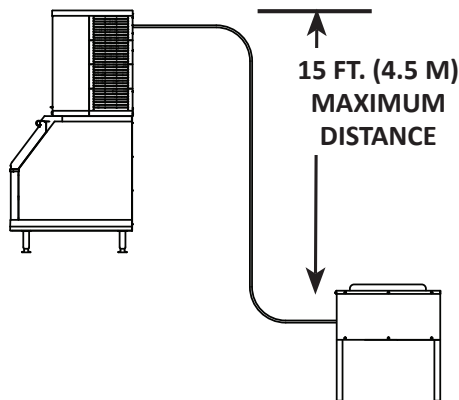
### Line Set Rise/Drop

The maximum rise is 35' (10.7 m).

The maximum drop is 15' (4.5 m).



**35 ft. (10.7 m) Rise:** The maximum distance the Condenser or Condensing Unit can be above the ice machine.



**15 ft. (4.5 m) Drop:** The maximum distance the Condenser or Condensing Unit can be below the ice machine.

## Calculated Line Set Distance

The maximum calculated distance is 150' (45.7 m).

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

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

1. Insert the **measured rise** into the formula below.  
Multiply by 1.7 to get the calculated rise.  
(Example: A condenser located 10 feet above the ice machine has a **calculated rise** of 17 feet.)
2. Insert the **measured drop** into the formula below.  
Multiply by 6.6 to get the calculated drop.  
(Example. A condenser located 10 feet below the ice machine has a **calculated drop** of 66 feet.)
3. Insert the **measured horizontal distance** into the formula below. No calculation is necessary.
4. Add together the **calculated rise, calculated drop, and horizontal distance** to get the **total calculated distance**. If this total exceeds 150' (45.7 m), move the condenser to a new location and perform the calculations again.

## Maximum Line Set Distance Formula

### Step 1

Measured Rise \_\_\_\_ X 1.7 = \_\_\_\_ Calculated Rise  
(35 ft. Max)

### Step 2

Measured Drop \_\_\_\_ X 6.6 = \_\_\_\_ Calculated Drop  
(15 ft. Max.)

### Step 3

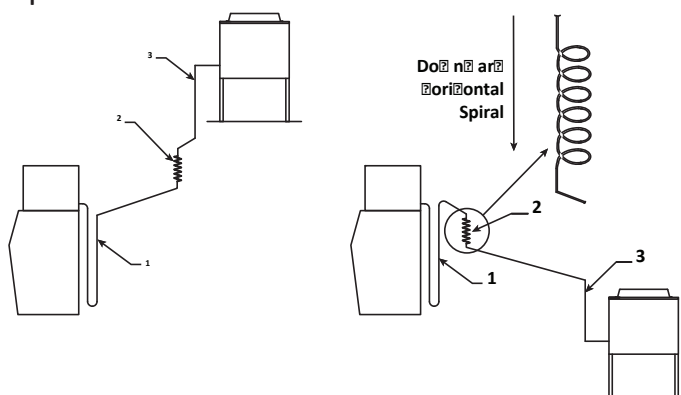
Measured Horizontal Distance = \_\_\_\_ Horizontal  
(100 ft. Max.) Distance

### Step 4

Total Calculated Distance = \_\_\_\_ Total Calculated  
(150 ft. Max.) Distance

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

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



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# Maintenance

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## De-scaling and Sanitizing

### GENERAL

Sanitizing for Exterior, Remedial, and Detailed procedures can be performed independently and more frequently than de-scaling when needed.

De-scale and sanitize the ice machine every six months for efficient operation. If the ice machine requires more frequent de-scaling 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 de-scaling and sanitizing.

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

Using non Manitowoc de-scalers, sanitizers, cleaners or solutions may result in bodily harm and/or cause damage to the ice machine that is not covered under the warranty.

The ice machine must be taken apart for de-scaling and sanitizing.

Maintenance procedures are not covered by the warranty.

### **Caution**

Use only Manitowoc Ice Machine De-scaler (part number 9405463) and Sanitizer (part number 9405653). Do not mix De-scaler and Sanitizer solutions together. It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling. Read and understand all labels printed on bottles before use.

## **ICE MACHINE INSPECTION**

Check all water fittings and lines for leaks. Also, confirm refrigeration tubing is not rubbing or vibrating against other tubing, panels, etc.

Do not put anything (boxes, etc.) in front of the ice machine. There must be adequate airflow through and around the ice machine to maximize ice production and ensure long component life.

## **EXTERIOR CLEANING**

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

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

Products containing abrasives will damage the coating and scratch the panels.

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

## **REMEDIAL DE-SCALING**

- This procedure de-scales all components in the water flow path, and is used between the bi-yearly detailed de-scaling and sanitizing procedure.

## **DETAILED DE-SCALING/SANITIZING**

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

- The ice machine and bin must be disassembled de-scaled and sanitized.
- All ice produced during the de-scaling and sanitizing procedures must be discarded.

## DETAILED DE-SCALING AND SANITIZING PROCEDURE

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

### TOGGLE SWITCH OPERATION

Moving the toggle switch to clean will start a Clean cycle.

- **Setting the ice machine to stop after the clean cycle:** Place the toggle switch in the clean position. The ice machine will stop after the clean cycle.
- **Pausing the cleaning cycle:** Move the toggle switch to Off. Moving the toggle switch to clean will restart the clean cycle.
- **Setting the ice machine to start ice making after the clean cycle:** Place the toggle switch in the Ice position more than 2 minutes into the clean cycle.

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

#### **Caution**

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

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

#### **Warning**

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

 **Caution**

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

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

| Model                                        | Amount of De-scaler |
|----------------------------------------------|---------------------|
| K0300 K0400 K0420 K0500<br>K0600 K0700 K1000 | 5 ounces (150 ml)   |
| K1350 K1700 K1800                            | 9 ounces (265 ml)   |

**Step 4** Wait until the cycle is complete (approximately 24-30 minutes) then place the toggle switch in the off position and disconnect power and water supplies to the ice machine (and dispenser when used).

**Warning**

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

**Step 5** Remove parts for de-scaling.  
Refer to the proper parts removal for your machine.  
Continue with Step 6 when the parts have been removed.

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

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

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

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

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

Rinse all areas thoroughly with clean water.

## SANITIZING PROCEDURE

**Step 9** Mix a solution of sanitizer and warm water.

| Solution Type | Water         | Mixed With             |
|---------------|---------------|------------------------|
| Sanitizer     | 3 gal. (12 l) | 2 oz (60 ml) sanitizer |

**Step 10** Use half of the sanitizer/water solution to sanitize all removed components. Use a spray bottle to liberally apply the solution to all surfaces of the removed parts or soak the removed parts in the sanitizer/water solution. **Do not rinse parts after sanitizing.**

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

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

**Do not rinse the sanitized areas.**

**Step 12** Replace all removed components.

**Step 13** Wait 20 minutes.

**Step 14** Reapply power to the ice machine and place the toggle switch in the CLEAN position.

**Step 15** Water will flow through the water dump valve and down the drain. Wait until the water trough refills, then add the proper amount of ice machine sanitizer to the water trough.

| Model                                        | Amount of Sanitizer |
|----------------------------------------------|---------------------|
| K0300 K0400 K0420 K0500<br>K0600 K0700 K1000 | 3 ounces (90 ml)    |
| K1350 K1700 K1800                            | 6 ounces (180 ml)   |

**Step 16** After the sanitize cycle is complete (approximately 24 minutes) move the toggle switch to the ICE position to start ice making.

**Notice**

Electrical connector must never be exposed to any liquids.

## REMOVE PARTS FOR DE-SCALING/SANITIZING

### **Warning**

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

1. Remove the water curtain
  - Gently flex the curtain in the center and remove it from the right side.
  - Slide the left pin out.
2. Remove the water trough and water diverter from the bottom of the evaporator.
  - Depress tabs on right and left side of the water trough.
  - Allow front of water trough to drop as you pull forward to disengage the rear pins.
  - Loosen thumbscrew on left side of water diverter tray.
3. Remove the ice thickness and harvest float switches
  - Pull the float switch straight down to disengage.
  - Lower the float switch until the wiring connector is visible.
  - Disconnect the wire lead from the float switch.
  - Remove the float switch from the ice machine.

#### 4. Remove the water distribution tube

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

- Loosen the two outer screws (do not remove screws completely they are retained to prevent loss) and pull forward on the distribution tube to release from slip joint.
- Disassemble distribution tube by loosening the two middle thumbscrews and dividing the distribution tube into two pieces.
- Proceed to page 43 Step 6.

#### 5. Remove the Water Trough

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

## Remedial De-scaling Procedure

This procedure de-scales all components in the water flow path, and is used to de-scale the ice machine between the bi-yearly detailed de-scaling and sanitizing procedure.

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

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

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



### Caution

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



### Warning

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

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

| Model                                        | Amount of De-scaler |
|----------------------------------------------|---------------------|
| K0300 K0400 K0420 K0500<br>K0600 K0700 K1000 | 5 ounces (150 ml)   |
| K1350 K1700 K1800                            | 9 ounces (265 ml)   |

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

## Door Removal

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

## Cleaning the Air Filter & AirCondenser

### **Warning**

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

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

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

### **Warning**

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

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

## **Removal from Service/Winterization**

### **AIR-COOLED MODELS**

1. Turn off the ice machine by pressing the On/Off button.
2. Turn off the water supply.
3. Remove the water from the water trough.
4. Disconnect and drain the incoming ice-making water line at the rear of the ice machine.
5. Energize the ice machine and wait one minute for the water inlet valve to open - or - Energize all relays in the touchscreen service menu.
6. Blow compressed air in both the incoming water and the drain openings in the rear of the ice machine until no more water comes out of the water inlet lines or the drain.
7. Disconnect the electric power at the circuit breaker or the electric service switch.
8. Make sure water is not trapped in any of the water lines, drain lines, distribution tubes, etc.
9. Replace all panels.

### **WATER-COOLED MODELS**

1. Perform Steps 1 – 6 under “Air-Cooled Models.”
2. Disconnect the incoming water and drain line from the water-cooled condenser.
3. Start the ice making cycle by pressing the On/Off button and wait for the freeze cycle. The increasing refrigerant pressure will open the water regulating valve.
4. Blow compressed air through the condenser until no water remains.
5. Turn off ice machine by pressing the On/Off button and then disconnecting power to the ice machine.
6. Replace all panels.

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# Operation

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## Ice Making Sequence of Operation

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

### Water Purge Cycle

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

### Freeze Cycle

Prechill - The refrigeration system chills the evaporator before water flow over the evaporator starts. The water inlet valve energizes during the pre-chill and remains on until the ice thickness float switch is satisfied.

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

### Dump Cycle

Upon initial start-up or start-up after an auto shut-off, water flows through the water dump valve and down the drain. If the water trough fails to drain after the water dump valve has energized/de-energized, a clean light will flash.

### Harvest Cycle

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

## **Full Bin Cycle**

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

## **CONTROL BOARD TIMERS**

- The ice machine is locked into the freeze cycle for 6 minutes before a harvest cycle can be initiated.
- The freeze time lock in feature is bypassed on the initial cycle (manual start or after a full bin/safety limit condition).
- If the harvest float switch is in the down position for 10 continuous seconds during the start of an initial freeze cycle, a harvest sequence is initiated. If the harvest float is in the down position in subsequent cycles a safety limit 3 cycle is initiated.
- The maximum freeze time is 35 minutes (60 minutes prior to software revision 3.2) at which time the control board automatically initiates a harvest sequence.
- The maximum harvest time is 3.5 minutes (software revision 3.2 and later, 7 minute max harvest, with water assist after 3.5 minutes. SL#2 will shut down after 100 cycles). The control board automatically initiates a freeze sequence when these times are exceeded.
- The ice machine will continue to fill with water for up to six minutes, or until the high water float opens for 5 continuous seconds. The control board will energize the water inlet valve one more time 3 minutes into the freeze cycle.

## SERVICE LIMITS

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

Service limits can be reset by cycling the toggle switch Off/On and starting a new ice making cycle.

A service limit is indicated by a flashing light on the control board.

### Service Limit 1

#### Software revision 3.2 and later:

If the freeze time reaches 35 minutes, the control board automatically initiates a harvest cycle.

- After 3 consecutive 35 minute cycles control board light SL#1 light will flash on/off at 1 second intervals.
- If 6 consecutive 35-minute freeze cycles occur, the ice machine stops and the SL#1 light on the control board will be on continuously.

NOTE: Prior to control board software revision 3.2 the maximum freeze time is 60 minutes rather than 35 minutes.

### Service Limit 2

If the harvest time reaches 3.5 minutes, the control board automatically returns the ice machine to the freeze cycle (software revision 3.2 and later, 7 minute max harvest, with water assist after 3.5 minutes. SL#2 will shut down after 3 attempts).

- If 3 consecutive 3.5 minute harvest cycles occur the SL#2 light on the control board will flash on/off at 1 second intervals. After 75 consecutive 3.5 minutes harvest cycles the SL#2 light will be energized continuously.
- If 100 consecutive 3.5 minute harvest cycles occur, the ice machine stops and the SL#2 light on the control board will be on continuously.

### Service Limit 3

If the harvest float switch hasn't opened for 10 continuous seconds within 4 minutes of the water inlet valve energizing the ice machine stops.

- Service Limit 3 is bypassed on the initial cycle (manual start or after a full bin/safety limit condition). For all subsequent cycles the ice machine stops for 30 minutes when the water inlet valve is energized for 4 minutes and the harvest float valve didn't open. Control board lights SL#1 and SL#2 will flash on/off at 1 second intervals.
- The ice machine automatically restarts at the end of the 30 minute delay period and stops flashing the control board lights.
- If 100 consecutive failures occur the ice machine stops and the SL#1 & SL#2 lights flash on/off at 1 second intervals.
- SL#1 & SL#2 will flash 3 times on startup and automatically erase after 100 normal cycles.

## ENERGIZED PARTS CHART

### Self-Contained Ice Machines

| ICE MAKING<br>SEQUENCE OF<br>OPERATION | Water Pump | Harvest<br>Valve | Water Inlet<br>Valve | Dump Valve | Compressor<br>& Condenser<br>Fan Motor* | Harvest Float<br>Switch | Ice Thickness<br>Float Switch | Length of<br>Time                                        |
|----------------------------------------|------------|------------------|----------------------|------------|-----------------------------------------|-------------------------|-------------------------------|----------------------------------------------------------|
| Initial Start-up                       | on         | on               | off                  | on         | off                                     | closed                  | closed                        | 45 seconds                                               |
| 1a. Water purge                        |            |                  |                      |            |                                         |                         |                               |                                                          |
| 1b. Delay period                       | off        | off              | off                  | off        | off                                     | closed                  | closed                        | 5 seconds                                                |
| 2. Refrigeration<br>System Start-up    |            |                  |                      |            |                                         |                         |                               |                                                          |
| 2a. Equalize<br>Pressure               | off        | on               | off                  | off        | off                                     | closed                  | closed                        | 5 seconds                                                |
| 2b. Compressor<br>Start-up             | off        | on               | off                  | off        | on                                      | closed                  | closed                        | 5 seconds                                                |
| Freeze Sequence                        |            |                  |                      |            |                                         |                         |                               |                                                          |
| 3. Pre chill                           | off        | off              | on                   | off        | on                                      | open                    | closed                        | 120 Seconds<br>initial cycle<br>Thereafter<br>30 seconds |

| ICE MAKING<br>SEQUENCE OF<br>OPERATION | Water Pump | Harvest<br>Valve | Water Inlet<br>Valve | Dump Valve | Compressor<br>& Condenser<br>Fan Motor* | Harvest Float<br>Switch | Ice Thickness<br>Float Switch | Length of<br>Time                                                      |
|----------------------------------------|------------|------------------|----------------------|------------|-----------------------------------------|-------------------------|-------------------------------|------------------------------------------------------------------------|
| 4. Freeze                              | on         | off              | on                   | off        | on                                      | open then<br>closed     | closed then<br>open           | Until Harvest<br>Float Switch<br>closes for<br>10 continual<br>seconds |
| Harvest Sequence                       | on         | on               | off                  | on         | on                                      | closed                  | closed                        | 45 seconds                                                             |
| 5. Water Purge                         | off        | on               | off                  | off        | on                                      | closed                  | closed                        | Bin switch<br>activation                                               |
| 6. Harvest                             | off        | off              | off                  | off        | off                                     | closed                  | closed                        | Until bin<br>switch<br>re-closes                                       |

\* Condenser Fan Motor: The fan motor is wired through a fan cycle pressure control; therefore, it may cycle on and off.

## Operational Checks

### ICE THICKNESS CHECK

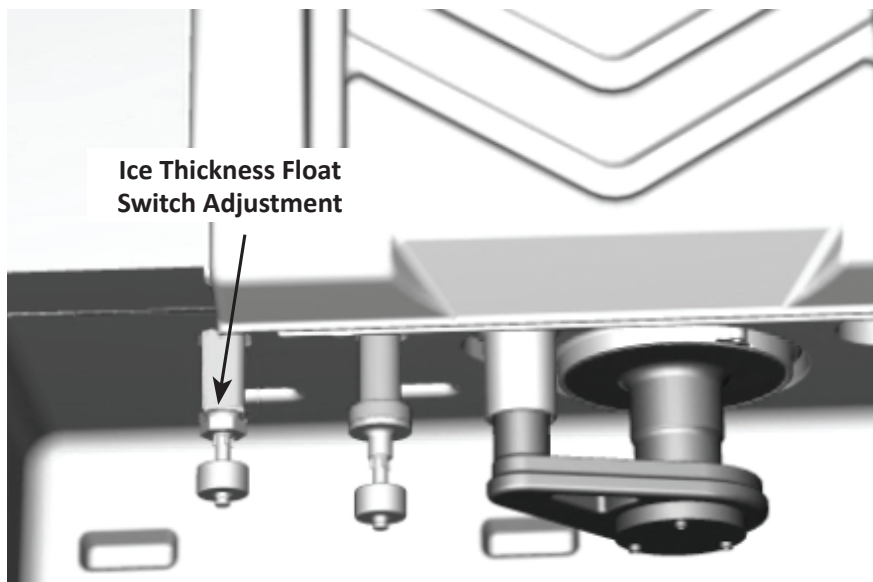
After a harvest cycle, inspect the ice cubes in the ice storage bin. The ice thickness float switch is factory-set to maintain the ice bridge thickness at 1/8" (3 mm).

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

1. Inspect the bridge connecting the cubes. It should be about 1/8" (3 mm) thick.
2. If adjustment is necessary make the following adjustment as you face the machine.

NOTE: The float can be adjusted with a 3/4" wrench while the water trough is in place.

- Turn the ice thickness float switch to the right to increase bridge thickness
- Turn the ice thickness float switch to the left to decrease bridge thickness.
- Test run two cycles to verify bridge thickness.



## MINIMUM/MAXIMUM SLAB WEIGHTS

Adjust ice thickness to meet chart specifications.

| Model            | Minimum Ice Weight<br>Per Cycle | Maximum Ice<br>Weight Per Cycle |
|------------------|---------------------------------|---------------------------------|
| KP0300<br>KT0300 | 3.4 lbs<br>1542 g               | 3.9 lbs<br>1769 g               |
| KP0400<br>KT0400 | 3.4 lbs<br>1542 g               | 3.9 lbs<br>1769 g               |
| KP0420<br>KT0420 | 3.4 lbs<br>1542 g               | 3.9 lbs<br>1769 g               |
| KP0500<br>KT0500 | 4.125 lbs<br>1871 g             | 4.75 lbs<br>2154 g              |
| KP0700<br>KT0700 | 4.125 lbs<br>1871 g             | 4.75 lbs<br>2154 g              |
| KP1000<br>KT1000 | 7.25 lbs<br>3288 g              | 7.75 lbs<br>3515 g              |
| KT1700           | 13.2 lbs<br>5987 g              | 14.8 lbs<br>6713 g              |

| Model                   | Minimum Ice Weight<br>Per Cycle | Maximum Ice<br>Weight Per Cycle |
|-------------------------|---------------------------------|---------------------------------|
| K0250<br>K0350<br>K0420 | 3.4 lbs<br>1542 g               | 3.9 lbs<br>1769 g               |
| K0500<br>K0600          | 4.6 lbs<br>2.1 kg               | 5.2 lbs<br>2.36 kg              |
| K1350                   | 12.75 lbs<br>5.78 kg            | 14.75 lbs<br>6.69 kg            |
| K1800                   | 12.80<br>5.8 kg                 | 14.4 lbs<br>6.5 kg              |

# Troubleshooting

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## Service Limits

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

Service limits can be reset by cycling the toggle switch Off/On and starting a new ice making cycle.

A service limit is indicated by a flashing light on the control board.

### Service Limit 1

#### Software revision 3.2 and later:

If the freeze time reaches 35 minutes, the control board automatically initiates a harvest cycle.

- After 3 consecutive 35 minute cycles control board light SL#1 light will flash on/off at 1 second intervals.
- If 6 consecutive 35-minute freeze cycles occur, the ice machine stops and the SL#1 light on the control board will be on continuously.

NOTE: Prior to control board software revision 3.2 the maximum freeze time is 60 minutes rather than 35 minutes.

### Service Limit 2

#### Software revision 3.2 and later:

If the harvest time reaches 7 minutes, the control board automatically returns the ice machine to the freeze cycle.

- If 3 consecutive 7 minute harvest cycles occur the SL#2 light on the control board will flash on/off at 1 second intervals. After 100 consecutive 7 minute harvest cycles the SL#2 light will be energized continuously.
- If 100 consecutive 3.5 minute harvest cycles occur, the ice machine stops and the SL#2 light on the control board will be on continuously.

**Software revision 3.1 and before:**

If the harvest time reaches 3.5 minutes, the control board automatically returns the ice machine to the freeze cycle (software revision 3.2 and later, 7 minute max harvest, with water assist after 3.5 minutes. SL#2 will shut down after 3 attempts).

- If 3 consecutive 3.5 minute harvest cycles occur the SL#2 light on the control board will flash on/off at 1 second intervals. After 75 consecutive 3.5 minutes harvest cycles the SL#2 light will be energized continuously.
- If 100 consecutive 3.5 minute harvest cycles occur, the ice machine stops and the SL#2 light on the control board will be on continuously.

### Service Limit 3

If the harvest float switch hasn't opened for 10 continuous seconds within 4 minutes of the water inlet valve energizing the ice machine stops.

- Service Limit 3 is bypassed on the initial cycle (manual start or after a full bin/safety limit condition). For all subsequent cycles the ice machine stops for 30 minutes when the water inlet valve is energized for 4 minutes and the harvest float valve didn't open. Control board lights SL#1 and SL#2 will flash on/off at 1 second intervals.
- The ice machine automatically restarts at the end of the 30 minute delay period and stops flashing the control board lights.
- If 100 consecutive failures occur the ice machine stops and the SL#1 & SL#2 lights flash on/off at 1 second intervals.
- SL#1 & SL#2 will flash 3 times on startup and automatically erase after 100 normal cycles.

## **Determining Which Service Limit Stopped the Ice Machine:**

1. Cycle the toggle switch Off.
2. Cycle the toggle switch On to start ice making.
3. Watch the service limit lights.
  - One will flash corresponding to service limits 1 or 2.
4. Service limit 3 is indicated by both SL#1 & SL#2 flashing.

After service limit indication, the ice machine will restart and run until a service limit is exceeded again.

### **Service Limit Notes**

- A continuous run of 100 harvests automatically erases the service limit code.
- The control board will store and indicate only one service limit – the last one exceeded.
- If the toggle switch is cycled OFF and then ON prior to reaching the 100-harvest point, the last service limit exceeded will be indicated.

## SERVICE LIMIT CHECKLIST

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.

### Service Limit #1

**Control board software revision 3.2 and higher**

**Freeze time exceeds 35 minutes for 6 consecutive freeze cycles.**

Possible Cause Checklist

#### ***Improper installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84

#### ***Water System***

- Float switch or water escaping water trough
- Low water pressure (20 psig min.)
- High water pressure (80 psig max.)
- High water temperature (90°F/32.2°C max.)
- Clogged water distribution tube
- Dirty/defective water inlet valve
- Defective water pump

### ***Electrical System***

- Harvest cycle not initiated electrically
- Contactor not energizing
- Compressor electrically non-operational
- Restricted condenser air flow
- High inlet air temperature (110°F/43.3°C max.)
- Condenser discharge air re-circulation
- Dirty condenser fins
- Defective fan cycling control
- Defective fan motor
- Dirty condenser

NOTE: Prior to control board software revision 3.2 the maximum freeze time is 60 minutes rather than 35 minutes.

### ***Refrigeration System***

- Non-OEM components
- Improper refrigerant charge
- Defective compressor
- TXV starving or flooding (check bulb mounting)
- Non-condensable in refrigeration system
- Plugged or restricted high side refrigerant lines or component
- Defective harvest valve

## **Service Limit #2**

**Harvest time exceeds 7 minutes for 100 Consecutive harvest cycles.**

Possible Cause Checklist

### ***Improper installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84

### ***Water System***

- Water area (evaporator) dirty
- Dirty/defective water dump valve
- Vent tube not installed on water outlet drain
- Water freezing behind evaporator
- Plastic extrusions and gaskets not securely mounted to the evaporator

### ***Electrical System***

- Bin switch defective
- Premature harvest

### ***Refrigeration System***

- Non-OEM components
- Improper refrigerant charge
- Defective harvest valve
- TXV flooding (check bulb mounting)
- Defective fan cycling control

### **Service Limit 3**

**The harvest float switch hasn't opened for 10 continuous seconds in the first 4 minutes of the freeze cycle.**

Possible Cause Checklist

#### ***Improper installation***

- Refer to "Installation/Visual Inspection Checklist" on page 84

#### ***Water System***

- Water dump valve
- Harvest float valve dirty or defective
- Low water pressure (20 psig min.)
- Dirty defective water filter (when used)
- Loss of water from sump area
- Dirty/defective water inlet valve

#### ***Electrical System***

- Water inlet valve coil defective
- Harvest float valve defective

## Control Board Test Mode

NOTE: The water curtain/bin switch can be open or closed and does not affect the operation of the test mode.

To enter the test mode, move the toggle switch to off, then press and hold the test button on the control board for 3 seconds. The control board test mode performs the following functions for a 2-minute time period:

- Energizes all control board relays
- Energizes all control board lights

After 2 minutes, the control board will automatically initiate and complete one ice-making cycle, then stop (On software revision 2.70 or earlier). On software version 2.71 or later the control board will complete 500 ice making cycles and shutdown.

### Canceling a test cycle:

To cancel a test cycle, press the test button a second time.

### Restarting a test cycle:

The test cycle will restart each time the test button is pressed for a 3-second time period.

## Diagnosing an Ice Machine that Will Not Run

### **Warning**

High (line) voltage is applied to the control board at all times. Removing the control board fuse or pressing the power button will not remove the power supplied to the control board.

1. Verify primary voltage is supplied to ice machine and the fuse/circuit breaker is closed.
2. Verify control board fuse is okay.

NOTE: If any control board lights are on, the fuse is okay.

3. Verify the bin switch functions properly. A defective bin switch can falsely indicate a full bin of ice.
4. Verify toggle switch functions properly. A defective toggle switch may keep the ice machine in the OFF mode. Refer to toggle switch diagnostics when Steps 1 – 3 test good.
5. Be sure Steps 1 – 4 were followed thoroughly. Intermittent problems are not usually related to the control board. Replace control board if toggle switch operation is correct.

## Troubleshooting By Symptom

The troubleshooting procedures follow diagnostic charts. There are four symptoms, the symptom that you are experiencing will determine which diagnostic chart to use. The chart asks yes and no questions to determine the problem. The diagnostic chart will direct you to a procedure to correct the problem. Remote condenser, and self contained models use separate charts.

### SYMPTOM #1

#### **Ice Machine Stops Running**

**Ice machine is in Ice Making cycle**

**or**

**Has a History of Shutting Down**

- Refer to Ice Machine Stops Running diagnostic chart

### SYMPTOM #2

#### **Ice Machine has a Long Freeze Cycle**

**Ice Formation is Thick**

**or**

**Thin Ice Fill on Inlet or Outlet of Evaporator**

**or**

**Low Production**

Service Fault (possible)

- Refer to Freeze Cycle Refrigeration System Operational Analysis Table

### SYMPTOM #3

#### **Ice Machine Will Not Harvest - Freeze Cycle is Normal and Ice Cubes are Not Melted After Harvest**

Long Harvest (possible)

- Refer to Refrigeration Harvest Flow Chart

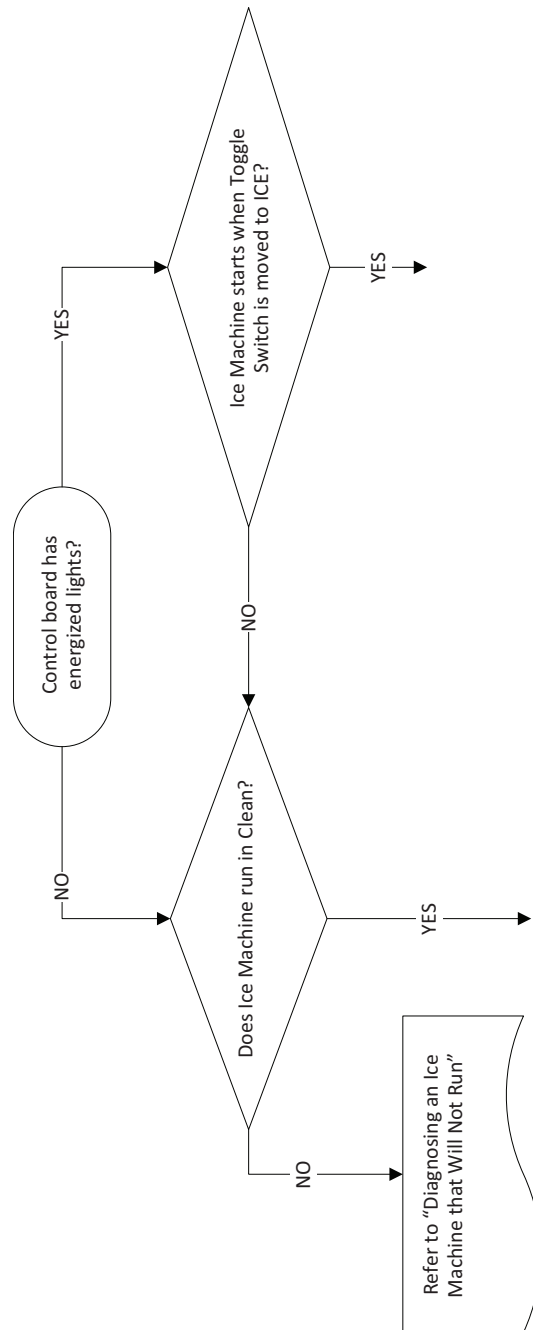
### SYMPTOM #4

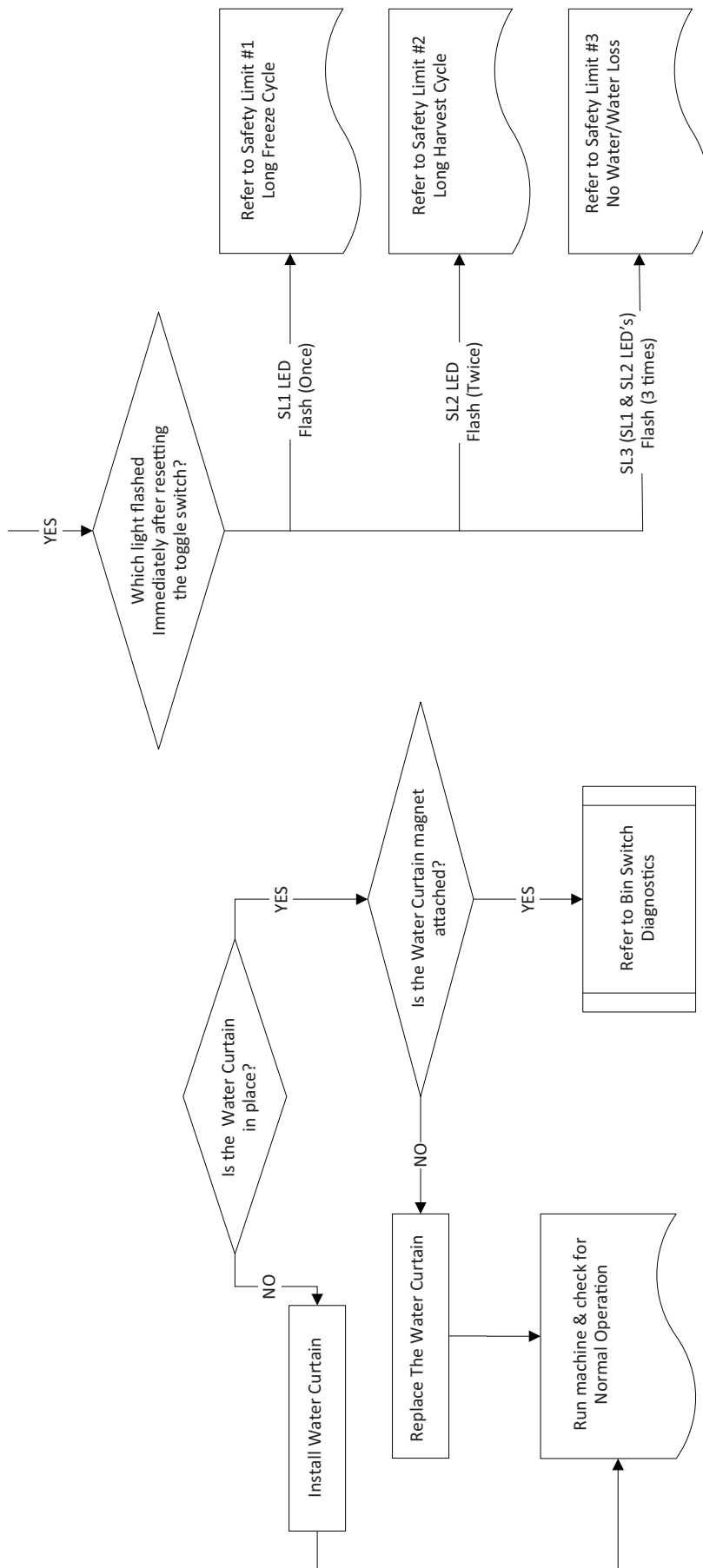
#### **Ice Machine Will Not Harvest - Freeze Cycle is Normal and Ice Cubes are Melted After Harvest**

- Refer to Ice Meltout Flow Chart

## SYMPTOM #1 - SELF-CONTAINED AIR, WATER-COOLED TRADITIONAL REMOTE

*Ice Machine stops running or has history of shutting down*





## #2 - LOW PRODUCTION, LONG FREEZE CYCLE

Ice Machine has a Long Freeze Cycle

Ice Formation is Thick

or

Thin on Inlet or Outlet of Evaporator

or

Low Production

**How to Use the Freeze Cycle Refrigeration System**

**Operational Analysis Table**

### GENERAL

These tables must be used with charts, checklists and other references to eliminate refrigeration components not listed on the tables and external items and problems which can cause good refrigeration components to appear defective.

The tables list five different defects that may affect the ice machine's operation.

NOTE: A low-on-charge ice machine and a starving expansion valve have very similar characteristics and are listed under the same column.

NOTE: Before starting, see "Before Beginning Service" for a few questions to ask when talking to the ice machine owner.

### PROCEDURE

**Step 1 Complete the "Operation Analysis" column.**

Read down the left "Operational Analysis" column.

Perform all procedures and check all information listed.

Each item in this column has supporting reference material to help analyze each step.

While analyzing each item separately, you may find an "external problem" causing a good refrigerant component to appear bad. Correct problems as they are found. If the operational problem is found, it is not necessary to complete the remaining procedures.

## **Step 2      Enter Checkmarks (✓).**

Each time the actual findings of an item in the “Operational Analysis” column matches the published findings on the table, enter a Checkmark.

Example: Freeze cycle suction pressure is determined to be low. Enter a Checkmark in the “low” column.

## **Step 3      Add the Checkmarks listed under each of the four columns. Note the column number with the highest total and proceed to “Final Analysis.”**

NOTE: If two columns have matching high numbers, a procedure was not performed properly, supporting material was not analyzed correctly or the problem component is not covered by the analysis table.

### **Before Beginning Service**

Ice machines may experience operational problems only during certain times of the day or night. A machine may function properly while it is being serviced, but malfunctions later. Information provided by the user can help the technician start in the right direction, and may be a determining factor in the final diagnosis.

Ask these questions before beginning service:

- When does the ice machine malfunction? (night, day, all the time, only during the Freeze cycle, etc.)
- When do you notice low ice production? (one day a week, every day, on weekends, etc.)
- Can you describe exactly what the ice machine seems to be doing?
- Has anyone been working on the ice machine?
- During “store shutdown,” is the circuit breaker, water supply or air temperature altered?
- Is there any reason why incoming water pressure might rise or drop substantially?

**SYMPTOM #2 - REFRIGERATION COMPONENT DIAGNOSTIC CHART**

| <b>Operational Analysis</b>          | <b>1</b>                                                                                                                                                                                                                          | <b>2</b> | <b>3</b> | <b>4</b> |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|
| <b>Ice Production</b>                | Published 24 hour ice production _____<br>Calculated (actual) 24 hour ice production _____<br>NOTE: The ice machine is operating properly if the ice fill pattern is normal and ice production is within 10% of charted capacity. |          |          |          |
| <b>Installation and Water System</b> | All installation and water related problems must be corrected before proceeding with chart.                                                                                                                                       |          |          |          |

| Operational Analysis                                                                                      | 1                                                                                                        | 2                                                                                                     | 3                                                                                                                                        | 4                                                                        |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Ice Formation Pattern</b>                                                                              | Ice formation is extremely thin on outlet of evaporator<br>-or-<br>No ice formation on entire evaporator | Ice formation extremely thin on outlet of evaporator<br>-or-<br>No ice formation on entire evaporator | Ice formation is normal<br>-or-<br>Ice formation is extremely thin on the bottom of evaporator<br>-or-<br>No ice formation on evaporator | Ice formation is normal<br>-or-<br>No ice formation on entire evaporator |
| <b>Service Limits</b><br>Refer to “Analyzing Service Limits” to eliminate all non-refrigeration problems. | Stops on service limit:<br><b>1 or 2</b>                                                                 | Stops on service limit:<br><b>1</b>                                                                   | Stops on service limit:<br><b>1 or 2</b>                                                                                                 | Stops on service limit:<br><b>1</b>                                      |

| Operational Analysis                                                                                        | 1                                                                                                                                                                                                | 2                                 | 3                                  | 4                                  |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| <div>Freeze Cycle</div> <div>Discharge Pressure</div> <div>_____</div> <div>1 minute    Middle    End</div> | If discharge pressure is High or Low, refer to freeze cycle high or low discharge pressure problem checklist to eliminate problems and/or components not listed on this table before proceeding. |                                   |                                    |                                    |
| <div>Freeze Cycle Suction Pressure</div> <div>_____</div> <div>1 minute    Middle    End</div>              |                                                                                                                                                                                                  |                                   |                                    |                                    |
|                                                                                                             | If suction pressure is High or Low refer to freeze cycle high or low suction pressure problem checklist to eliminate problems and/or components not listed on this table before proceeding.      |                                   |                                    |                                    |
|                                                                                                             | Suction pressure is<br><b>High</b>                                                                                                                                                               | Suction pressure is<br><b>Low</b> | Suction pressure is<br><b>High</b> | Suction pressure is<br><b>High</b> |

| Operational Analysis                                                                               | 1                                                                                     | 2                                                                                      | 3                                                                                       | 4                                                                                      |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Harvest Valve</b>                                                                               | The harvest valve inlet is <b>HOT</b> and the compressor discharge line is <b>HOT</b> | The harvest valve inlet is <b>COOL</b> and the compressor discharge line is <b>HOT</b> | The harvest valve inlet is <b>COOL</b> and the compressor discharge line is <b>COOL</b> | The harvest valve inlet is <b>COOL</b> and the compressor discharge line is <b>HOT</b> |
| <b>Discharge Line Temp.</b><br>Record freeze cycle discharge line temp at the end of freeze cycle. | Discharge line temp <b>150°F (66°C) or higher</b> at the end of freeze cycle          | Discharge line temp <b>150°F (66°C) or higher</b> at the end of freeze cycle           | Discharge line temp <b>less than 150°F (66°C)</b> at the end of freeze cycle            | Discharge line temp <b>150°F (66°C) or higher</b> at the end of freeze cycle           |
| <b>Final Analysis</b><br>Enter total number of boxes checked in each column.                       | Harvest Valve Leaking                                                                 | Low On Charge -or- TXV Starving                                                        | TXV Flooding                                                                            | Compressor                                                                             |

## Ice Machine Does Not Cycle Into Harvest when the Harvest Float Is Down/Closed

NOTE: The ice machine will make a thick or double slab when a new freeze cycle is started with ice already present on the evaporator.

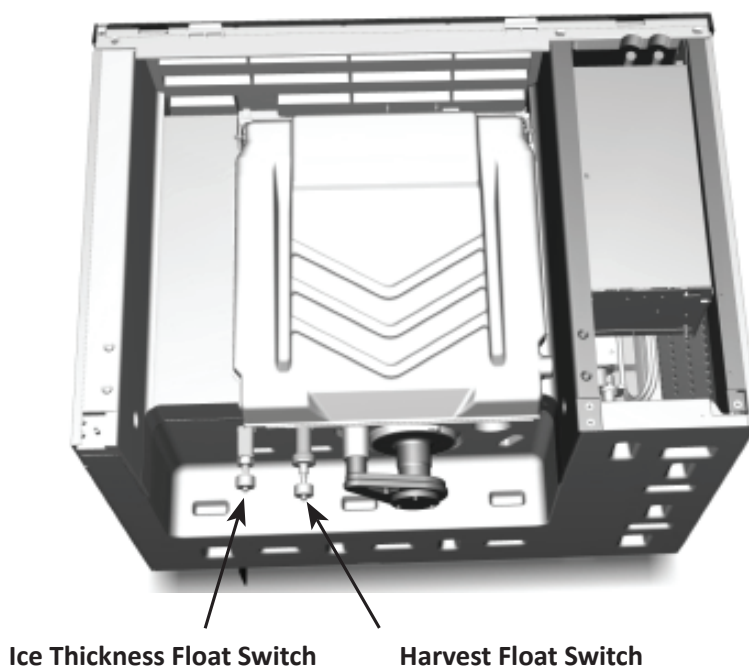
Two of the most common scenarios are:

- Power is cycled off/on with ice on the evaporator.
- The water curtain/bin switch is opened/closed in the harvest cycle before the ice releases.

Remove all ice from the evaporator before starting diagnostic procedures.

### Freeze Time Lock-In Feature

The ice machine control system incorporates a freeze time lock-in feature. This prevents the ice machine from short cycling in and out of harvest. The control board locks the ice machine in the freeze cycle for six minutes. After six minutes a harvest cycle can be initiated. To allow the service technician to initiate a harvest cycle without delay, this feature is not used on the first cycle after moving the toggle switch to OFF and back to ON.



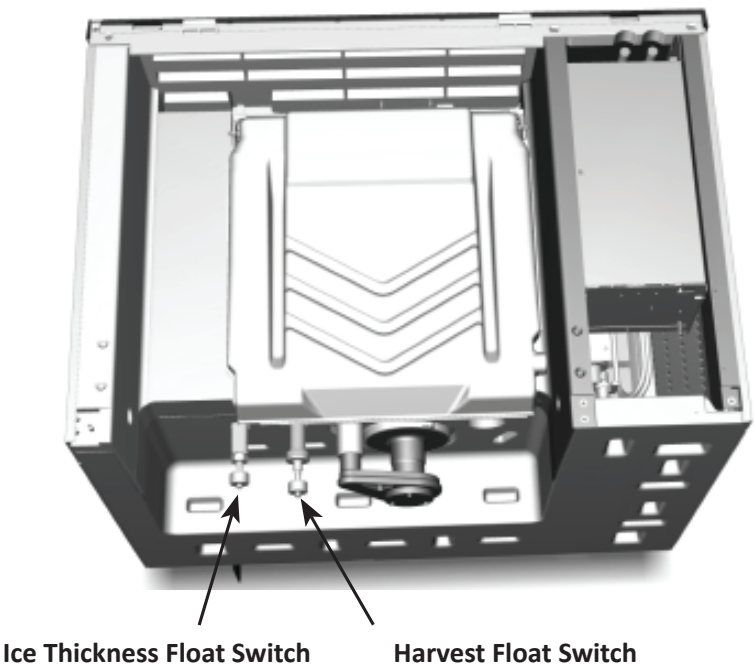
**Step 1** Disconnect power to the ice machine, remove the electrical panel to allow viewing of the control board lights. Disconnect the harvest float switch wire from the control board and place a jumper on the control board harvest switch terminals.

**Step 2** Bypass the freeze time lock-in feature by moving the toggle switch Off/On to cycle the ice machine on. Wait until water flows over the evaporator, then refer to chart.

| Result                                                                                                                        | Correction                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 10 seconds into the freeze cycle the ice machine cycles from freeze to harvest and the control board harvest light energizes. | The ice thickness float switch, connectors or wiring are causing the malfunction. |
| The harvest light comes on, but the ice machine remains in the freeze cycle.                                                  | The ice machine is in a 6 minute freeze lock -<br>Cycle on/off and retest.        |
| The harvest light stays off and the ice machine remains in freeze.                                                            | Replace the control board.                                                        |

**Ice Machine Cycles Into Harvest Before the Harvest Float Is Down/Closed**

**Step 1**      Disconnect power to the ice machine, remove the electrical panel to allow viewing of the control board lights and disconnect the float switch harness from the control board.



**Step 2**      Reapply power and move the toggle switch to Ice to bypass the freeze time lock-in feature. Wait until water flows over the evaporator, then refer to chart.

| Result                                                                                                                        | Correction                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| The harvest light does not come on and the ice machine stays in freeze.                                                       | The ice thickness float switch, connectors or wiring are causing the malfunction. Refer to float switch diagnostics. |
| 10 seconds into the freeze cycle the ice machine cycles from freeze to harvest and the control board harvest light energizes. | Replace the control board.                                                                                           |



## Ice Production Check

The amount of ice a machine produces directly relates to the operating water and air temperatures. This means an ice machine with a 70°F (21°C) ambient temperature and 50°F (10°C) water produces more ice than the same ice machine with 90°F (32°C) ambient and 70°F (21°C) water.

1. Determine the ice machine operating conditions:  
Air temp entering condenser: \_\_\_\_\_°  
Air temp around ice machine: \_\_\_\_\_°  
Water temp entering sump trough: \_\_\_\_\_°
2. Refer to the appropriate 24-Hour Ice Production Chart. Use the operating conditions determined in Step 1 to find published 24-Hour Ice Production: \_\_\_\_\_
  - Times are in minutes.  
Example: 1 min. 15 sec. converts to 1.25 min.  
(15 seconds ÷ 60 seconds = .25 minutes)
  - Weights are in pounds.  
Example: 2 lb. 6 oz. converts to 2.375 lb.  
(6 oz. ÷ 16 oz. = .375 lb.)
3. Perform an ice production check using the formula below.

|                       |                  |                           |
|-----------------------|------------------|---------------------------|
| 1.                    | +                | =                         |
| Freeze Time           | Harvest Time     | Total Cycle Time          |
| 2. 1440               | ÷                | =                         |
| Minutes in 24 Hrs.    | Total Cycle Time | Cycles per Day            |
| 3.                    | x                | = _____                   |
| Weight of One Harvest | Cycles per Day   | Actual 24-Hour Production |

Weighing the ice is the only 100% accurate check.

4. Compare the results of Step 3 with Step 2. Ice production is normal when these numbers match closely. If they match closely, determine if:
  - Another larger ice machine is required.
  - Relocating the existing equipment to lower the load conditions is required.

## Installation/Visual Inspection Checklist

### ***Ice machine is not level***

- Level the ice machine

### ***Condenser is dirty***

- Clean the condenser

### ***Water filtration is plugged (if used)***

- Install a new water filter

### ***Water drains are not run separately and/or are not vented***

- Run and vent drains according to the Installation Manual

## **Water System Checklist**

A water-related problem often causes the same symptoms as a refrigeration system component malfunction.

Example: A water dump valve leaking during the freeze cycle, a system low on charge, and a starving TXV have similar symptoms.

Water system problems must be identified and eliminated prior to replacing refrigeration components.

### ***Water area (evaporator) is dirty***

- Clean as needed

### ***Water inlet pressure not between 20 and 80 psig (1–5 bar, 138–552 kPa)***

- Install a water regulator valve or increase the water pressure

### ***Incoming water temperature is not between 35°F (1.7°C) and 90°F (32.2°C)***

- If too hot, check the hot water line check valves in other store equipment

### ***Water filtration is plugged (if used)***

- Install a new water filter

### ***Vent tube is not installed on water outlet drain***

- See Installation Instructions

### ***Hoses, fittings, etc., are leaking water***

- Repair/replace as needed

### ***Water valve is stuck open, closed or is leaking***

- Clean/replace as needed

***Water is spraying out of the sump trough area***

- Stop the water spray

***Uneven water flow across the evaporator***

- Clean the ice machine

***Water is freezing behind the evaporator***

- Correct the water flow

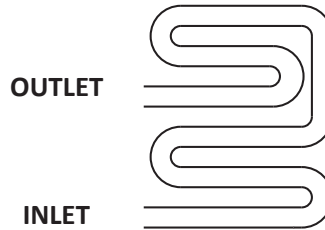
***Plastic extrusions and gaskets are not secured to the evaporator***

- Remount/replace as needed

## Ice Formation Pattern

Evaporator ice formation pattern analysis is helpful in ice machine diagnostics.

Analyzing the ice formation pattern alone cannot diagnose an ice machine malfunction. However, when this analysis is used along with the Refrigeration System Operational Analysis Table, it can help diagnose an ice machine malfunction.



### Example of Evaporator Tubing Routing

#### Normal Ice Formation

Ice forms across the entire evaporator surface.

At the beginning of the Freeze cycle, it may appear that more ice is forming on the inlet of the evaporator than at the outlet. At the end of the Freeze cycle, ice formation at the outlet will be close to, or just a bit thinner than, ice formation at the inlet. The dimples in the cubes at the outlet of the evaporator may be more pronounced than those at the inlet. This is normal.

If ice forms uniformly across the evaporator surface, but does not do so in the proper amount of time, this is still considered a normal ice fill pattern.

### **Extremely Thin at Evaporator Outlet**

There is no ice, or a considerable lack of ice formation on the outlet of the evaporator.

Examples: No ice at all at the outlet of the evaporator, but ice forms at the inlet half of the evaporator. Or, the ice at the outlet of the evaporator reaches the correct thickness, but the outlet of the evaporator already has 1/2" to 1" (12 to 25 mm) of ice formation.

### **Extremely Thin at Evaporator Inlet**

There is no ice, or a considerable lack of ice formation at the inlet of the evaporator. Examples: The ice at the outlet of the evaporator reaches the correct thickness, but there is no ice formation at all at the inlet of the evaporator.

### **No Ice Formation**

The ice machine operates for an extended period, but there is no ice formation at all on the evaporator.

### **Evaporator Tubing Routing**

Routing of the tubing on the back of the evaporator determines the ice fill pattern failure mode.

### **One Evaporator, One TXV Models**

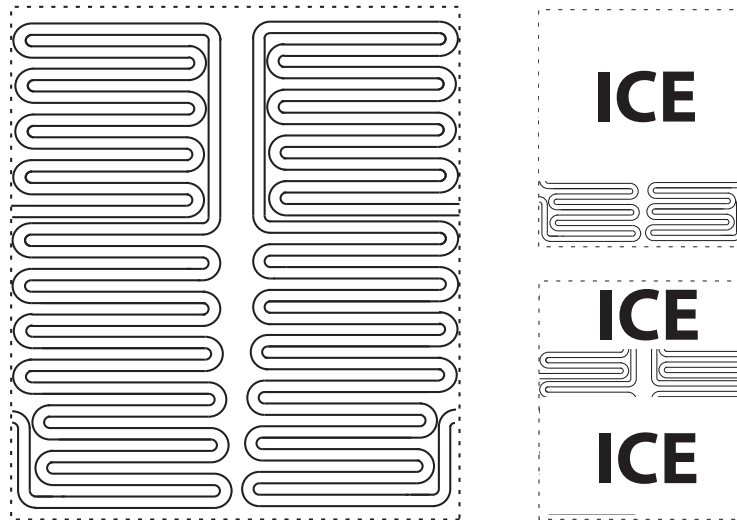
The evaporator outlet tubing does not exit directly at the top of the evaporator, but exits several inches below the top of the evaporator. Extremely Thin at the Evaporator Outlet will first be visible several inches below the top of the evaporator. Extremely Thin at Evaporator Inlet will first be visible at the bottom of the evaporator.

## One Evaporator, Two TXV 48" Models

Tubing routing for one evaporator with two TXV's is different. The evaporator has two inlets and outlets. Fill pattern varies depending on which circuit is affected,

### Extremely Thin at the Evaporator Outlet

Will first be visible 1/3 of the way down the evaporator. Only one side of the evaporator may be affected depending on failure. A TXV failure will usually show on only one side, while low on refrigerant can affect one or both sides depending on the amount of refrigerant loss and ambient temperature.



### Extremely Thin at the Evaporator Inlet

Will show at the bottom of the evaporator. Depending on the failure either the entire bottom of the evaporator or one side of the bottom of the evaporator may be affected.

## Analyzing Suction Pressure

The suction pressure gradually drops throughout the freeze cycle. The actual suction pressure (and drop rate) changes as the air and water temperature entering the ice machine changes. These variables also determine the freeze cycle times.

To analyze and identify the proper suction pressure drop throughout the freeze cycle, compare the published suction pressure to the published freeze cycle time.

NOTE: Analyze discharge pressure before analyzing suction pressure. High or low discharge pressure may be causing high or low suction pressure.

## Procedure

Step

1. Determine the ice machine operating conditions.

Example:

Air temp. entering condenser: 90°F/32.2°C

Air temp. around ice machine: 80°F/26.7°C

Water temp. entering water fill valve: 70°F/21.1°C

2A. Refer to “Cycle Time” and “Operating Pressure” charts for ice machine model being checked. Using operating conditions from Step 1, determine published freeze cycle time and published freeze cycle suction pressure.

Example:

Published freeze cycle time: 14.8 - 15.9 minutes

Published freeze cycle suction pressure: 65 - 26 psig

2B. Compare the published freeze cycle time and published freeze cycle suction pressure. Develop a chart.

Example:

Published Freeze Cycle Time (minutes)

|    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|
| 1  | 2  | 4  | 7  | 10 | 12 | 14 |
|    |    |    |    |    |    |    |
| 65 | 55 | 47 | 39 | 34 | 30 | 26 |

Published Freeze Cycle Suction Pressure (psig)

In the example, the proper suction pressure should be approximately 39 psig at 7 minutes; 30 psig at 12 minutes; etc.

3. Perform an actual suction pressure check at the beginning, middle and end of the freeze cycle. Note the times at which the readings are taken.

Example:

Manifold gauges were connected to the example ice machine and suction pressure readings taken as follows: \_\_\_\_\_ PSIG

Beginning of freeze cycle: 79 (at 1 min.)

Middle of freeze cycle: 48 (at 7 min.)

End of freeze cycle: 40 (at 14 min.)

4. Compare the actual freeze cycle suction pressure (Step 3) to the published freeze cycle time and pressure comparison (Step 2B). Determine if the suction pressure is high, low or acceptable.

Example:

In this example, the suction pressure is considered high throughout the freeze cycle. It should have been:

Approximately 65 psig (at 1 minute) – not 79

Approximately 39 psig (at 7 minutes) – not 48

Approximately 26 psig (at 14 minutes) – not 40

## SUCTION PRESSURE HIGH CHECKLIST

### ***Improper Installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84.

### ***Discharge Pressure***

- Discharge pressure is too high and is affecting suction pressure, refer to “Discharge Pressure High Checklist” on page 96.

### ***Improper Refrigerant Charge***

- Overcharged
- Wrong type of refrigerant
- Non-condensable in system

### ***Other***

- Non-OEM components in system
- Harvest valve leaking
- TXV flooding (check bulb mounting)
- Defective compressor

## SUCTION PRESSURE LOW CHECKLIST

### ***Improper Installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84.

### ***Discharge Pressure***

- Discharge pressure is too low, and is affecting suction pressure, refer to “Freeze Cycle Discharge Pressure Low Checklist” on page 96

### ***Improper Refrigerant Charge***

- Undercharged
- Wrong type of refrigerant

### ***Other***

- Non-OEM components in system
- Improper water supply over evaporator refer to “Water System Checklist” on page 85.
- Loss of heat transfer from tubing on back side of evaporator
- Restricted/plugged liquid line drier
- Restricted/plugged tubing in suction side of refrigeration system
- TXV starving

NOTE: Do not limit your diagnosis to only the items listed in the checklists.

**Comparing Evaporator Inlet and Outlet Temperatures**

The temperatures of the suction lines entering and leaving the evaporator alone cannot diagnose an ice machine. However, comparing these temperatures during the freeze cycle, along with the Refrigeration System Operational Analysis Table, can help diagnose an ice machine malfunction.

The actual temperatures entering and leaving the evaporator vary by model, and change throughout the freeze cycle. This makes documenting the “normal” inlet and outlet temperature readings difficult. The key to the diagnosis lies in the difference between the two temperatures five minutes into the freeze cycle. These temperatures must be within 7°F (4°C) of each other.

Use this procedure to document freeze cycle inlet and outlet temperatures.

- 1. Use a quality temperature meter, capable of taking temperature readings on curved copper lines.
- 2. Attach the temperature meter sensing device to the copper lines entering and leaving the evaporator.

**Important**

Do not simply insert the sensing device under the insulation. It must be attached to and reading the actual temperature of the copper line.

- 3. Wait five minutes into the freeze cycle.
- 4. Record the temperatures below and determine the difference between them.

|                                               |                                                                                                    |                                                |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------|
| <div>_____</div> <div>Inlet Temperature</div> | <div>_____</div> <div>Difference must be within 7°F (4°C) at 5 minutes into the freeze cycle</div> | <div>_____</div> <div>Outlet Temperature</div> |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------|

- 5. Use this with other information gathered on the Refrigeration System Operational Analysis Table to determine the ice machine malfunction.



## Analyzing Discharge Pressure

1. Determine the ice machine operating conditions:

Air temp. entering condenser \_\_\_\_\_

Air temp. around ice machine \_\_\_\_\_

Water temp. entering sump trough \_\_\_\_\_

2. Refer to "Cycle Times, 24 Hr. Ice Production and Refrigerant Pressure Charts" on page 149 for ice machine being checked.

Use the operating conditions determined in Step 1 to find the published normal discharge pressures.

Freeze Cycle \_\_\_\_\_

Harvest Cycle \_\_\_\_\_

3. Perform an actual discharge pressure check.

|                       | Freeze Cycle<br>PSIG | Harvest Cycle<br>PSIG |
|-----------------------|----------------------|-----------------------|
| Beginning of<br>Cycle | _____                | _____                 |
| Middle of<br>Cycle    | _____                | _____                 |
| End of<br>Cycle       | _____                | _____                 |

4. Compare the actual discharge pressure (Step 3) with the published discharge pressure (Step 2).

The discharge pressure is normal when the actual pressure falls within the published pressure range for the ice machine's operating conditions. It is normal for the discharge pressure to be higher at the beginning of the freeze cycle (when load is greatest), then drop throughout the freeze cycle.

## DISCHARGE PRESSURE HIGH CHECKLIST

### ***Improper Installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84.

### ***Condenser Air Flow***

- High inlet air temperature
- Condenser discharge air re-circulation
- Dirty condenser fins
- Defective fan cycling control
- Defective fan motor

### ***Improper Refrigerant Charge***

- Overcharged
- Non-condensable in system
- Wrong type of refrigerant

### ***Other***

- Non-OEM components in system
- High side refrigerant lines/component restricted (before mid-condenser)

## FREEZE CYCLE DISCHARGE PRESSURE LOW CHECKLIST

### ***Improper Installation***

- Refer to “Installation/Visual Inspection Checklist” on page 84.

### ***Improper Refrigerant Charge***

- Undercharged
- Wrong type of refrigerant

### ***Other***

- Non-OEM components in system
- High side refrigerant lines/component restricted (before mid-condenser)
- Defective fan cycle control

NOTE: Do not limit your diagnosis to only the items listed in the checklists.

## Harvest Valve

### General

The harvest valve is an electrically operated valve that opens when energized, and closes when de-energized.

### Normal Operation

The valve is de-energized (closed) during the freeze cycle and energized (open) during the harvest cycle. The valve is positioned between the compressor discharge line and the evaporator and performs two functions:

1. Prevents refrigerant from entering the evaporator during the freeze cycle.

The harvest valve is not used during the freeze cycle. The harvest valve is de-energized (closed) preventing refrigerant flow from the discharge line into the evaporator.

2. Allows refrigerant vapor to enter the evaporator in the harvest cycle.

During the harvest cycle, the harvest valve is energized (open) allowing refrigerant gas from the discharge line of the compressor to flow into the evaporator. The heat is absorbed by the evaporator and allows release of the ice slab.

Exact pressures vary according to ambient temperature and ice machine model. Harvest pressures can be found in the Cycle Time/24 Hour Ice Production/ Refrigerant Pressure Charts in this book.

## HARVEST VALVE ANALYSIS

The valve can fail in two positions:

- Valve will not open in the harvest cycle.
- Valve remains open during the freeze cycle.

### ***Valve will not open in the harvest cycle***

Although the circuit board has initiated a harvest cycle, the evaporator temperature remains unchanged from the freeze cycle.

### ***Valve remains open in the freeze cycle:***

Symptoms of a harvest valve remaining partially open during the freeze cycle can be similar to symptoms of an expansion valve or compressor problem. Symptoms are dependent on the amount of leakage in the freeze cycle.

A small amount of leakage will cause increased freeze times and an ice fill pattern that is “Thin at the Outlet”, but fills in at the end of the cycle.

As the amount of leakage increases, the length of the freeze cycle increases and the amount of ice at the outlet of the evaporator decreases.

Refer to the Parts Manual for proper valve application. If replacement is necessary, use only “original” replacement parts.

Use the following procedure and table to help determine if a harvest valve is remaining partially open during the freeze cycle.

1. Wait five minutes into the freeze cycle.
2. Feel the inlet of the harvest valve(s).

### **Important**

Feeling the harvest valve outlet or across the harvest valve itself will not work for this comparison.

The harvest valve outlet is on the suction side (cool refrigerant). It may be cool enough to touch even if the valve is leaking.

3. Feel the compressor discharge line.

### **⚠ Warning**

The inlet of the harvest valve and the compressor discharge line could be hot enough to burn your hand. Just touch them momentarily.

4. Compare the temperature of the inlet of the harvest valves to the temperature of the compressor discharge line.

| <b>Findings</b>                                                                                                                             | <b>Comments</b>                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The inlet of the harvest valve is cool enough to touch and the compressor discharge line is hot.</p> <p><b>Cool &amp; Hot</b></p>        | <p>This is normal as the discharge line should always be too hot to touch and the harvest valve inlet, although too hot to touch during harvest, should be cool enough to touch after 5 minutes into the freeze cycle.</p>                                                                           |
| <p>The inlet of the harvest valve is hot and approaches the temperature of a hot compressor discharge line.</p> <p><b>Hot &amp; Hot</b></p> | <p>This is an indication something is wrong, as the harvest valve inlet did not cool down during the freeze cycle. If the compressor dome is also entirely hot, the problem is not a harvest valve leaking, but rather something causing the compressor (and the entire ice machine) to get hot.</p> |
| <p>Both the inlet of the harvest valve and the compressor discharge line are cool enough to touch.</p> <p><b>Cool &amp; Cool</b></p>        | <p>This is an indication something is wrong, causing the compressor discharge line to be cool to the touch. This is not caused by a harvest valve leaking.</p>                                                                                                                                       |

5. Record your findings on the table.

## **Discharge Line Temperature Analysis**

### GENERAL

Knowing if the discharge line temperature is increasing, decreasing or remaining constant can be an important diagnostic tool. Maximum compressor discharge line temperature on a normally operating ice machine steadily increases throughout the freeze cycle. Comparing the temperatures over several cycles will result in a consistent maximum discharge line temperature.

Ambient air temperatures affect the maximum discharge line temperature.

Higher ambient air temperatures at the condenser = higher discharge line temperatures at the compressor.

Lower ambient air temperatures at the condenser = lower discharge line temperatures at the compressor.

Regardless of ambient temperature, the freeze cycle discharge line temperature will be higher than 150°F (66°C) on a normally operating ice machine.

### PROCEDURE

Connect a temperature probe on the compressor discharge line within 6" (15 cm) of the compressor. Observe the discharge line temperature for the last three minutes of the freeze cycle and record the maximum discharge line temperature.

**Discharge Line Temperature Above 150°F (66°C) at End of Freeze Cycle:**

Ice machines that are operating normally will have consistent maximum discharge line temperatures above 150°F (66°C).

Verify the expansion valve sensing bulb is positioned and secured correctly.

**Discharge Line Temperature Below 150°F (66°C) at End of Freeze Cycle**

Ice machines that have a flooding expansion valve will have a maximum discharge line temperature that decreases each cycle.

Verify the expansion valve sensing bulb is 100% insulated and sealed airtight. Condenser air contacting an incorrectly insulated sensing bulb will cause overfeeding of the expansion valve.

## **Final Analysis - Self-contained Air, Water & Remote Condenser Models**

The column with the highest number of check marks identifies the refrigeration problem.

### COLUMN 1 - HARVEST VALVE LEAKING

Replace the valve as required.

### COLUMN 2 - LOW CHARGE/TXV STARVING

Normally, a starving expansion valve only affects the freeze cycle pressures, not the harvest cycle pressures. A low refrigerant charge normally affects both pressures. Verify the ice machine is not low on charge before replacing an expansion valve.

1. Add refrigerant charge to verify a low charge (air and water self-contained only). Do not add more than 30% of nameplate refrigerant charge. If the problem is corrected, the ice machine is low on charge.

NOTE: Do not add charge to remote models. The symptoms of a remote low on charge will result in a service long freeze in cool ambient temperatures. Check the liquid line temperature at the ice machine. The liquid line will be hot with a normal or below normal head pressure in freeze when the ice machine is low on refrigerant.

2. Find the refrigerant leak. The ice machine must operate with the nameplate charge. If the leak cannot be found, proper refrigerant procedures must still be followed. Change the liquid line drier. Then, evacuate and weigh in the proper charge.
3. If the problem is not corrected by adding charge, the expansion valve is faulty.

### COLUMN 3 - TXV FLOODING OR REFRIGERANT OVERCHARGE

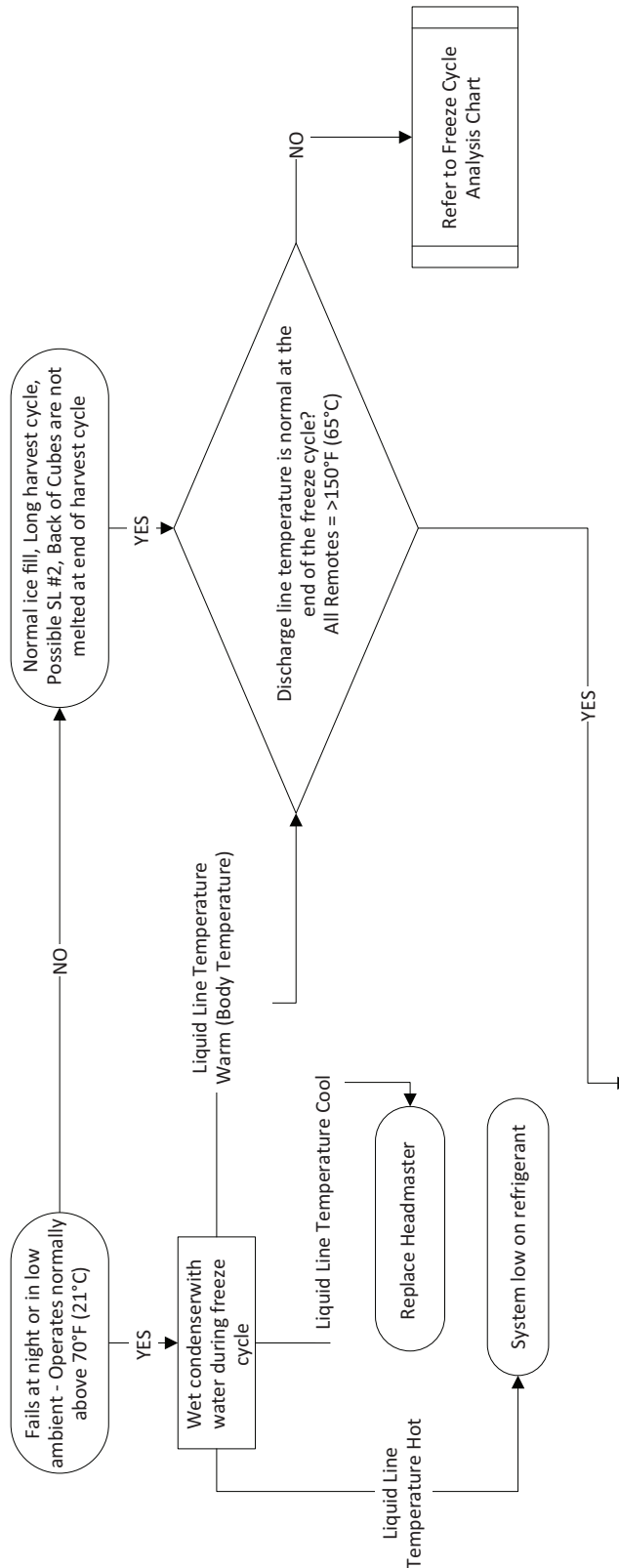
A loose or improperly mounted expansion valve bulb causes the expansion valve to flood. Check bulb mounting, insulation, etc, before changing the valve. Verify refrigerant amount is correct by weighing recovered refrigerant before replacing a TXV.

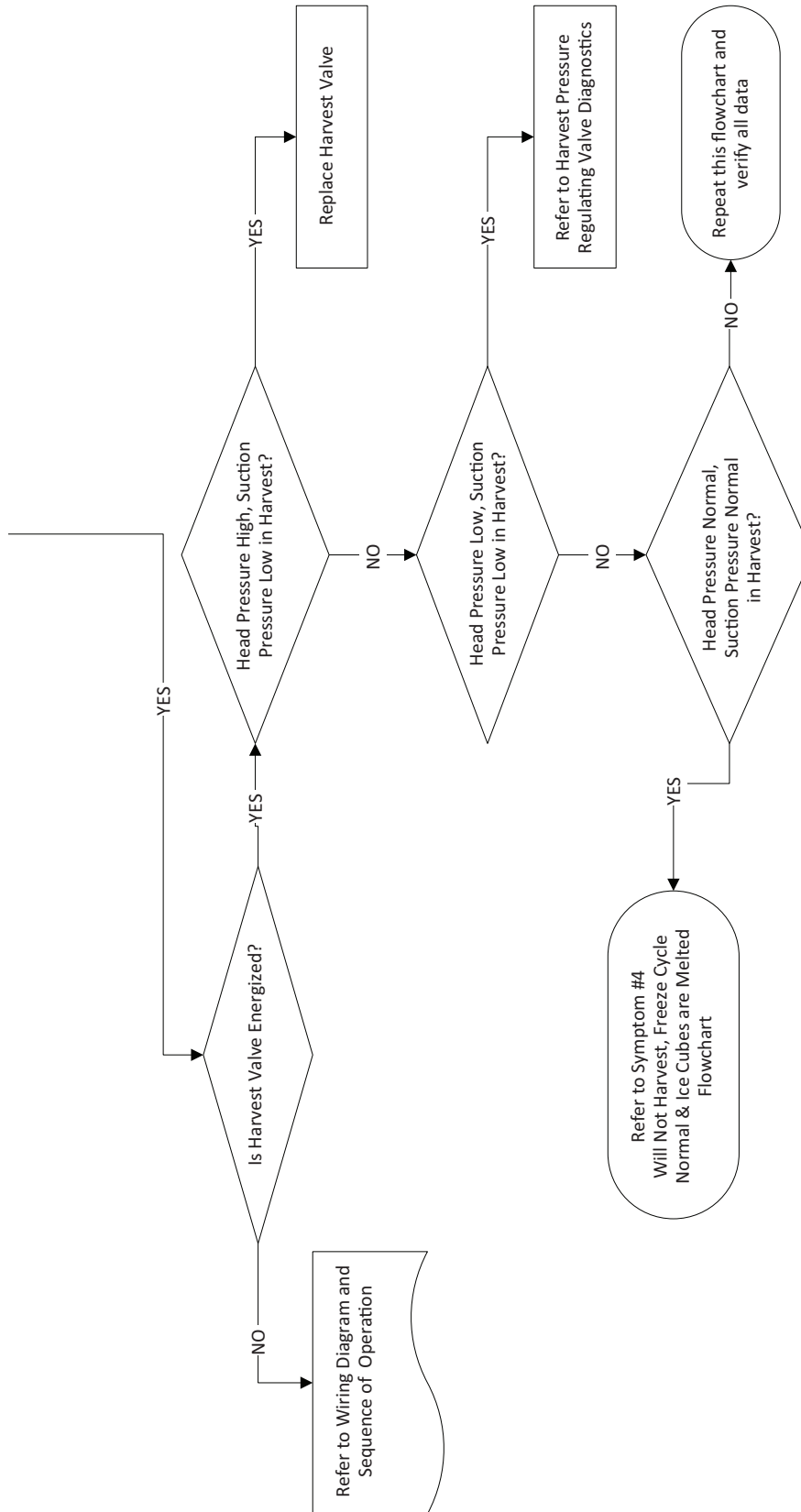
### COLUMN 4 - COMPRESSOR

Replace the compressor. To receive warranty credit, the compressor ports must be properly sealed by crimping and soldering them closed.

## SYMPTOM #3 - REMOTE CONDENSER

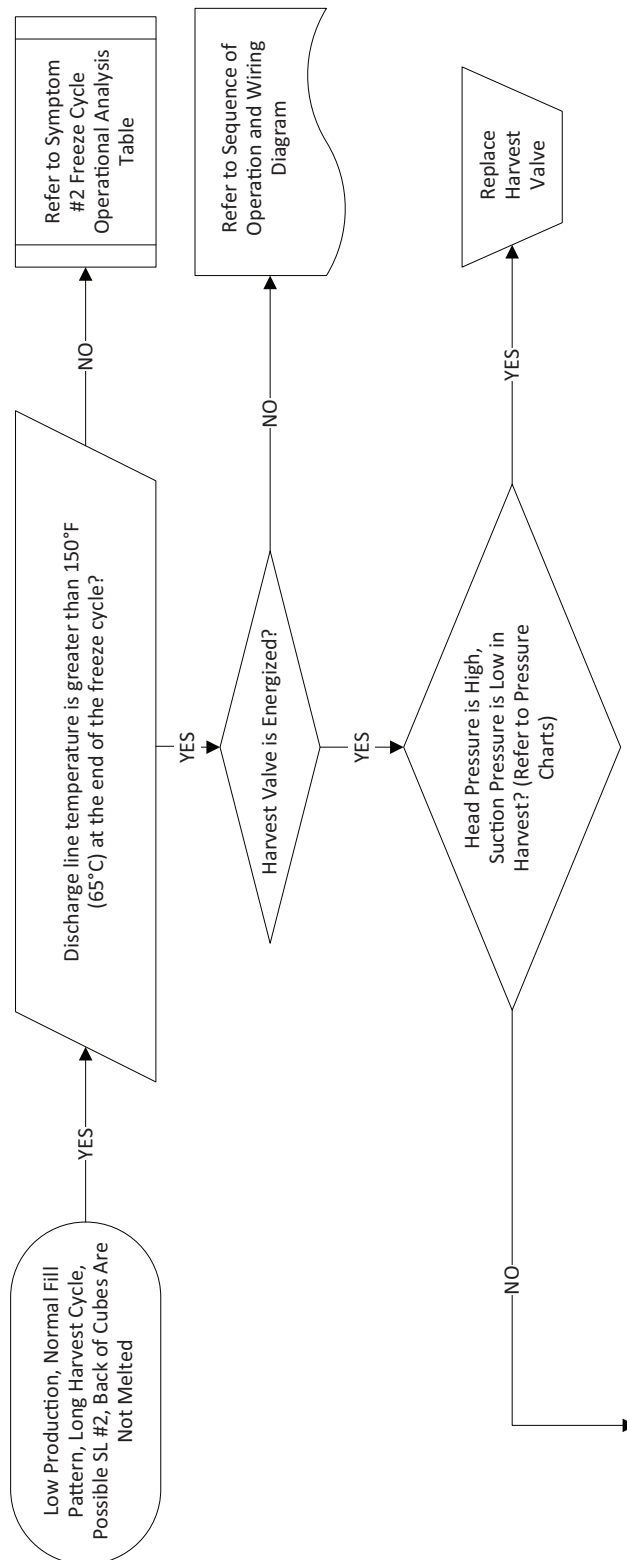
### *Traditional Remote Ice Machine – Long Harvest/Low Production/Intermittent Service Limit 2*

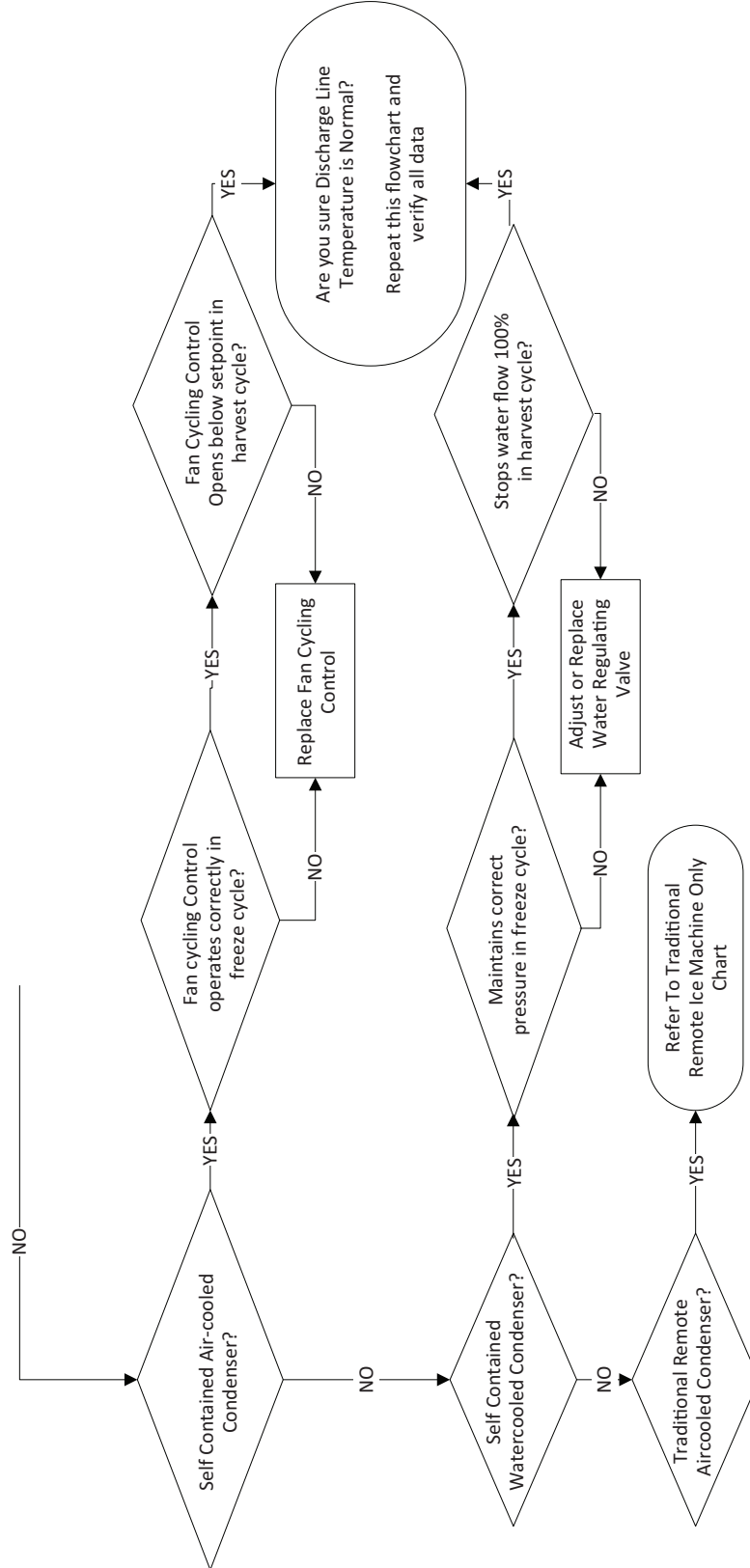




### SYMPTOM #3 - SELF-CONTAINED AIR OR WATER-COOLED

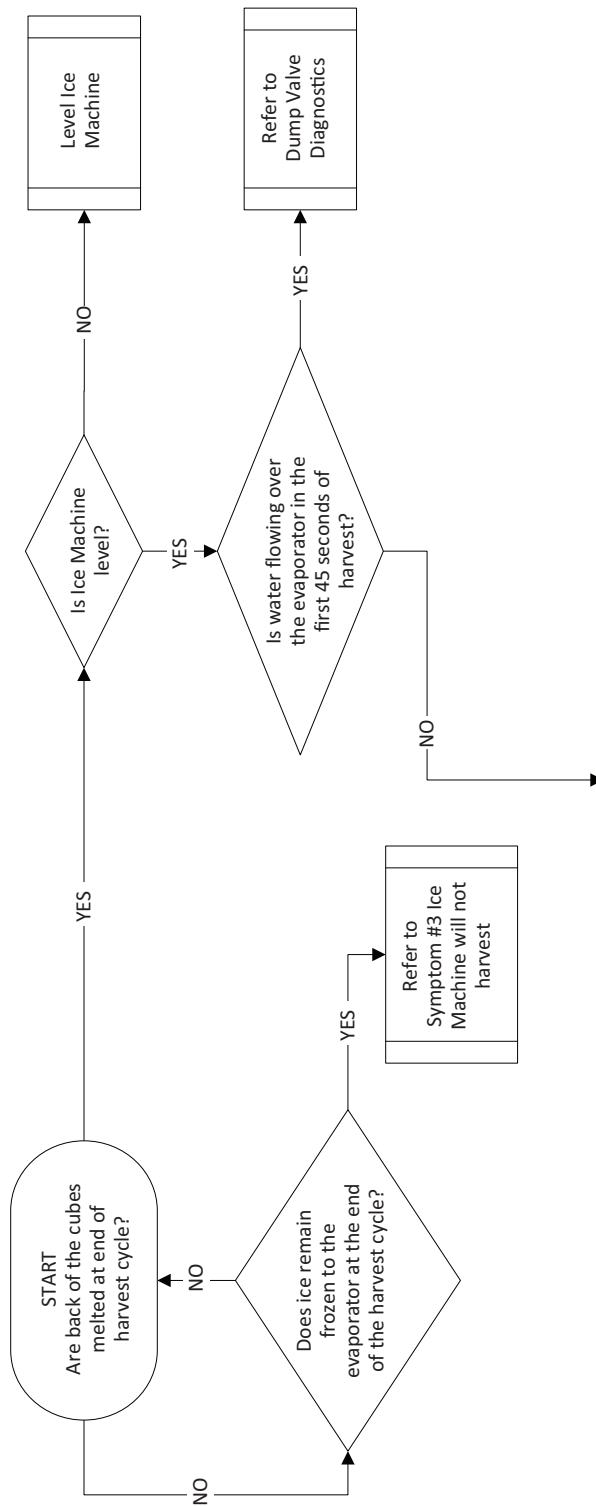
***Ice Machine Will Not Harvest – Freeze Cycle is Normal and ice Cubes Are Not Melted After Harvest***

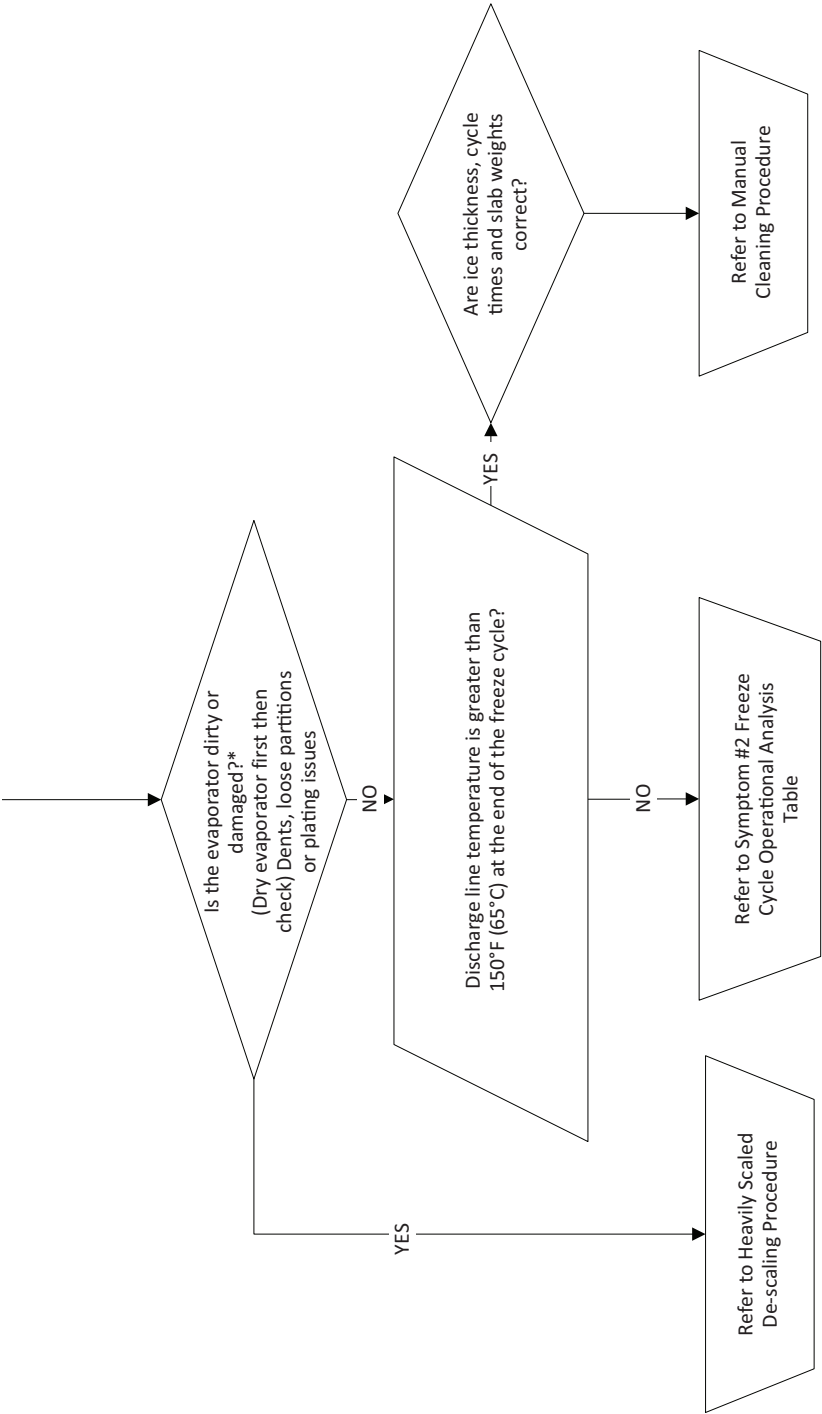




## SYMPTOM #4

***Ice Machine Will Not Harvest – Freeze Cycle Is Normal  
and Ice Cubes Are Not Melted After Harvest***





\*A damaged evaporator may not be repairable. For example: the top molding assembly is replaceable however the side moldings and/or the evaporator grid is not repairable.

# Component Check Procedures

## Main Fuse

### Function

The control board fuse stops ice machine operation if electrical components fail causing high amp draw.

### Specifications

- The main fuse is 250 Volt, 3.15 amp.

### Warning

High (line) voltage is applied to the control board at all times. Removing the control board fuse or cycling the toggle switch Off/On will not remove the power supplied to the control board.

### Check Procedure

1. If the curtain light is on with the water curtain closed, the fuse is good.

### Warning

Disconnect electrical power to the entire ice machine before proceeding.

2. Remove the fuse. Check the resistance across the fuse with an ohmmeter.

| Reading    | Result       |
|------------|--------------|
| Open (OL)  | Replace fuse |
| Closed (O) | Fuse is good |

## Bin Switch

### Function

Bin switch operation is controlled by the movement of the water curtain. The bin switch has two main functions:

1. Terminating the harvest cycle and returning the ice machine to the freeze cycle.

This occurs when the bin switch is opened and closed again within 30 seconds of opening during the harvest cycle.

2. Automatic ice machine shut-off.

If the storage bin is full at the end of a harvest cycle, the sheet of cubes fails to clear the water curtain and holds it down. After the water curtain is held down for 30 seconds, the ice machine shuts off.

The ice machine remains off until enough ice is removed from the storage bin to allow the sheet of cubes to drop clear of the water curtain. As the water curtain swings back to the operating position, the bin switch closes and the ice machine restarts.

### Important

The water curtain must be installed (bin switch closed) to start ice making.

### Check Procedure

1. Cycle the toggle switch OFF.
2. Watch the curtain light on the control board.
3. Move the water curtain upward, toward the evaporator. The bin switch must close. The curtain light “on” indicates the bin switch has closed properly.
4. Move the water curtain away from the evaporator. The bin switch must open. The curtain light “off” indicates the bin switch has opened properly.

## Ohm Test

1. Disconnect the bin switch wires from the control board.
2. Connect an ohmmeter to the disconnected bin switch.
3. Cycle the bin switch open and closed numerous times by opening and closing the water curtain.

NOTE: To prevent misdiagnosis:

- Always use the water curtain magnet to cycle the switch (a larger or smaller magnet will affect switch operation).
- Watch for consistent readings when the bin switch is cycled open and closed (bin switch failure could be erratic).

## **Float Switch**

### **Function**

Open and close to indicate to the control board the level of water in the water trough.

### **Specifications**

Normally closed, float operated magnetic reed switch.

The float switch contacts are closed in the down position. When water raises the float to the up position the magnet in the float opens the contacts.

### **Check Procedure**

The ice machine uses two float switches.

Ice Thickness Float - Indicates the water level has been reached.

Harvest Float - Indicates a harvest cycle needs to be initiated.

Initial testing can be performed by viewing the control board light(s) while raising and lowering the float. The corresponding control board light must turn on and off when the float is raised and lowered.

### **Harvest Float Switch:**

- A. The light must be on in the up position.
- B. The light must be off in the down position.

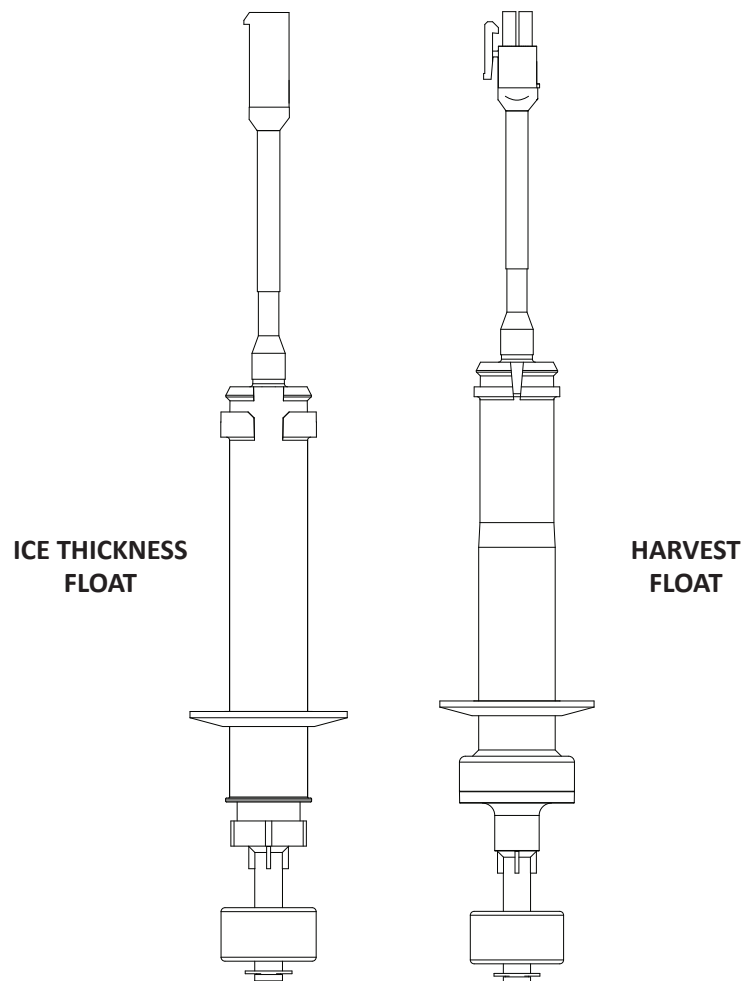
### **Ice Thickness Float Switch:**

- A. The light must be off in the down position.
- B. The light must be on in the up position.

If the control board light does not respond to the float, proceed with Step 1 below.

1. Disconnect power to the ice machine and pull the float switch and connector through the ice machine base and disconnect.
2. Attach an ohm meter lead to each float switch wire.
3. Place the float in the down position - The float switch must be closed.
4. Place the float in the up position - The float switch must be open.
5. If the float tests good, ohm the interconnecting wires to the control board and inspect connectors.

NOTE: Make adjustments with the ice machine in the off position. Making adjustments during the freeze cycle may produce an initial sheet of ice that is thicker than future cycles.



## Compressor Electrical Diagnostics

The compressor does not start or will trip repeatedly on overload.

### Check Resistance (Ohm) Values

NOTE: Compressor windings can have very low ohm values. Use a properly calibrated meter.

Perform the resistance test after the compressor cools. The compressor dome should be cool enough to touch (below 120°F/49°C) to ensure that the overload is closed and the resistance readings will be accurate.

### Single Phase Compressors

1. Disconnect power and remove the wires from the compressor terminals.
2. The resistance values between C and S and between C and R, when added together should equal the resistance value between S and R.
3. If the overload is open, there will be a resistance reading between S and R, and open readings between C and S and between C and R. Allow the compressor to cool, then check the readings again.

### Check Motor Windings to Ground

Check continuity between all three terminals and the compressor shell or copper refrigeration line. Scrape metal surface to get good contact. If continuity is present, the compressor windings are grounded and the compressor should be replaced.

To determine if the compressor is seized, check the amp draw while the compressor is trying to start.

## **Compressor Drawing Locked Rotor**

The two likely causes of this are:

- Defective starting component
- Mechanically seized compressor

To determine which you have:

1. Install high and low side gauge.
2. Try to start the compressor.
3. Watch the pressures closely.
  - If the pressures do not move, the compressor is seized. Replace the compressor.
  - If the pressures move, the compressor is turning slowly and is not seized. Check the start components.

## **Compressor Drawing High Amps**

The continuous amperage draw on start-up should not be near the maximum fuse size indicated on the serial tag.

The wiring must be correctly sized to minimize voltage drop at compressor start-up. The voltage when the compressor is trying to start must be within  $\pm 10\%$  of the nameplate voltage.

## PTCR

The PTCR allows current to flow through the start winding at compressor startup. Current flow heats the ceramic discs in the PTCR. The electrical resistance increases with temperature and stops all except a trickle of current flow through the start winding. The small flow of current keeps the PTCR hot (260°F/127°C) and the start winding out of the circuit.

The PTCR must be cooled before attempting to start the compressor, otherwise the PTCR will heat up too quickly and stop current flow through the start winding before the compressor motor reaches full speed.

### **Warning**

Disconnect electrical power to the entire ice machine at the building electrical disconnect box before proceeding.

NOTE: If a PTCR is dropped internal damage can occur to the ceramic PTCR discs. The ceramic disc can chip and cause arcing which leads to PTCR failure. Since there is no way to open the PTCR in order to determine if the ceramic disc is chipped or not, it must be discarded when dropped.

## PTCR Operation Check

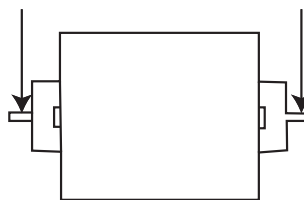
1. Visually inspect the PTCR. Check for signs of physical damage.

NOTE: The PTCR case temperature may reach 210°F (100°C) while the compressor is running. This is normal. Do not change a PTCR just because it is hot.

2. Wait at least 10 minutes for the PTCR to cool to room temperature.
3. Remove the PTCR from the ice machine.
4. Measure the resistance of the PTCR as shown. The resistance reading must be between:

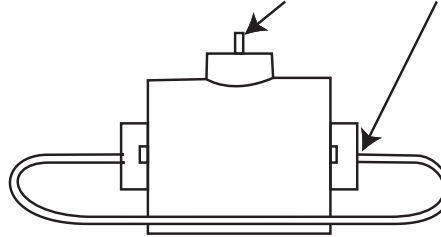
| PTCR                                              | Ohm Value | Amp | Part Number |
|---------------------------------------------------|-----------|-----|-------------|
| Two Terminal Black<br>Cera-Mite 305C2             | 60 to 110 | 12  | 000014323   |
| Two Terminal<br>Black or Blue<br>Cera-Mite 305C20 | 24 to 46  | 10  | 8505003     |
| Three Terminal<br>Blue or Tan<br>Cera-Mite 305C19 | 21 to 39  | 18  | 8504993     |
| Three Terminal<br>Blue or Tan<br>Cera-Mite 305C09 | 10 to 20  | 36  | 8504913     |

Measure Resistance at Ends



Two Terminal PTCR

Measure Resistance at Center and End



Leave Jumper Wire Attached

Three Terminal PTCR

## Fan Cycle Control

### Function

Cycles the fan motor on and off to maintain proper operating discharge pressure.

The fan cycle control closes on an increase, and opens on a decrease in discharge pressure.

### Specifications

| Model                                                                          | Cut-In<br>(Close)                        | Cut-Out<br>(Open)                        |
|--------------------------------------------------------------------------------|------------------------------------------|------------------------------------------|
| KT0300 K0350 KT0400 KT0420<br>K0420 KT0500 K0500 K0600<br>KT0700 KT1000 KT1700 | 335 psig $\pm 5$<br>2310 kPa $\pm 5$     | 275 psig $\pm 5$<br>1896 kPa $\pm 5$     |
| K1000 K1350 K1800                                                              | 385 psig $\pm 5$<br>2654 kPa $\pm 5$     | 305 psig $\pm 5$<br>2103 kPa $\pm 5$     |
| KP0300 KP0400 KP0420<br>KP0500 KP0700 KP1000                                   | 200 psig $\pm 5$<br>(1379 kPa $\pm 34$ ) | 150 psig $\pm 5$<br>(1030 kPa $\pm 34$ ) |

### Check Procedure

Disconnect electrical power to the ice machine at the electrical service disconnect.

Verify fan motor windings are not open or grounded, and fan spins freely.

Connect manifold gauge to ice machine.

Hook voltmeter in parallel across the fan cycle control, leaving wires attached.

Reconnect electrical power to the ice machine and Cycle the toggle switch On.

Wait until water flows over the evaporator then refer to chart below.

| System Pressure: | Reading Should Be: | Fan Should Be: |
|------------------|--------------------|----------------|
| above cut-in     | 0 volts            | running        |
| below cut-out    | line voltage       | off            |

# High Pressure Cutout (HPCO) Control

## Function

Stops the ice machine if subjected to excessive high-side pressure. The HPCO control is normally closed, and opens on a rise in discharge pressure.

## Specifications

| Specifications  |                                           |                                            |
|-----------------|-------------------------------------------|--------------------------------------------|
| Refrigerant     | Cut-Out                                   | Cut-In                                     |
| R410A           | 600 psig $\pm 10$<br>(4136 kPa $\pm 69$ ) | 450 psig $\pm 20$<br>(3103 kPa $\pm 138$ ) |
| R290            | 250 psig $\pm 10$<br>(1724 kPa $\pm 69$ ) | 350 psig $\pm 20$<br>(2413 kPa $\pm 138$ ) |
| Automatic Reset |                                           |                                            |

## Check Procedure

1. Move toggle switch to OFF.
2. Connect manifold gauge.
3. Hook voltmeter in parallel across the HPCO, leaving wires attached.
4. On water-cooled models, close the water service valve to the water condenser inlet. On self-contained air-cooled models, disconnect the fan motor.
5. Move toggle switch to ON.
6. No water or air flowing through the condenser will cause the HPCO control to open because of excessive pressure. Watch the pressure gauge and record the cut-out pressure.

### Warning

If discharge pressure exceeds 600 psig - 4137 kPa and the HPCO control does not cut out, cycle the toggle switch Off to stop ice machine operation.

Replace the HPCO control if it:

- Will not reset
- Does not open at the specified cut-out point

## Refrigeration Components

### HEAD PRESSURE CONTROL VALVE

Koolaire remote systems require head pressure control valves with special settings. Replace defective head pressure control valves only with “original” Koolaire replacement parts.

### Refrigerant Charge Verification

The correct amount of refrigerant (name plate charge) is required to operate correctly at all ambient conditions.

An ice machine with an overcharge or undercharge of refrigerant may function properly at higher ambient temperatures and fails at lower ambient temperatures. Symptoms of incorrect refrigerant amount are:

- Works during the day and malfunctions at night, and/or fails whenever the outdoor temperature drops.
- A Safety limit is stored in control board memory.

Refrigerant loss and ambient temperature are directly related to each other. As the ambient temperature drops, more refrigerant is stored in the condenser.

When the refrigerant charge and ambient temperature create an undercharge of refrigerant in the freeze cycle, the receiver dip tube will lose it's liquid seal. Without liquid refrigerant to the TXV, the ice machine fails to make a full sheet of ice in 60 minutes and a safety limit #1 results.

NOTE: When a head pressure control valve is being replaced or refrigerant charge is suspected, verify the refrigerant charge is correct by recovering the refrigerant, weighing and comparing to the nameplate amount. Refer to Refrigerant Recovery/Evacuation for recovery procedures.

## **FREEZE CYCLE OPERATION ALL MODELS**

The head pressure control valve is non adjustable.

At ambient temperatures of approximately 70°F (21°C) or above, refrigerant flows through the valve from the condenser to the receiver inlet. At temperatures below this (or at higher temperatures if it is raining), the head pressure control dome's nitrogen charge closes the condenser port and opens the bypass port from the compressor discharge line.

In this modulating mode, the valve maintains minimum head pressure by building up liquid in the condenser and bypassing discharge gas directly to the receiver.

## **HARVEST CYCLE OPERATION**

### **Remote Condenser Models**

The head pressure control cycles into full bypass due to the pressure drop when the harvest valve opens. Refrigerant flows from the compressor to the evaporator through the harvest valve and the head pressure valve is out of the circuit.

### **Diagnostics**

#### **FREEZE CYCLE - REMOTE CONDENSER**

1. Determine if the coil is clean.
2. Determine the air temperature entering the condenser.
3. Determine if the head pressure is high or low in relationship to the outside temperature. (Refer to the proper "Cycle Times/24-Hour Ice Production/Refrigerant Pressure Charts").
4. Determine the temperature of the liquid line entering the receiver by feeling it. This line is normally warm; "body temperature."
5. Using the information gathered, refer to the chart.

NOTE: A head pressure control valve that will not bypass, will function properly with condenser air temperatures of approximately 70°F (21°C) or above. When the temperature drops below 70°F (21°C), the head pressure control valve fails to bypass and the ice machine malfunctions. Lower ambient conditions can be simulated by rinsing the condenser with cool water during the freeze cycle.

| Condition                                                     | Probable Cause               | Corrective Measure                    |
|---------------------------------------------------------------|------------------------------|---------------------------------------|
| Discharge Pressure - High<br>Liquid Line Temperature<br>- Hot | Valve stuck in<br>bypass     | Replace valve                         |
| Discharge Pressure - Low<br>Liquid Line Temperature<br>- Cold | Valve not<br>bypassing       | Replace valve                         |
| Discharge Pressure - Low<br>Liquid Line Temperature<br>- Hot  | Ice Machine<br>Low on Charge | Refrigerant<br>Charge<br>Verification |

### **Undercharge Symptoms**

- Safety limit #1 or Safety limit #2 in control board memory.
- Harvest cycle suction pressure is low.
- Harvest cycle discharge pressure is low.
- Liquid line entering receiver feels warm to hot in the freeze cycle.

### **Overcharge Symptoms**

- Safety limit #2 in control board memory, a flashing alert and after pressing left arrow Long Harvest is displayed.
- Harvest cycle discharge pressure is normal.
- Freeze cycle time, suction and discharge pressure are normal and the ice machine will not harvest. The sheet of ice cubes show little or no sign of melting when removed from the evaporator after the harvest cycle has been completed. (If the cubes are melted you have a release problem, clean the ice machine).

## **HARVEST PRESSURE REGULATING VALVE (HPR) SYSTEM REMOTE CONDENSER ONLY**

### **GENERAL**

The harvest pressure regulating (HPR) system includes:

- Harvest pressure regulating solenoid valve (HPR solenoid). This is an electrically operated valve which opens when energized, and closes when de-energized.
- Harvest pressure regulating valve (HPR valve). This is a pressure regulating valve which modulates open and closed, based on the refrigerant pressure at the outlet of the valve. The valve closes completely and stops refrigerant flow when the pressure at the outlet rises above the valve setting.
- The harvest pressure regulating valve is not adjustable.

### **FREEZE CYCLE**

The HPR system is not used during the freeze cycle.

The HPR solenoid is closed (de-energized), preventing refrigerant flow into the HPR valve.

### **HARVEST CYCLE**

During the harvest cycle, the check valve in the discharge line prevents refrigerant in the remote condenser and receiver from back feeding into the evaporator and condensing to liquid.

The HPR solenoid is opened (energized) during the harvest cycle, allowing refrigerant gas from the top of the receiver to flow into the HPR valve. The HPR valve modulates open and closed, raising the suction pressure high enough to sustain heat for the harvest cycle, without allowing refrigerant to condense to liquid in the evaporator.

In general, harvest cycle suction pressure rises, then stabilize. Exact pressures vary from model to model. Refer to cycle time/24 hour ice production and operational pressure charts.

## HPR DIAGNOSTICS

Steps 1 through 5 can be quickly verified without attaching a manifold gauge set or thermometer.

All questions must have a yes answer to continue the diagnostic procedure.

1. Liquid line warm?  
(Body temperature is normal)  
If liquid line is cooler than body temperature, refer to head pressure control valve diagnostics.
2. Ice fill pattern normal?  
Refer to “Ice Formation Pattern” if ice fill is not normal.
3. Freeze time normal?  
(Refer to Cycle Times/Refrigerant Pressures/24 Hour Ice Production Charts).
  - A. Shorter freeze cycles?  
Refer to head pressure control valve diagnostics.
  - B. Longer freeze cycles?  
Refer to water system checklist, then refer to Refrigeration Diagnostic Procedures.
4. Harvest time is longer than normal and control board indicates safety limit #2?  
(Refer to Cycle Times/Refrigerant Pressures/24 Hour Ice Production Charts).
5. Discharge line temperature is greater than 160°F at the end of the freeze cycle?  
(Refer to Discharge Line Temperature Analysis)

6. Connect refrigeration manifold gauge set to the access valves on the front of the ice machine. Establish baseline by recording suction and discharge pressure and freeze & harvest cycle times. (Refer to “Freeze Cycle Refrigeration System Operational Analysis Tables” for data collection detail).
7. Freeze cycle Head Pressure is in the range indicated in the cycle time/24 hour ice production and operational pressure chart?  
If the head pressure is low refer to head pressure control valve diagnostics.
8. Freeze cycle Suction Pressure normal?  
Refer to analyzing suction pressure if suction pressure is high or low.
9. Harvest cycle suction and discharge pressures are lower than indicated in the cycle times/refrigerant pressures/24 hour ice production chart?  
Replace Harvest Pressure Regulating solenoid

## **WATER REGULATING VALVE**

Water-Cooled Models Only

### **FUNCTION**

The water regulating valve maintains the freeze cycle discharge pressure.

### **CHECK PROCEDURE**

1. Determine if the head pressure is high or low (refer to cycle time/24 hour ice production and operational pressure chart for the model you are servicing).
2. Verify the condenser water meets specifications.
3. Adjust valve to increase or decrease discharge pressure.
4. Determine the temperature of the liquid line entering the receiver by feeling it. This line is normally warm; body temperature.
5. Using the information gathered, refer to the list for diagnosis.

### **Problem (Freeze Cycle)**

#### VALVE NOT MAINTAINING DISCHARGE PRESSURE.

- Valve incorrectly set, dirty or defective. Adjust, clean or replace valve.

#### DISCHARGE PRESSURE EXTREMELY HIGH; LIQUID LINE ENTERING RECEIVER FEELS HOT.

- Water regulating valve incorrectly set or not opening.

#### DISCHARGE PRESSURE LOW, LIQUID LINE ENTERING RECEIVER FEELS WARM TO HOT.

- Ice machine low on charge - Verify Total System Refrigerant Charge

# Refrigerant Recovery/Evacuation

## DEFINITIONS

### Recover

To remove refrigerant, in any condition, from a system and store it in an external container, without necessarily testing or processing it in any way.

### Recycle

To clean refrigerant for re-use by oil separation and single or multiple passes through devices, such as replaceable core filter-driers, which reduce moisture, acidity and particulate matter. This term usually applies to procedures implemented at the field job site or at a local service shop.

### Reclaim

To reprocess refrigerant to new product specifications (see below) by means which may include distillation. A chemical analysis of the refrigerant is required after processing to be sure that product specifications are met. This term usually implies the use of processes and procedures available only at a reprocessing or manufacturing facility.

Chemical analysis is the key requirement in this definition. Regardless of the purity levels reached by a reprocessing method, refrigerant is not considered “reclaimed” unless it has been chemically analyzed and meets ARI Standard 700 (latest edition).

### New Product Specifications

This means ARI Standard 700 (latest edition). Chemical analysis is required to assure that this standard is met.

## REFRIGERANT RE-USE POLICY

Koolaire recognizes and supports the need for proper handling, re-use, and disposal of refrigerants. Koolaire service procedures require recapturing refrigerants, not venting them to the atmosphere.

It is not necessary, in or out of warranty, to reduce or compromise the quality and reliability of your customers' products to achieve this.

### **Important**

Koolaire assumes no responsibility for use of contaminated refrigerant. Damage resulting from the use of contaminated, recovered, or recycled refrigerant is the sole responsibility of the servicing company.

Koolaire approves the use of:

1. New Refrigerant
  - Must be of original nameplate type.
2. Reclaimed Refrigerant
  - Must be of original nameplate type.
  - Must meet ARI Standard 700 (latest edition) specifications.
3. Recovered or Recycled Refrigerant
  - Must be recovered or recycled in accordance with current local, state and federal laws.
  - Must be recovered from and re-used in the same Koolaire product. Re-use of recovered or recycled refrigerant from other products is not approved.
  - Recycling equipment must be certified to ARI Standard 740 (latest edition) and be maintained to consistently meet this standard.

4. Recovered refrigerant must come from a “contaminant-free” system. To decide whether the system is contaminant free, consider:
  - Type(s) of previous failure(s)
  - Whether the system was cleaned, evacuated and recharged properly following failure(s)
  - Whether the system has been contaminated by this failure
  - Compressor motor burnouts and improper past service prevent refrigerant re-use.
  - Refer to “Determining Severity of Contamination” on page 140 to test for contamination.
5. “Substitute” or “Alternative” Refrigerant
  - Must use only Koolaire-approved alternative refrigerants.
  - Must follow Koolaire-published conversion procedures.

## RECOVERY AND RECHARGING PROCEDURES

Do not purge refrigerant to the atmosphere. Capture refrigerant using recovery equipment. Follow the manufacturer's recommendations.

### **Important**

Koolaire assumes no responsibility for the use of contaminated refrigerant. Damage resulting from the use of contaminated refrigerant is the sole responsibility of the servicing company.

### **Important**

Replace the liquid line drier before evacuating and recharging. Use only a Koolaire (O.E.M.) liquid line filter drier to prevent voiding the warranty.

## CONNECTIONS

1. Suction side of the compressor through the suction service valve.
2. Discharge side of the compressor through the discharge service valve.
3. Liquid side through the liquid line drier.

### SELF-CONTAINED RECOVERY/EVACUATION

1. Cycle the toggle switch Off.
2. Install manifold gauge, scale and recovery unit or two-stage vacuum pump and open high, low and charging ports.
3. Perform recovery or evacuation:
  - A. Recovery: Operate the recovery unit as directed by the manufacturer's instructions.
  - B. Evacuation prior to recharging: Pull the system down to 500 microns. Then, allow the pump to run for an additional half hour. Turn off the pump and perform a standing vacuum leak check.
4. Follow the Charging Procedures.

## CHARGING PROCEDURES

### **Important**

The charge is critical on all Koolaire machines. Use a scale or a charging cylinder to ensure the proper charge is installed.

1. Cycle the toggle switch Off.
2. Isolate the vacuum pump valve, low side and high side access valves from the refrigeration system. The refrigerant charging access valve remains open.
3. Open the high side manifold gauge valve.
4. Open the refrigerant cylinder and add the proper refrigerant charge (shown on nameplate) through the liquid line drier.

### **Caution**

Damage may occur when charging liquid into the front discharge line access port.

Replacement driers have a Schrader valve built into the inlet of the drier. Filter driers without an access port must be replaced with the current OEM part before recharging the ice machine. All Liquid refrigerant must be added through the liquid line drier access port.

5. Let the system “settle” for 2 to 3 minutes.
6. Cycle the toggle switch On.

NOTE: Manifold gauge set must be removed properly to ensure that no refrigerant contamination or loss occurs.

7. Make sure that all of the vapor in the charging hoses is drawn into the ice machine before disconnecting the charging hoses.
  - A. Run the ice machine in freeze cycle.
  - B. Remove the high side low loss fitting from the liquid line filter drier.
  - C. Open the high and low side valves on the manifold gauge set. Any refrigerant in the lines will be pulled into the low side of the system.
  - D. Allow the pressures to equalize while the ice machine is in the freeze cycle.
  - E. Remove the hoses from the ice machine and install the caps.

## REMOTE CONDENSER MODEL PROCEDURE

### Refrigerant Recovery/Evacuation

Do not purge refrigerant to the atmosphere. Capture refrigerant using recovery equipment. Follow the manufacturer's recommendations.

#### **Important**

Koolaire assumes no responsibility for the use of contaminated refrigerant. Damage resulting from the use of contaminated refrigerant is the sole responsibility of the servicing company.

#### **Important**

Replace the liquid line drier after recovering the refrigerant and before evacuating and recharging. Use only a Koolaire (O.E.M.) liquid line filter drier to prevent voiding the warranty.

#### **Important**

Recovery/evacuation of a remote system requires connections at four points for complete system evacuation.

### MAKE THESE CONNECTIONS:

- Suction side of the compressor through the suction service valve.
- Discharge side of the compressor through the discharge service valve.
- Receiver outlet service valve, which evacuates the area between the check valve in the liquid line and the pump down solenoid.

- Access valve on the discharge line quick-connect fitting, located on the outside of the compressor/evaporator compartment. This connection evacuates the condenser. Without it, the magnetic check valves would close when the pressure drops during evacuation, preventing complete evacuation of the condenser.

NOTE: Koolaire recommends using an access valve core removal and installation tool on the discharge line quick-connect fitting. This permits access valve core removal. This allows for faster evacuation and charging, without removing the manifold gauge hose.

#### REMOTE CONDENSER RECOVERY/EVACUATION

1. Stop the ice machine.
2. Install manifold gauge set, scale and recovery unit or two-stage vacuum pump.
3. Open high and low side on the manifold gauge set.
4. Perform recovery or evacuation:
  - A. Recovery: Operate the recovery unit as directed by the manufacturer's instructions.
  - B. Evacuation prior to recharging: Pull the system down to 500 microns. Then, allow the pump to run for an additional hour. Turn off the pump and perform a standing vacuum leak check.

NOTE: Check for leaks with an electronic leak detector after charging the ice machine.

5. Follow the Remote Charging Procedures.

## REMOTE CHARGING PROCEDURES

1. Close the vacuum pump valve and the low side manifold gauge valve.
2. Open the refrigerant cylinder and add the proper refrigerant charge (shown on nameplate) into the system high side (receiver outlet valve/liquid line drier and/or liquid line quick-connect fitting).
3. If the high side does not take the entire charge, close the high side on the manifold gauge set and start the ice machine. Add the remaining charge through the low side until the machine is fully charged.

NOTE: If an access valve core removal and installation tool is used on any of the access valves, reinstall the cores before disconnecting the access tool and hose.

4. Verify all of the vapor in the charging hoses is drawn into the refrigeration system before disconnecting the charging hoses.
  - A. Run the ice machine in freeze cycle.
  - B. Remove the high side low loss fitting.
  - C. Open the high and low side valves on the manifold gauge set. Any refrigerant in the lines will be pulled into the low side of the system.
  - D. Allow the suction pressures in the refrigeration system and the manifold gauge set to equalize while the ice machine is in the freeze cycle.
  - E. Isolate and remove the low side hose.
  - F. Install access valve caps.

## System Contamination Cleanup

This section describes the basic requirements for restoring contaminated systems to reliable service.

### Important

Koolaire assumes no responsibility for the use of contaminated refrigerant. Damage resulting from the use of contaminated refrigerant is the sole responsibility of the servicing company.

### DETERMINING SEVERITY OF CONTAMINATION

System contamination is generally caused by either moisture or residue from compressor burnout entering the refrigeration system.

Inspection of the refrigerant usually provides the first indication of system contamination. Obvious moisture or an acrid odor in the refrigerant indicates contamination.

If harmful levels of contamination are suspected, perform the following procedure.

1. Remove the refrigerant charge from the ice machine.
2. Remove the compressor from the system.
3. Check the odor and appearance of the oil.
4. Inspect open suction and discharge lines at the compressor for burnout deposits.
5. If no signs of contamination are present, perform an acid oil test to determine the type of cleanup required.

| <b>Contamination/Cleanup Chart</b>                                                                                                                                                                                           |                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Symptoms/Findings</b>                                                                                                                                                                                                     | <b>Required Cleanup Procedure</b>      |
| No symptoms or suspicion of contamination                                                                                                                                                                                    | Normal evacuation/recharging procedure |
| Moisture/Air Contamination symptoms<br>Refrigeration system open to atmosphere for longer than 15 minutes<br>Refrigeration test kit and/or acid oil test shows contamination<br>No burnout deposits in open compressor lines | Mild contamination cleanup procedure   |
| Mild Compressor Burnout symptoms<br>Oil appears clean but smells acrid<br>Refrigeration test kit or acid oil test shows harmful acid content<br>No burnout deposits in open compressor lines                                 | Mild contamination cleanup procedure   |
| Severe Compressor Burnout symptoms<br>Oil is discolored, acidic, and smells acrid<br>Burnout deposits found in the compressor, lines, and other components                                                                   | Severe contamination cleanup procedure |

## **CLEANUP PROCEDURE**

### **Mild System Contamination**

1. Replace any failed components.
2. If the compressor is good, change the oil.
3. Replace the liquid line drier.

NOTE: If the contamination is from moisture, use heat lamps during evacuation. Position them at the compressor, condenser and evaporator prior to evacuation. Do not position heat lamps too close to plastic components, or they may melt or warp.

4. Follow the normal evacuation procedure, except replace the evacuation step with the following:
  - A. Pull vacuum to 1000 microns. Break the vacuum with dry nitrogen and sweep the system. Pressurize to a minimum of 5 psig.
  - B. Pull vacuum to 500 microns. Break the vacuum with dry nitrogen and sweep the system. Pressurize to a minimum of 5 psig.
  - C. Change the vacuum pump oil.
  - D. Pull vacuum to 500 microns. Run the vacuum pump for 1/2 hour on self-contained models, 1 hour on remotes.

NOTE: You may perform a pressure test as a preliminary leak check. You should use an electronic leak detector after system charging to be sure there are no leaks.

5. Charge the system with the proper refrigerant to the nameplate charge.
6. Operate the ice machine.

## SEVERE SYSTEM CONTAMINATION CLEANUP PROCEDURE

1. Remove the refrigerant charge.
2. Remove the compressor and inspect the refrigeration lines. If burnout deposits are found, install a new harvest valve, replace the manifold strainer, TXV and harvest pressure regulating valve.
3. Wipe away any burnout deposits from suction and discharge lines at compressor.
4. Sweep through the open system with dry nitrogen.
5. Install a new compressor and new start components.
6. Install suction line filter-drier in front of compressor.
7. Install an access valve at the inlet of the suction line drier.
8. Install a new liquid line drier.
9. Follow the normal evacuation procedure, except replace the evacuation step with the following:
  - A. Pull vacuum to 1000 microns. Break the vacuum with dry nitrogen and sweep the system. Pressurize to a minimum of 5 psig.
  - B. Change the vacuum pump oil.
  - C. Pull vacuum to 500 microns. Break the vacuum with dry nitrogen and sweep the system. Pressurize to a minimum of 5 psig.
  - D. Change the vacuum pump oil.
  - E. Pull vacuum to 500 microns. Run the vacuum pump for 1 additional hour.

NOTE: You may perform a standing vacuum test to make a preliminary leak check. You should use an electronic leak detector after system charging to be sure there are no leaks.

10. Charge the system with the proper refrigerant to the nameplate charge.
11. Operate the ice machine for one hour. Then, check the pressure drop across the suction line filter-drier.
  - A. If the pressure drop is less than 1 psig the filter-drier should be adequate for complete cleanup.
  - B. If the pressure drop exceeds 1 psig, change the suction line filter-drier and the liquid line drier. Repeat until the pressure drop is acceptable.
12. Operate the ice machine for 48 – 72 hours. Replace the suction line and liquid line drier if necessary.
13. Follow normal evacuation procedures.

### **LIQUID LINE FILTER DRIERS**

The filter-driers used on Koolaire ice machines are manufactured to Koolaire specifications and have an access fitting for charging with refrigerant. A Koolaire drier also has dirt-retaining filtration, with fiberglass filters on both the inlet and outlet ends. This is very important because ice machines have a back-flushing action that takes place during every Harvest cycle.

A Koolaire filter-drier has high moisture and acid removal capability.

The size of the filter-drier is important. The refrigerant charge is critical. Using an improperly sized filter-drier will cause the ice machine to be improperly charged with refrigerant.

#### **Important**

Driers are covered as a warranty part. The drier must be replaced any time the system is opened for repairs.

## REPLACING PRESSURE CONTROLS WITHOUT REMOVING REFRIGERANT CHARGE

This procedure reduces repair time and cost. Use it when any of the following components require replacement, and the refrigeration system is operational and leak-free.

- Fan cycle control
  - High pressure cut-out control
  - High side access valve
  - Low side access valve
1. Disconnect power to the ice machine.
  2. Follow all manufacturers' instructions supplied with the pinch-off tool. Position the pinch-off tool around the tubing as far from the pressure control as feasible. (See the figure on next page.) Clamp down on the tubing until the pinch-off is complete.

### **Warning**

Do not unsolder a defective component. Cut it out of the system. Do not remove the pinch-off tool until the new component is securely in place.

3. Cut the tubing of the defective component with a small tubing cutter.
4. Solder the replacement component in place. Allow the solder joint to cool.
5. Remove the pinch-off tool.
6. Re-round the tubing. Position the flattened tubing in the proper hole in the pinch off tool. Tighten the wing nuts until the block is tight and the tubing is rounded.

NOTE: The pressure controls will operate normally once the tubing is re-rounded. Tubing may not re-round 100%.

## Refrigerant Amount

### KP MODELS

NOTE: All models charged with R290 refrigerant.

**Nameplate information overrides all data in this chart.**

| Model  | Self-Contained<br>Air-Cooled | Self-Contained<br>Water-Cooled |
|--------|------------------------------|--------------------------------|
| KP0300 | 5.3 oz<br>150 g              | N/A                            |
| KP0400 | 5.9 oz<br>170 g              | 5.3 oz<br>150 g                |
| KP0420 | 5.9 oz<br>170 g              | 5.3 oz<br>150 g                |
| KP0500 | 5.3 oz<br>150 g              | 6.5 oz<br>180 g                |
| KP0700 | 10.9 oz<br>310 g             | 10.9 oz<br>310 g               |
| KP1000 | 14.1 oz<br>400 g             | 14.1 oz<br>400 g               |

## KT MODELS

NOTE: All models charged with R410A refrigerant.

**Nameplate information overrides all data in this chart.**

| Model                                                                                                             | Air-Cooled      | Water-Cooled   | Remote          | 51' to 100'<br>Line sets* |
|-------------------------------------------------------------------------------------------------------------------|-----------------|----------------|-----------------|---------------------------|
| <b>KT0300</b><br><b>60 Hz</b>                                                                                     | 15 oz<br>425 g  | N/A            | N/A             | N/A                       |
| <b>KT0300</b><br><b>50 Hz</b>                                                                                     | 17 oz<br>482 g  | N/A            | N/A             | N/A                       |
| <b>KT0400</b><br><b>60 Hz</b>                                                                                     | 18 oz<br>510 g  | 14 oz<br>397 g | N/A             | N/A                       |
| <b>KT0400</b><br><b>50 Hz</b>                                                                                     | 21 oz<br>595 g  | N/A            | N/A             | N/A                       |
| <b>KT0420</b><br><b>60 Hz</b>                                                                                     | 16 oz<br>454 g  | 14 oz<br>397 g | N/A             | N/A                       |
| <b>KT0420</b><br><b>50 Hz</b>                                                                                     | 16 oz<br>454 g  | N/A            | N/A             | N/A                       |
| <b>KT0500</b><br><b>60 Hz</b>                                                                                     | 18 oz<br>510 g  | 18 oz<br>510 g | N/A             | N/A                       |
| <b>KT0500</b><br><b>50 Hz</b>                                                                                     | 18 oz<br>510 g  | N/A            | N/A             | N/A                       |
| <b>KT0700</b><br><b>60 Hz</b>                                                                                     | 22 oz<br>624 g  | 18 oz<br>510 g | N/A             | N/A                       |
| <b>KT0700</b><br><b>50 Hz</b>                                                                                     | 22 oz<br>624 g  | N/A            | N/A             | N/A                       |
| <b>KT1000</b><br><b>60 Hz</b>                                                                                     | 28 oz<br>794 g  | 26 oz<br>624 g | 7 lbs<br>3.2 kg | 2 lbs<br>907 g            |
| <b>KT1000</b><br><b>50 Hz</b>                                                                                     | 28 oz<br>794 g  | N/A            | N/A             | N/A                       |
| <b>KT1700</b><br><b>60 Hz</b>                                                                                     | 42 oz<br>1191 g | 34 oz<br>964 g | 7 lbs<br>3.2 kg | 2 lbs<br>907 g            |
| <b>KT1700</b><br><b>50 Hz</b>                                                                                     | 42 oz<br>1191 g | N/A            | N/A             | N/A                       |
| * Additional amount of refrigerant to be added for remote condenser with line sets that are 51' to 100' in length |                 |                |                 |                           |

## K MODELS

NOTE: All models charged with R410A refrigerant.

**Nameplate information overrides all data in this chart.**

| Model                                                                                                             | Air-Cooled      | Water-Cooled   | Remote                   | 51' to 100'<br>Line sets* |
|-------------------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------------------|---------------------------|
| <b>K0250<br/>60 Hz</b>                                                                                            | 15 oz<br>425 g  | N/A            | N/A                      | N/A                       |
| <b>K0250<br/>50 Hz</b>                                                                                            | 17 oz<br>482 g  | N/A            | N/A                      | N/A                       |
| <b>K0350<br/>60 Hz</b>                                                                                            | 18 oz<br>510 g  | 14 oz<br>397 g | N/A                      | N/A                       |
| <b>K0350<br/>50 Hz</b>                                                                                            | 21 oz<br>595 g  | 14 oz<br>397 g | N/A                      | N/A                       |
| <b>K0420 60 Hz<br/>and 50 Hz</b>                                                                                  | 16 oz<br>454 g  | 14 oz<br>397 g | N/A                      | N/A                       |
| <b>K0500 60 Hz<br/>and 50 Hz</b>                                                                                  | 18 oz<br>510 g  | 18 oz<br>510 g | N/A                      | N/A                       |
| <b>K0600 60 Hz<br/>and 50 Hz</b>                                                                                  | 24 oz<br>680 g  | 18 oz<br>510 g | N/A                      | N/A                       |
| <b>K1000 60 Hz</b>                                                                                                | 28 oz<br>794 g  | 24 oz<br>680 g | 7 lbs 5 oz<br>3.4 kg     | 2 lbs<br>907 g            |
| <b>K1000 50 Hz</b>                                                                                                | 44 oz<br>1247 g | 24 oz<br>680 g | 7 lbs 5 oz<br>3.4 kg     | 2 lbs<br>907 g            |
| <b>K1350<br/>60 Hz</b>                                                                                            | 42 oz<br>1191 g | 32 oz<br>907 g | 11 lbs<br>5 oz<br>5.2 kg | 2 lbs<br>907 g            |
| <b>K1350<br/>50 Hz</b>                                                                                            | 42 oz<br>1191 g | N/A            | 11 lbs<br>5 oz<br>5.2 kg | 2 lbs<br>907 g            |
| <b>K1800 60 Hz<br/>and 50 Hz</b>                                                                                  | 46 oz<br>1304 g | N/A            | 12 lbs<br>5.4 kg         | 2 lbs<br>907 g            |
| * Additional amount of refrigerant to be added for remote condenser with line sets that are 51' to 100' in length |                 |                |                          |                           |

# Charts

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## **Cycle Times, 24 Hr. Ice Production and Refrigerant Pressure Charts**

These charts are used as guidelines to verify correct ice machine operation.

Accurate collection of data is essential to obtain the correct diagnosis.

- Production and cycle times are for dice cube - Half dice cube cycle times can be 1-2 minutes faster depending on model and ambient temperature.
- Ice production checks that are within 10% of the chart are considered normal. This is due to variances in water and air temperature. Actual temperatures will seldom match the chart exactly.
- Refer to “Operational Analysis Chart” for the list of data that must be collected for refrigeration diagnostics.
- Zero out manifold gauge set before obtaining pressure readings to avoid mis-diagnosis.
- Discharge and suction pressure are highest at the beginning of the cycle. Suction pressure will drop throughout the cycle. Verify the pressures are within the range indicated.
- Record beginning of freeze cycle suction pressure one minute after the water pump energizes.

## K0250A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.3-11.5                | 10.8-12.9 | 12.3-14.6 | 1.0-2.5         |
| 80/27                                       | 10.6-12.6               | 12.3-14.6 | 13.5-16.0 |                 |
| 90/32                                       | 11.8-14.0               | 13.9-16.4 | 15.0-17.7 |                 |
| 100/38                                      | 13.2-15.7               | 14.6-17.3 | 16.2-19.2 |                 |
| 110/43                                      | 15.0-17.7               | 15.8-18.7 | 17.7-20.9 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 310 lbs                 | 280 lbs | 250 lbs |
|                                       | 141 kgs                 | 127 kgs | 113 kgs |
| <b>80/27</b>                          | 285 lbs                 | 250 lbs | 230 lbs |
|                                       | 129 kgs                 | 113 kgs | 104 kgs |
| <b>90/32</b>                          | 260 lbs                 | 225 lbs | 210 lbs |
|                                       | 118 kgs                 | 102 kgs | 95 kgs  |
| <b>100/38</b>                         | 235 lbs                 | 215 lbs | 195 lbs |
|                                       | 107 kgs                 | 98 kgs  | 88 kgs  |
| <b>110/43</b>                         | 210 lbs                 | 200 lbs | 180 lbs |
|                                       | 95 kgs                  | 91 kgs  | 82 kgs  |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.79 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C                        | Freeze Cycle                  |                            |
|--------------------------------------------------------------|-------------------------------|----------------------------|
|                                                              | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG   |
| <b>50/10</b>                                                 | 300-335 psig<br>20.7-23.1 bar | 70-38 psig<br>4.8-2.6 bar  |
| <b>70/21</b>                                                 | 310-340 psig<br>21.4-23.4 bar | 75-40 psig<br>5.2-2.8 bar  |
| <b>80/27</b>                                                 | 315-360 psig<br>21.7-24.8 bar | 80-42 psig<br>5.5-2.9 bar  |
| <b>90/32</b>                                                 | 320-375 psig<br>22.1-25.9 bar | 90-44 psig<br>6.2-3.0 bar  |
| <b>100/38</b>                                                | 420-510 psig<br>29.0-35.2 bar | 100-49 psig<br>6.9-3.4 bar |
| <b>110/43</b>                                                | 450-540 psig<br>31.0-37.2 bar | 120-52 psig<br>8.3-3.6 bar |
| Suction pressure drops gradually throughout the freeze cycle |                               |                            |

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 160-180 psig<br>11.0-12.4 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>70/21</b>                          | 180-200 psig<br>12.4-13.8 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>80/27</b>                          | 185-210 psig<br>12.8-14.5 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>90/32</b>                          | 190-215 psig<br>13.1-14.8 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>100/38</b>                         | 300-330 psig<br>20.7-22.8 bar | 200-250 psig<br>13.8-17.2 bar |
| <b>110/43</b>                         | 355-370 psig<br>24.5-25.5 bar | 270-290 psig<br>18.6-20.0 bar |

## KP0300A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 13.0 - 15.5             | 15.5 - 18.5 | 18.0 - 21.0 | 1.0-2.5         |
| 80/27                                       | 15.5 - 18.0             | 17.9 - 20.8 | 19.5 - 22.5 |                 |
| 90/32                                       | 17.2 - 20.0             | 19.2 - 22.5 | 21.5 - 25.0 |                 |
| 100/38                                      | 19.1 - 22.2             | 21.0 - 24.5 | 23.5 - 27.0 |                 |
| 110/43                                      | 21.5 - 25.0             | 23.0 - 26.5 | 25.5 - 29.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                       |                      |
|---------------------------------------|-------------------------|-----------------------|----------------------|
|                                       | 50/10                   | 70/21                 | 90/32                |
| <b>70/21</b>                          | 330 lbs<br>(150 kgs)    | 280 lbs<br>(127 kgs)  | 250 lbs<br>(113 kgs) |
| <b>80/27</b>                          | 285 lbs<br>(129 kgs)    | 250 lbs<br>(113 kgs ) | 230 lbs<br>(104 kgs) |
| <b>90/32</b>                          | 260 lbs<br>(118 kgs)    | 230 lbs<br>(104 kg)   | 210 lbs<br>(95 kgs)  |
| <b>100/38</b>                         | 235 lbs<br>(107 kgs)    | 215 lbs<br>(98 kgs)   | 195 lbs<br>(88 kgs)  |
| <b>110/43</b>                         | 210 lbs<br>(95 kgs)     | 200 lbs<br>(91 kgs)   | 180 lbs<br>(82 kgs)  |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                               |
|---------------------------------------|-------------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 145 - 200 psig<br>(10.0 - 13.8 bar) | 40 - 19 psig<br>(2.8-1.3 bar) |
| <b>70/21</b>                          | 150 - 210 psig<br>(10.3 - 14.5 bar) | 42 - 20 psig<br>(2.9-1.4 bar) |
| <b>80/27</b>                          | 155 - 220 psig<br>(10.7 - 15.2 bar) | 44 - 21 psig<br>(3.0-1.4 bar) |
| <b>90/32</b>                          | 160 - 220 psig<br>(11.0 - 15.2 bar) | 47 - 23 psig<br>(3.2-1.6 bar) |
| <b>100/38</b>                         | 220 - 265 psig<br>(15.2 - 18.3 bar) | 50 - 24 psig<br>(3.4-1.7 bar) |
| <b>110/43</b>                         | 230 - 285 psig<br>(15.9 - 19.6 bar) | 58 - 25 psig<br>(4.0-1.7 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                     |                                  |
|---------------------------------------|-----------------------------------|----------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG         |
| <b>50/10</b>                          | 70 -85 psig<br>(4.8 - 5.9 bar)    | 55 -65 psig<br>(3.8 - 4.5 bar)   |
| <b>70/21</b>                          | 75 - 90 psig<br>(5.2 - 6.2 bar)   | 60 -70 psig<br>(4.1 - 4.8 bar)   |
| <b>80/27</b>                          | 80 - 90 psig<br>(5.2 - 6.2 bar)   | 60 - 70 psig<br>(4.1 - 4.8 bar)  |
| <b>90/32</b>                          | 105 - 115 psig<br>(7.2 - 7.9 bar) | 70 - 85 psig<br>(4.8 - 5.9 bar)  |
| <b>100/38</b>                         | 115 -135 psig<br>(7.9 - 9.3 bar)  | 80 - 100 psig<br>(5.5 - 5.9 bar) |
| <b>110/43</b>                         | 125 -145 psig<br>(8.6 - 10.0 bar) | 85 - 105 psig<br>(5.9 - 7.2 bar) |

## KT0300A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 13.3-15.5               | 16.0-18.6 | 18.1-21.0 | 1.0-2.5         |
| 80/27                                       | 15.7-18.2               | 18.1-21.0 | 19.8-22.9 |                 |
| 90/32                                       | 17.3-20.1               | 19.3-22.4 | 21.8-25.2 |                 |
| 100/38                                      | 19.3-22.4               | 21.3-24.6 | 23.6-27.3 |                 |
| 110/43                                      | 21.8-25.2               | 23.0-26.6 | 25.7-29.7 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 330 lbs                 | 280 lbs | 250 lbs |
|                                       | 150 kgs                 | 127 kgs | 113 kgs |
| <b>80/27</b>                          | 285 lbs                 | 250 lbs | 230 lbs |
|                                       | 129 kgs                 | 113 kgs | 104 kgs |
| <b>90/32</b>                          | 260 lbs                 | 230 lbs | 210 lbs |
|                                       | 118 kgs                 | 104 kgs | 95 kgs  |
| <b>100/38</b>                         | 235 lbs                 | 215 lbs | 195 lbs |
|                                       | 107 kgs                 | 98 kgs  | 88 kgs  |
| <b>110/43</b>                         | 210 lbs                 | 200 lbs | 180 lbs |
|                                       | 95 kgs                  | 91 kgs  | 82 kgs  |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                            |
|---------------------------------------|-------------------------------|----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG   |
| <b>50/10</b>                          | 300-335 psig<br>20.7-23.1 bar | 70-38 psig<br>4.8-2.6 bar  |
| <b>70/21</b>                          | 310-340 psig<br>21.4-23.4 bar | 75-40 psig<br>5.2-2.8 bar  |
| <b>80/27</b>                          | 315-360 psig<br>21.7-24.8 bar | 80-42 psig<br>5.5-2.9 bar  |
| <b>90/32</b>                          | 320-375 psig<br>22.1-25.9 bar | 90-44 psig<br>6.2-3.0 bar  |
| <b>100/38</b>                         | 420-510 psig<br>29.0-35.2 bar | 100-49 psig<br>6.9-3.4 bar |
| <b>110/43</b>                         | 450-540 psig<br>31.0-37.2 bar | 120-52 psig<br>8.3-3.6 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 160-180 psig<br>11.0-12.4 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>70/21</b>                          | 180-200 psig<br>12.4-13.8 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>80/27</b>                          | 185-210 psig<br>12.8-14.5 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>90/32</b>                          | 190-215 psig<br>13.1-14.8 bar | 150-175 psig<br>10.3-12.1 bar |
| <b>100/38</b>                         | 300-330 psig<br>20.7-22.8 bar | 200-250 psig<br>13.8-17.2 bar |
| <b>110/43</b>                         | 355-370 psig<br>24.5-25.5 bar | 270-290 psig<br>18.6-20.0 bar |

## K0350A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.6-13.5               | 12.7-14.8 | 14.0-16.3 | 1.0-2.5         |
| 80/27                                       | 12.5-14.5               | 14.0-16.3 | 15.1-17.5 |                 |
| 90/32                                       | 13.6-15.8               | 14.8-17.2 | 15.7-18.2 |                 |
| 100/38                                      | 14.8-17.2               | 15.4-17.9 | 16.6-19.3 |                 |
| 110/43                                      | 15.7-18.2               | 16.3-18.9 | 17.0-19.7 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 375 lbs                 | 345 lbs | 315 lbs |
|                                       | 170 kgs                 | 156 kgs | 143 kgs |
| <b>80/27</b>                          | 350 lbs                 | 315 lbs | 295 lbs |
|                                       | 159 kgs                 | 143 kgs | 134 kgs |
| <b>90/32</b>                          | 325 lbs                 | 300 lbs | 285 lbs |
|                                       | 147 kgs                 | 136 kgs | 129 kgs |
| <b>100/38</b>                         | 300 lbs                 | 290 lbs | 270 lbs |
|                                       | 136 kgs                 | 132 kgs | 122 kgs |
| <b>110/43</b>                         | 285 lbs                 | 275 lbs | 265 lbs |
|                                       | 129 kgs                 | 125 kgs | 120 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.79 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-320 psig<br>17.9-22.1 bar | 55-32 psig<br>3.8-2.2 bar |
| <b>70/21</b>                          | 275-340 psig<br>19.0-23.4 bar | 60-33 psig<br>4.1-2.3 bar |
| <b>80/27</b>                          | 285-395 psig<br>19.7-27.2 bar | 65-34 psig<br>4.5-2.3 bar |
| <b>90/32</b>                          | 335-410 psig<br>23.1-28.3 bar | 70-35 psig<br>4.8-2.4 bar |
| <b>100/38</b>                         | 400-500 psig<br>27.6-34.5 bar | 80-40 psig<br>5.5-2.8 bar |
| <b>110/43</b>                         | 450-520 psig<br>31.0-35.9 bar | 85-42 psig<br>5.9-2.9 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 130-200 psig<br>9.0-13.8 bar  | 90-140 psig<br>6.2-9.7 bar    |
| <b>70/21</b>                          | 150-200 psig<br>10.3-13.8 bar | 100-140 psig<br>6.9-9.7 bar   |
| <b>80/27</b>                          | 170-230 psig<br>11.7-15.9 bar | 105-165 psig<br>7.2-11.4 bar  |
| <b>90/32</b>                          | 190-250 psig<br>13.1-17.2 bar | 110-175 psig<br>7.6-12.1 bar  |
| <b>100/38</b>                         | 280-340 psig<br>19.3-23.4 bar | 160-220 psig<br>11.0-15.2 bar |
| <b>110/43</b>                         | 320-360 psig<br>22.1-24.8 bar | 190-235 psig<br>13.1-16.2 bar |

## K0350W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.4-13.3               | 12.3-14.3 | 13.1-15.3 | 1.0-2.5         |
| 80/27                                       | 11.6-13.5               | 12.5-14.5 | 13.3-15.5 |                 |
| 90/32                                       | 11.7-13.7               | 14.6-16.1 | 13.6-15.8 |                 |
| 100/38                                      | 11.9-13.9               | 12.9-15.0 | 13.8-16.1 |                 |
| 110/43                                      | 12.1-14.1               | 13.8-16.1 | 14.0-16.3 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                             | 380 lbs                 | 355 lbs | 335 lbs |
|                                          | 172 kgs                 | 161 kgs | 152 kgs |
| <b>80/27</b>                             | 375 lbs                 | 350 lbs | 330 lbs |
|                                          | 170 kgs                 | 159 kgs | 150 kgs |
| <b>90/32</b>                             | 370 lbs                 | 340 lbs | 325 lbs |
|                                          | 168 kgs                 | 154 kgs | 147 kgs |
| <b>100/38</b>                            | 365 lbs                 | 330 lbs | 320 lbs |
|                                          | 166 kgs                 | 150 kgs | 145 kgs |
| <b>110/43</b>                            | 360 lbs                 | 320 lbs | 315 lbs |
|                                          | 163 kgs                 | 145 kgs | 143 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.79 kg)

Water regulating valve set to maintain 320 PSIG discharge pressure

Condenser Water usage per 100 lbs ice = 170 gal (45 kg = 644 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>70/21</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>80/27</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>90/32</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>100/38</b>                         | 315-335 psig<br>21.7-23.1 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>110/43</b>                         | 315-340 psig<br>21.7-23.4 bar | 65-36 psig<br>4.5-2.5 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>70/21</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>80/27</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>90/32</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>100/38</b>                         | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>110/43</b>                         | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |

## KP0400A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 9.5 - 11.0              | 10.5 - 12.1 | 10.5 - 12.1 | 1.0-2.5         |
| 80/27                                       | 10.2 - 11.8             | 11.1 - 13.1 | 11.1 - 13.1 |                 |
| 90/32                                       | 11.0 - 13.0             | 12.3 - 14.5 | 12.3 - 14.5 |                 |
| 100/38                                      | 12.5 - 14.0             | 14.2 - 16.5 | 14.2 - 16.5 |                 |
| 110/43                                      | 13.0 - 16.0             | 15.5 - 18.0 | 15.5 - 18.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                    |                    |
|---------------------------------------|-------------------------|--------------------|--------------------|
|                                       | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                          | 450 lbs<br>204 kgs      | 425 lbs<br>193 kgs | 400 lbs<br>181 kgs |
| <b>80/27</b>                          | 420 lbs<br>190 kgs      | 400 lbs<br>181 kgs | 380 lbs<br>172 kgs |
| <b>90/32</b>                          | 400 lbs<br>181 kgs      | 390 lbs<br>177 kgs | 375 lbs<br>170 kgs |
| <b>100/38</b>                         | 385 lbs<br>175 kgs      | 365 lbs<br>166 kgs | 350 lbs<br>159 kgs |
| <b>110/43</b>                         | 370 lbs<br>345 kgs      | 345 lbs<br>156 kgs | 320 lbs<br>145 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 155 - 205 psig<br>(10.7 - 14.1 bar) | 30 - 14 psig<br>(2.1 - 1.0 bar) |
| <b>70/21</b>                          | 165 - 205 psig<br>(11.4 - 14.1 bar) | 32 - 15 psig<br>(2.2 - 1.0 bar) |
| <b>80/27</b>                          | 170 - 205 psig<br>(11.7 - 14.1 bar) | 36 - 15 psig<br>(2.5 - 1.0 bar) |
| <b>90/32</b>                          | 185 - 205 psig<br>(12.8 - 14.1 bar) | 35 - 15 psig<br>(2.4 - 1.0 bar) |
| <b>100/38</b>                         | 250 - 265 psig<br>(17.2 - 18.3 bar) | 48 - 20 psig<br>(3.3 - 1.4 bar) |
| <b>110/43</b>                         | 260 - 285 psig<br>(17.9 - 19.6 bar) | 50 - 20 psig<br>(3.4 - 1.4 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 95 - 105 psig<br>(6.5 - 7.2 bar)  | 52 - 62 psig<br>(3.6 - 4.3 bar) |
| <b>70/21</b>                          | 105 - 115 psig<br>(7.2 - 7.9 bar) | 60 - 70 psig<br>(4.1 - 4.8 bar) |
| <b>80/27</b>                          | 110 - 120 psig<br>(7.6 - 8.3 bar) | 60 - 70 psig<br>(4.1 - 4.8 bar) |
| <b>90/32</b>                          | 120 - 130 psig<br>(8.3 - 9.0 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |
| <b>100/38</b>                         | 120 - 130 psig<br>(8.3 - 9.0 bar) | 66 - 75 psig<br>(4.5 - 5.2 bar) |
| <b>110/43</b>                         | 120 - 135 psig<br>(8.3 - 9.3 bar) | 70 - 80 psig<br>(4.8 - 5.5 bar) |

## KP0400W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 9.2 - 10.3              | 9.4 - 10.2  | 10.3 - 11.1 | 1.0-2.5         |
| 80/27                                       | 9.5 - 10.6              | 9.5 - 11.3  | 10.6 - 11.7 |                 |
| 90/32                                       | 9.7 - 10.8              | 9.9 - 11.4  | 10.9 - 12.0 |                 |
| 100/38                                      | 10.3 - 11.5             | 10.3 - 11.9 | 11.2 - 12.2 |                 |
| 110/43                                      | 10.8 - 11.7             | 11.1 - 12.1 | 11.5 - 12.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| 70/21                                    | 470 lbs<br>213 kgs      | 445 lbs<br>202 kgs | 420 lbs<br>190 kgs |
| 80/27                                    | 460 lbs<br>209 kgs      | 461 lbs<br>209 kgs | 410 lbs<br>186 kgs |
| 90/32                                    | 450 lbs<br>204 kgs      | 450 lbs<br>204 kgs | 400 lbs<br>181 kgs |
| 100/38                                   | 451 lbs<br>204 kgs      | 451 lbs<br>204 kgs | 395 lbs<br>179 kgs |
| 110/43                                   | 445 lbs<br>202 kgs      | 446 lbs<br>202 kgs | 380 lbs<br>172 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

Water regulating valve set to maintain 170 PSIG

Condenser Water usage per 100 lbs ice = 170 gal (45 kg = 644 L)

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 30 - 15 psig<br>(2.1 - 1.0 bar) |
| <b>70/21</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 35 - 16 psig<br>(2.4 - 1.1 bar) |
| <b>80/27</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 35 - 17 psig<br>(2.4 - 1.2 bar) |
| <b>90/32</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 36 - 18 psig<br>(2.5 - 1.2 bar) |
| <b>100/38</b>                         | 180 - 190 psig<br>(12.4 - 13.1 bar) | 37 - 19 psig<br>(2.6 - 1.3 bar) |
| <b>110/43</b>                         | 180 - 190 psig<br>(12.4 - 13.1 bar) | 38 - 20 psig<br>(2.6 - 1.4 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 100 - 125 psig<br>(6.9 - 8.6 bar) | 58 - 73 psig<br>(4.0 - 5.0 bar) |
| <b>70/21</b>                          | 100 - 120 psig<br>(6.9 - 8.3 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>80/27</b>                          | 100 - 120 psig<br>(6.9 - 8.3 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>90/32</b>                          | 105 - 125 psig<br>(7.2 - 8.6 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>100/38</b>                         | 105 - 125 psig<br>(7.2 - 8.6 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>110/43</b>                         | 105 - 125 psig<br>(7.2 - 8.6 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |

## KT0400A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.6-11.3                | 10.4-12.2 | 12.5-14.5 | 1.0-2.5         |
| 80/27                                       | 10.2-11.9               | 11.2-13.1 | 14.0-16.3 |                 |
| 90/32                                       | 11.1-12.9               | 12.7-14.8 | 14.8-17.2 |                 |
| 100/38                                      | 12.1-14.1               | 14.3-16.6 | 16.3-18.9 |                 |
| 110/43                                      | 14.0-16.3               | 15.7-18.2 | 17.0-19.7 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                    |                    |
|---------------------------------------|-------------------------|--------------------|--------------------|
|                                       | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                          | 440 lbs<br>200 kgs      | 410 lbs<br>186 kgs | 350 lbs<br>159 kgs |
| <b>80/27</b>                          | 420 lbs<br>191 kgs      | 385 lbs<br>175 kgs | 315 lbs<br>143 kgs |
| <b>90/32</b>                          | 390 lbs<br>177 kgs      | 345 lbs<br>156 kgs | 300 lbs<br>136 kgs |
| <b>100/38</b>                         | 360 lbs<br>163 kgs      | 310 lbs<br>141 kgs | 275 lbs<br>125 kgs |
| <b>110/43</b>                         | 315 lbs<br>143 kgs      | 285 lbs<br>129 kgs | 265 lbs<br>120 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-320 psig<br>17.9-22.1 bar | 55-32 psig<br>3.8-2.2 bar |
| <b>70/21</b>                          | 275-340 psig<br>19.0-23.4 bar | 60-33 psig<br>4.1-2.3 bar |
| <b>80/27</b>                          | 285-395 psig<br>19.7-27.2 bar | 65-34 psig<br>4.5-2.3 bar |
| <b>90/32</b>                          | 335-410 psig<br>23.1-28.3 bar | 70-35 psig<br>4.8-2.4 bar |
| <b>100/38</b>                         | 400-500 psig<br>27.6-34.5 bar | 80-40 psig<br>5.5-2.8 bar |
| <b>110/43</b>                         | 450-520 psig<br>31.0-35.9 bar | 85-42 psig<br>5.9-2.9 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 130-200 psig<br>9.0-13.8 bar  | 90-140 psig<br>6.2-9.7 bar    |
| <b>70/21</b>                          | 150-200 psig<br>10.3-13.8 bar | 100-140 psig<br>6.9-9.7 bar   |
| <b>80/27</b>                          | 170-230 psig<br>11.7-15.9 bar | 105-165 psig<br>7.2-11.4 bar  |
| <b>90/32</b>                          | 190-250 psig<br>13.1-17.2 bar | 110-175 psig<br>7.6-12.1 bar  |
| <b>100/38</b>                         | 280-340 psig<br>19.3-23.4 bar | 160-220 psig<br>11.0-15.2 bar |
| <b>110/43</b>                         | 320-360 psig<br>22.1-24.8 bar | 190-235 psig<br>13.1-16.2 bar |

## KT0400W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.0-11.7               | 9.9-11.6  | 11.7-13.7 | 1.0-2.5         |
| 80/27                                       | 10.9-12.7               | 11.7-13.7 | 12.5-14.5 |                 |
| 90/32                                       | 11.1-12.9               | 12.1-14.1 | 12.7-14.8 |                 |
| 100/38                                      | 11.2-13.1               | 12.7-14.8 | 13.8-16.1 |                 |
| 110/43                                      | 11.7-13.7               | 13.3-15.5 | 14.6-16.9 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 425 lbs                 | 430 lbs | 370 lbs |
|                                          | 193 kgs                 | 195 kgs | 168 kgs |
| 80/27                                    | 395 lbs                 | 370 lbs | 350 lbs |
|                                          | 179 kgs                 | 168 kgs | 159 kgs |
| 90/32                                    | 390 lbs                 | 360 lbs | 345 lbs |
|                                          | 177 kgs                 | 163 kgs | 156 kgs |
| 100/38                                   | 385 lbs                 | 345 lbs | 320 lbs |
|                                          | 175 kgs                 | 156 kgs | 145 kgs |
| 110/43                                   | 370 lbs                 | 330 lbs | 305 lbs |
|                                          | 168 kgs                 | 150 kgs | 138 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

Water regulating valve set to maintain 320 PSIG discharge pressure

Condenser Water usage per 100 lbs ice = 170 gal (45 kg = 644 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>70/21</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>80/27</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>90/32</b>                          | 315-330 psig<br>21.7-22.8 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>100/38</b>                         | 315-335 psig<br>21.7-23.1 bar | 60-34 psig<br>4.1-2.3 bar |
| <b>110/43</b>                         | 315-340 psig<br>21.7-23.4 bar | 65-36 psig<br>4.5-2.5 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>70/21</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>80/27</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>90/32</b>                          | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>100/38</b>                         | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>110/43</b>                         | 150-210 psig<br>10.3-14.5 bar | 110-150 psig<br>7.6-10.3 bar |

## K0420A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.7-13.7               | 12.5-14.5 | 13.6-15.8 | 1.0-2.5         |
| 80/27                                       | 12.9-15.0               | 13.8-16.1 | 15.4-17.9 |                 |
| 90/32                                       | 14.0-16.3               | 14.6-16.9 | 16.6-19.3 |                 |
| 100/38                                      | 15.7-18.2               | 17.0-19.7 | 18.1-21.0 |                 |
| 110/43                                      | 17.7-20.5               | 18.9-21.9 | 20.3-23.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| 70/21                                 | 370 lbs                 | 350 lbs | 325 lbs |
|                                       | 168 kgs                 | 159 kgs | 147 kgs |
| 80/27                                 | 340 lbs                 | 320 lbs | 290 lbs |
|                                       | 154 kgs                 | 145 kgs | 132 kgs |
| 90/32                                 | 315 lbs                 | 305 lbs | 270 lbs |
|                                       | 143 kgs                 | 138 kgs | 122 kgs |
| 100/38                                | 285 lbs                 | 265 lbs | 250 lbs |
|                                       | 129 kgs                 | 120 kgs | 113 kgs |
| 110/43                                | 255 lbs                 | 240 lbs | 225 lbs |
|                                       | 116 kgs                 | 109 kgs | 102 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.79 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 275-360 psig<br>19.0-24.8 bar | 60-31 psig<br>4.1-2.1 bar |
| <b>70/21</b>                          | 290-380 psig<br>20.0-26.2 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>80/27</b>                          | 300-390 psig<br>20.7-26.9 bar | 65-33 psig<br>4.5-2.3 bar |
| <b>90/32</b>                          | 330-400 psig<br>22.8-27.6 bar | 70-34 psig<br>4.8-2.3 bar |
| <b>100/38</b>                         | 400-500 psig<br>27.6-34.5 bar | 80-34 psig<br>5.5-2.3 bar |
| <b>110/43</b>                         | 430-520 psig<br>29.6-35.9 bar | 95-34 psig<br>6.6-2.3 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 180-220 psig<br>12.4-15.2 bar | 130-160 psig<br>9.0-11.0 bar  |
| <b>70/21</b>                          | 200-220 psig<br>13.8-15.2 bar | 140-160 psig<br>9.7-11.0 bar  |
| <b>80/27</b>                          | 215-235 psig<br>14.8-16.2 bar | 150-170 psig<br>10.3-11.7 bar |
| <b>90/32</b>                          | 235-245 psig<br>16.2-16.9 bar | 160-180 psig<br>11.0-12.4 bar |
| <b>100/38</b>                         | 355-370 psig<br>24.5-25.5 bar | 240-270 psig<br>16.5-18.6 bar |
| <b>110/43</b>                         | 370-375 psig<br>25.5-25.9 bar | 255-275 psig<br>17.6-19.0 bar |

## K0420W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.7-13.7               | 11.2-15.2 | 12.7-13.5 | 1.0-2.5         |
| 80/27                                       | 13.1-14.0               | 14.6-15.5 | 12.9-17.7 |                 |
| 90/32                                       | 13.3-14.2               | 11.7-15.8 | 13.1-18.1 |                 |
| 100/38                                      | 13.1-14.9               | 15.1-17.5 | 17.3-18.4 |                 |
| 110/43                                      | 14.0-15.0               | 15.4-16.4 | 17.7-18.8 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 370 lbs                 | 310 lbs | 275 lbs |
|                                          | 168 kgs                 | 141 kgs | 125 kgs |
| 80/27                                    | 335 lbs                 | 305 lbs | 270 lbs |
|                                          | 152 kgs                 | 138 kgs | 122 kgs |
| 90/32                                    | 330 lbs                 | 300 lbs | 265 lbs |
|                                          | 150 kgs                 | 136 kgs | 120 kgs |
| 100/38                                   | 320 lbs                 | 295 lbs | 260 lbs |
|                                          | 145 kgs                 | 134 kgs | 118 kgs |
| 110/43                                   | 315 lbs                 | 290 lbs | 255 lbs |
|                                          | 143 kgs                 | 132 kgs | 116 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.79 kg)

Water regulating valve set to maintain 320 PSIG discharge pressure

Condenser Water usage per 100 lbs ice = 170 gal (45 kg = 644 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>70/21</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>80/27</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>90/32</b>                          | 325-335 psig<br>22.4-23.1 bar | 75-31 psig<br>5.2-2.1 bar |
| <b>100/38</b>                         | 325-345 psig<br>22.4-23.8 bar | 80-31 psig<br>5.5-2.1 bar |
| <b>110/43</b>                         | 325-350 psig<br>22.4-24.1 bar | 80-31 psig<br>5.5-2.1 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 155-230 psig<br>10.7-15.9 bar | 110-165 psig<br>7.6-11.4 bar |
| <b>70/21</b>                          | 155-235 psig<br>10.7-16.2 bar | 110-170 psig<br>7.6-11.7 bar |
| <b>80/27</b>                          | 160-240 psig<br>11.0-16.5 bar | 110-170 psig<br>7.6-11.7 bar |
| <b>90/32</b>                          | 160-245 psig<br>11.0-16.9 bar | 110-175 psig<br>7.6-12.1 bar |
| <b>100/38</b>                         | 160-245 psig<br>11.0-16.9 bar | 115-180 psig<br>7.9-12.4 bar |
| <b>110/43</b>                         | 160-245 psig<br>11.0-16.9 bar | 115-180 psig<br>7.9-12.4 bar |

## KP0420A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 9.5 - 11.5              | 10.2 - 12.2 | 12.5 - 14.5 | 1.0-2.5         |
| 80/27                                       | 10.1 - 11.9             | 11.1 - 13.1 | 14.0 - 16.0 |                 |
| 90/32                                       | 11.0 - 13.0             | 12.5 - 14.5 | 14.7 - 17.2 |                 |
| 100/38                                      | 12.0 - 14.0             | 14.0 - 16.5 | 16.0 - 19.0 |                 |
| 110/43                                      | 14.2 - 16.2             | 15.5 - 18.0 | 17.0 - 19.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 430 lbs                 | 395 lbs | 360 lbs |
|                                       | 190 kgs                 | 179 kgs | 163 kgs |
| <b>80/27</b>                          | 420 lbs                 | 385 lbs | 335 lbs |
|                                       | 190 kgs                 | 175 kgs | 152 kgs |
| <b>90/32</b>                          | 390 lbs                 | 375 lbs | 310 lbs |
|                                       | 177 kgs                 | 170 kgs | 141 kgs |
| <b>100/38</b>                         | 355 lbs                 | 335 lbs | 300 lbs |
|                                       | 161 kgs                 | 152 kgs | 136 kgs |
| <b>110/43</b>                         | 320 lbs                 | 300 lbs | 285 lbs |
|                                       | 145 kgs                 | 136 kgs | 129 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 140 - 200 psig<br>(9.7 - 13.8 bar)  | 36 - 16 psig<br>(2.5 - 1.1 bar) |
| <b>70/21</b>                          | 150 - 205 psig<br>(10.3 - 14.1 bar) | 38 - 18 psig<br>(2.6 - 1.2 bar) |
| <b>80/27</b>                          | 160 - 210 psig<br>(11.0 - 14.5 bar) | 42 - 20 psig<br>(2.9 - 1.4 bar) |
| <b>90/32</b>                          | 185 - 215 psig<br>(12.8 - 14.8 bar) | 46 - 20 psig<br>(3.2 - 1.4 bar) |
| <b>100/38</b>                         | 190 - 240 psig<br>(13.1 - 16.5 bar) | 48 - 22 psig<br>(3.3 - 1.5 bar) |
| <b>110/43</b>                         | 240 - 270 psig<br>(16.5 - 18.6 bar) | 50 - 22 psig<br>(3.4 - 1.5 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                      |                                  |
|---------------------------------------|------------------------------------|----------------------------------|
|                                       | Discharge Pressure<br>PSIG         | Suction Pressure<br>PSIG         |
| <b>50/10</b>                          | 90 - 105 psig<br>(6.2 - 7.2 bar)   | 60 - 70 psig<br>(4.1 - 4.8 bar)  |
| <b>70/21</b>                          | 95 - 115 psig<br>(6.5 - 7.9 bar)   | 65 - 75 psig<br>(4.5 - 5.2 bar)  |
| <b>80/27</b>                          | 105 - 120 psig<br>(7.2 - 8.3 bar)  | 75 - 90 psig<br>(5.2 - 6.2 bar)  |
| <b>90/32</b>                          | 105 - 120 psig<br>(7.2 - 8.3 bar)  | 75 - 90 psig<br>(5.2 - 6.2 bar)  |
| <b>100/38</b>                         | 110 - 135 psig<br>(7.6 - 9.3 bar)  | 80 - 95 psig<br>(5.5 - 6.5 bar)  |
| <b>110/43</b>                         | 120 - 145 psig<br>(8.3 - 10.0 bar) | 85 - 110 psig<br>(5.9 - 7.6 bar) |

## KP0420W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 10.0 - 11.5             | 10.2 - 11.7 | 11.7 - 13.7 | 1.0-2.5         |
| 80/27                                       | 10.5 - 12.5             | 11.5 - 13.5 | 12.5 - 14.5 |                 |
| 90/32                                       | 11.0 - 12.8             | 12.0 - 14.0 | 12.5 - 14.7 |                 |
| 100/38                                      | 11.2 - 13.0             | 12.5 - 14.7 | 13.2 - 16.0 |                 |
| 110/43                                      | 11.5 - 13.5             | 13.0 - 15.5 | 14.5 - 16.8 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 450 lbs                 | 435 lbs | 390 lbs |
|                                          | 204 kgs                 | 197 kgs | 177 kgs |
| 80/27                                    | 425 lbs                 | 430 lbs | 360 lbs |
|                                          | 193 kgs                 | 195 kgs | 163 kgs |
| 90/32                                    | 420 lbs                 | 425 lbs | 345 lbs |
|                                          | 190 kgs                 | 193 kgs | 156 kgs |
| 100/38                                   | 400 lbs                 | 390 lbs | 330 lbs |
|                                          | 181 kgs                 | 177 kgs | 150 kgs |
| 110/43                                   | 390 lbs                 | 350 lbs | 325 lbs |
|                                          | 177 kgs                 | 159 kgs | 147 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)  
Water regulating valve set to maintain 170 PSIG Condenser Water  
Usage per 100 lbs (45 kg) ice =

Half-dice: 128.6 gallons (487 liters), Dice: 119.4 gallons (452 liters)

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                        |                                  |
|---------------------------------------|-------------------------------------|----------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG         |
| <b>50/10</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 35 - 12 psig<br>(2.4 - 0.8 bar)  |
| <b>70/21</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 38 - 15 psig<br>( 2.6 - 1.0 bar) |
| <b>80/27</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 39 - 16 psig<br>(2.7 - 1.1 bar)  |
| <b>90/32</b>                          | 180 - 190 psig<br>(12.4 - 13.1 bar) | 40 - 18 psig<br>( 2.8 - 1.2 bar) |
| <b>100/38</b>                         | 180 - 190 psig<br>(12.4 - 13.1 bar) | 42 -20 psig<br>(2.9 - 1.4 bar)   |
| <b>110/43</b>                         | 185 - 195 psig<br>(12.8 - 13.4 bar) | 45 -20 psig<br>(3.1 -1.4 bar)    |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 90 - 110 psig<br>(6.2 - 7.6 bar)  | 52 - 75 psig<br>(3.6 - 5.2 bar) |
| <b>70/21</b>                          | 95 - 115 psig<br>(6.5 - 7.9 bar)  | 55 - 75 psig<br>(3.8 - 5.2 bar) |
| <b>80/27</b>                          | 95 - 115 psig<br>(6.5 - 7.9 bar)  | 55 - 75 psig<br>(3.8 - 5.2 bar) |
| <b>90/32</b>                          | 100 - 120 psig<br>(6.9 - 8.3 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>100/38</b>                         | 100 - 120 psig<br>(6.9 - 8.3 bar) | 60 - 75 psig<br>(4.1 - 5.2 bar) |
| <b>110/43</b>                         | 100 - 125 psig<br>(6.9 - 8.6 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |

## KT0420A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.6-11.3                | 10.4-12.2 | 12.5-14.5 | 1.0-2.5         |
| 80/27                                       | 10.2-11.9               | 11.2-13.1 | 14.0-16.3 |                 |
| 90/32                                       | 11.1-12.9               | 12.5-14.5 | 14.8-17.2 |                 |
| 100/38                                      | 12.1-14.1               | 14.3-16.6 | 16.3-18.9 |                 |
| 110/43                                      | 14.0-16.3               | 15.7-18.2 | 17.0-19.7 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                    |                    |
|---------------------------------------|-------------------------|--------------------|--------------------|
|                                       | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                          | 440 lbs<br>200 kgs      | 410 lbs<br>186 kgs | 350 lbs<br>159 kgs |
| <b>80/27</b>                          | 420 lbs<br>191 kgs      | 385 lbs<br>175 kgs | 315 lbs<br>143 kgs |
| <b>90/32</b>                          | 390 lbs<br>177 kgs      | 350 lbs<br>159 kgs | 300 lbs<br>136 kgs |
| <b>100/38</b>                         | 360 lbs<br>163 kgs      | 310 lbs<br>141 kgs | 275 lbs<br>125 kgs |
| <b>110/43</b>                         | 315 lbs<br>143 kgs      | 285 lbs<br>129 kgs | 265 lbs<br>120 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 275-360 psig<br>19.0-24.8 bar | 60-31 psig<br>4.1-2.1 bar |
| <b>70/21</b>                          | 290-380 psig<br>20.0-26.2 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>80/27</b>                          | 300-390 psig<br>20.7-26.9 bar | 65-33 psig<br>4.5-2.3 bar |
| <b>90/32</b>                          | 330-400 psig<br>22.8-27.6 bar | 70-34 psig<br>4.8-2.3 bar |
| <b>100/38</b>                         | 400-500 psig<br>27.6-34.5 bar | 80-34 psig<br>5.5-2.3 bar |
| <b>110/43</b>                         | 430-520 psig<br>29.6-35.9 bar | 95-34 psig<br>6.6-2.3 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 180-220 psig<br>12.4-15.2 bar | 130-160 psig<br>9.0-11.0 bar  |
| <b>70/21</b>                          | 200-220 psig<br>13.8-15.2 bar | 140-160 psig<br>9.7-11.0 bar  |
| <b>80/27</b>                          | 215-235 psig<br>14.8-16.2 bar | 150-170 psig<br>10.3-11.7 bar |
| <b>90/32</b>                          | 235-245 psig<br>16.2-16.9 bar | 160-180 psig<br>11.0-12.4 bar |
| <b>100/38</b>                         | 355-370 psig<br>24.5-25.5 bar | 240-270 psig<br>16.5-18.6 bar |
| <b>110/43</b>                         | 370-375 psig<br>25.5-25.9 bar | 255-275 psig<br>17.6-19.0 bar |

## KT0420W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.0-11.7               | 9.9-11.6  | 11.7-13.7 | 1.0-2.5         |
| 80/27                                       | 10.9-12.7               | 11.7-13.7 | 12.5-14.5 |                 |
| 90/32                                       | 11.1-12.9               | 12.1-14.1 | 12.7-14.8 |                 |
| 100/38                                      | 11.2-13.1               | 12.7-14.8 | 13.8-16.1 |                 |
| 110/43                                      | 11.7-13.7               | 13.3-15.5 | 14.6-16.9 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 425 lbs                 | 430 lbs | 370 lbs |
|                                          | 193 kgs                 | 195 kgs | 168 kgs |
| 80/27                                    | 395 lbs                 | 370 lbs | 350 lbs |
|                                          | 179 kgs                 | 168 kgs | 159 kgs |
| 90/32                                    | 390 lbs                 | 360 lbs | 345 lbs |
|                                          | 177 kgs                 | 163 kgs | 156 kgs |
| 100/38                                   | 385 lbs                 | 345 lbs | 320 lbs |
|                                          | 175 kgs                 | 156 kgs | 145 kgs |
| 110/43                                   | 370 lbs                 | 330 lbs | 305 lbs |
|                                          | 168 kgs                 | 150 kgs | 138 kgs |

Based on average ice slab weight of 3.40 – 3.90 lb (1.54 – 1.77 kg)

Water regulating valve set to maintain 330 PSIG discharge pressure

Condenser Water usage per 100 lbs ice =170 gal (45 kg = 644 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>70/21</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>80/27</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>90/32</b>                          | 325-335 psig<br>22.4-23.1 bar | 75-31 psig<br>5.2-2.1 bar |
| <b>100/38</b>                         | 325-345 psig<br>22.4-23.8 bar | 80-31 psig<br>5.5-2.1 bar |
| <b>110/43</b>                         | 325-350 psig<br>22.4-24.1 bar | 80-31 psig<br>5.5-2.1 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 155-230 psig<br>10.7-15.9 bar | 110-165 psig<br>7.6-11.4 bar |
| <b>70/21</b>                          | 155-235 psig<br>10.7-16.2 bar | 110-170 psig<br>7.6-11.7 bar |
| <b>80/27</b>                          | 160-240 psig<br>11.0-16.5 bar | 110-170 psig<br>7.6-11.7 bar |
| <b>90/32</b>                          | 160-245 psig<br>11.0-16.9 bar | 110-175 psig<br>7.6-12.1 bar |
| <b>100/38</b>                         | 160-245 psig<br>11.0-16.9 bar | 115-180 psig<br>7.9-12.4 bar |
| <b>110/43</b>                         | 160-245 psig<br>11.0-16.9 bar | 115-180 psig<br>7.9-12.4 bar |

## K0500A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.9-13.6               | 14.1-16.1 | 15.7-17.9 | 1.0-2.5         |
| 80/27                                       | 13.6-15.5               | 15.1-17.2 | 16.6-19.0 |                 |
| 90/32                                       | 14.9-17.0               | 15.5-17.7 | 17.7-20.2 |                 |
| 100/38                                      | 16.6-19.0               | 18.3-20.9 | 20.2-23.1 |                 |
| 110/43                                      | 18.9-21.5               | 19.5-22.3 | 20.6-23.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 495 lbs                 | 425 lbs | 385 lbs |
|                                       | 225 kgs                 | 193 kgs | 175 kgs |
| <b>80/27</b>                          | 440 lbs                 | 400 lbs | 365 lbs |
|                                       | 200 kgs                 | 181 kgs | 166 kgs |
| <b>90/32</b>                          | 405 lbs                 | 390 lbs | 345 lbs |
|                                       | 184 kgs                 | 177 kgs | 156 kgs |
| <b>100/38</b>                         | 365 lbs                 | 335 lbs | 305 lbs |
|                                       | 166 kgs                 | 152 kgs | 138 kgs |
| <b>110/43</b>                         | 325 lbs                 | 315 lbs | 300 lbs |
|                                       | 147 kgs                 | 143 kgs | 136 kgs |

Based on average ice slab weight of 4.6 – 5.2 lb (2.1 – 2.36 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-325 psig<br>17.9-22.4 bar | 60-36 psig<br>4.1-2.5 bar |
| <b>70/21</b>                          | 270-340 psig<br>18.6-23.4 bar | 65-37 psig<br>4.5-2.6 bar |
| <b>80/27</b>                          | 275-380 psig<br>19.0-26.2 bar | 65-37 psig<br>4.5-2.6 bar |
| <b>90/32</b>                          | 340-400 psig<br>23.4-27.6 bar | 75-38 psig<br>5.2-2.6 bar |
| <b>100/38</b>                         | 380-500 psig<br>26.2-34.5 bar | 80-42 psig<br>5.5-2.9 bar |
| <b>110/43</b>                         | 440-520 psig<br>30.3-35.9 bar | 80-44 psig<br>5.5-3.0 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 140-175 psig<br>9.7-12.1 bar  | 100-120 psig<br>6.9-8.3 bar   |
| <b>70/21</b>                          | 150-185 psig<br>10.3-12.8 bar | 105-130 psig<br>7.2-9.0 bar   |
| <b>80/27</b>                          | 165-200 psig<br>11.4-13.8 bar | 110-150 psig<br>7.6-10.3 bar  |
| <b>90/32</b>                          | 190-220 psig<br>13.1-15.2 bar | 130-160 psig<br>9.0-11.0 bar  |
| <b>100/38</b>                         | 280-320 psig<br>19.3-22.1 bar | 180-235 psig<br>12.4-16.2 bar |
| <b>110/43</b>                         | 290-330 psig<br>20.0-22.8 bar | 185-240 psig<br>12.8-16.5 bar |

## K0500W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.7-13.7               | 13.6-15.5 | 15.7-17.7 | 1.0-2.5         |
| 80/27                                       | 12.0-13.8               | 13.7-15.7 | 15.5-17.9 |                 |
| 90/32                                       | 12.4-14.3               | 13.9-15.9 | 16.4-18.7 |                 |
| 100/38                                      | 12.7-14.6               | 14.5-16.5 | 16.6-19.0 |                 |
| 110/43                                      | 13.1-15.0               | 14.7-16.8 | 16.9-19.3 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                             | 545 lbs<br>247 kgs      | 440 lbs<br>200 kgs | 390 lbs<br>177 kgs |
| <b>80/27</b>                             | 490 lbs<br>222 kgs      | 435 lbs<br>197 kgs | 385 lbs<br>175 kgs |
| <b>90/32</b>                             | 475 lbs<br>215 kgs      | 430 lbs<br>195 kgs | 370 lbs<br>168 kgs |
| <b>100/38</b>                            | 465 lbs<br>211 kgs      | 415 lbs<br>188 kgs | 365 lbs<br>166 kgs |
| <b>110/43</b>                            | 455 lbs<br>206 kgs      | 410 lbs<br>186 kgs | 360 lbs<br>163 kgs |

Based on average ice slab weight of 4.6 – 5.2 lb (2.1– 2.4 kg)  
Water regulating valve set to maintain 330 PSI discharge pressure  
Condenser Water usage per 100 lbs ice = 160 gal (45 kg = 606 L)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-38 psig<br>4.8-2.6 bar |
| <b>70/21</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-39 psig<br>4.8-2.7 bar |
| <b>80/27</b>                          | 325-335 psig<br>22.4-23.1 bar | 75-39 psig<br>5.2-2.7 bar |
| <b>90/32</b>                          | 325-340 psig<br>22.4-23.4 bar | 80-39 psig<br>5.5-2.7 bar |
| <b>100/38</b>                         | 325-340 psig<br>22.4-23.4 bar | 80-39 psig<br>5.5-2.7 bar |
| <b>110/43</b>                         | 325-345 psig<br>22.4-23.8 bar | 80-39 psig<br>5.5-2.7 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 145-175 psig<br>10.0-12.1 bar | 105-130 psig<br>7.2-9.0 bar |
| <b>70/21</b>                          | 150-180 psig<br>10.3-12.4 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>80/27</b>                          | 150-185 psig<br>10.3-12.8 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>90/32</b>                          | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>100/38</b>                         | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>110/43</b>                         | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |

## KP0500A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 11.7 - 13.3             | 13.2 - 15.0 | 14.5 - 16.0 | 1.0-2.5         |
| 80/27                                       | 12.3 - 14.1             | 14.5 - 16.5 | 14.8 - 16.4 |                 |
| 90/32                                       | 12.4 - 14.3             | 15.1 - 17.2 | 15.5 - 18.0 |                 |
| 100/38                                      | 12.6 - 14.4             | 15.5 - 17.7 | 16.0 - 18.0 |                 |
| 110/43                                      | 15.0 - 17.0             | 15.9 - 18.2 | 17.5 - 19.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 500 lbs                 | 465 lbs | 435 lbs |
|                                       | 227 kgs                 | 211 kgs | 197 kgs |
| <b>80/27</b>                          | 480 lbs                 | 445 lbs | 420 lbs |
|                                       | 218 kgs                 | 202 kgs | 190 kgs |
| <b>90/32</b>                          | 460 lbs                 | 425 lbs | 405 lbs |
|                                       | 209 kgs                 | 193 kgs | 184 kgs |
| <b>100/38</b>                         | 450 lbs                 | 415 lbs | 390 lbs |
|                                       | 204 kgs                 | 188 kgs | 177 kgs |
| <b>110/43</b>                         | 430 lbs                 | 400 lbs | 370 lbs |
|                                       | 195 kgs                 | 181 kgs | 168 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 150 - 200 psig<br>(10.3 - 13.8 bar) | 34 - 7 psig<br>(2.3 - 0.5 bar)  |
| <b>70/21</b>                          | 150 - 200 psig<br>(10.3 - 13.8 bar) | 34 - 8 psig<br>(2.3 - 0.6 bar)  |
| <b>80/27</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 36 - 11 psig<br>(2.5 - 0.8 bar) |
| <b>90/32</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 38 - 13 psig<br>(2.6 - 0.9 bar) |
| <b>100/38</b>                         | 170 - 190 psig<br>(11.4 - 12.8 bar) | 40 - 15 psig<br>(2.7 - 1.0 bar) |
| <b>110/43</b>                         | 175 - 200 psig<br>(11.4 - 12.8 bar) | 42 - 18 psig<br>(2.9 - 1.2 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 70 - 100 psig<br>(4.8 - 6.9 bar)  | 50 - 75 psig<br>(3.4 - 5.2 bar) |
| <b>70/21</b>                          | 70 - 100 psig<br>(4.8 - 6.9 bar)  | 50 - 75 psig<br>(3.4 - 5.2 bar) |
| <b>80/27</b>                          | 95 - 110 psig<br>(6.5 - 7.6 bar)  | 55 - 75 psig<br>(3.8 - 5.2 bar) |
| <b>90/32</b>                          | 95 - 110 psig<br>(6.5 - 7.6 bar)  | 58 - 78 psig<br>(4.0 - 5.4 bar) |
| <b>100/38</b>                         | 95 - 110 psig<br>(6.5 - 7.6 bar)  | 60 - 80 psig<br>(4.1 - 5.5 bar) |
| <b>110/43</b>                         | 100 - 120 psig<br>(6.9 - 8.3 bar) | 61 - 85 psig<br>(4.5 - 5.9 bar) |

## KP0500W SELF-CONTAINED WATER-COOLED

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 10.8 - 12.0             | 11.5 - 12.9 | 12.7 - 14.1 | 1.0-2.5         |
| 80/27                                       | 11.2 - 12.3             | 12.1 - 13.1 | 12.9 - 14.3 |                 |
| 90/32                                       | 11.8 - 12.9             | 12.2 - 13.3 | 13.1 - 14.6 |                 |
| 100/38                                      | 12.4 - 14.2             | 12.7 - 13.5 | 13.4 - 14.9 |                 |
| 110/43                                      | 12.9 - 14.8             | 13.3 - 15.6 | 13.7 - 15.4 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                             | 500 lbs<br>227 kgs      | 460 lbs<br>209 kgs | 420 lbs<br>190 kgs |
| <b>80/27</b>                             | 495 lbs<br>224 kgs      | 455 lbs<br>206 kgs | 415 lbs<br>188 kgs |
| <b>90/32</b>                             | 490 lbs<br>222 kgs      | 450 lbs<br>204 kgs | 410 lbs<br>186 kgs |
| <b>100/38</b>                            | 480 lbs<br>218 kgs      | 445 lbs<br>202 kgs | 405 lbs<br>184 kgs |
| <b>110/43</b>                            | 475 lbs<br>215 kgs      | 440 lbs<br>200 kgs | 400 lbs<br>181 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)

Water regulating valve set to maintain 330 PSI discharge pressure

Condenser Water usage per 100 lbs ice = 160 gal (45 kg = 606 L)

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 38 - 16 psig<br>(2.6 - 1.1 bar) |
| <b>70/21</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 38 - 17 psig<br>(2.6 - 1.2 bar) |
| <b>80/27</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 40 - 19 psig<br>(2.8 - 1.3 bar) |
| <b>90/32</b>                          | 165 - 185 psig<br>(11.4 - 12.8 bar) | 40 - 19 psig<br>(2.8 - 1.3 bar) |
| <b>100/38</b>                         | 170 - 190 psig<br>(11.7 - 13.1 bar) | 43 - 20 psig<br>(3.0 - 1.4 bar) |
| <b>110/43</b>                         | 175 - 200 psig<br>(12.1 - 13.8 bar) | 43 - 20 psig<br>(3.0 - 1.4 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                    |                                 |
|---------------------------------------|----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG       | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 75 - 90 psig<br>(5.2 - 6.2 bar)  | 55 - 70 psig<br>(3.8 - 4.8 bar) |
| <b>70/21</b>                          | 75 - 90 psig<br>(5.2 - 6.2 bar)  | 55 - 70 psig<br>(3.8 - 4.8 bar) |
| <b>80/27</b>                          | 80 - 110 psig<br>(5.5 - 7.6 bar) | 58 - 72 psig<br>(4.0 - 5.0 bar) |
| <b>90/32</b>                          | 80 - 100 psig<br>(5.5 - 6.9 bar) | 60 - 70 psig<br>(4.1 - 4.8 bar) |
| <b>100/38</b>                         | 85 - 110 psig<br>(5.9 - 7.6 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |
| <b>110/43</b>                         | 85 - 110 psig<br>(5.9 - 7.6 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |

## KT0500A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.0-11.8               | 12.5-14.6 | 13.4-15.6 | 1.0-2.5         |
| 80/27                                       | 11.7-13.7               | 12.6-14.8 | 14.3-16.7 |                 |
| 90/32                                       | 12.6-14.8               | 15.5-17.7 | 15.5-18.0 |                 |
| 100/38                                      | 13.9-16.3               | 15.5-18.0 | 16.8-19.5 |                 |
| 110/43                                      | 14.8-17.2               | 16.8-19.5 | 18.3-21.3 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 515 lbs                 | 425 lbs | 400 lbs |
|                                       | 234 kgs                 | 193 kgs | 181 kgs |
| <b>80/27</b>                          | 450 lbs                 | 420 lbs | 375 lbs |
|                                       | 204 kgs                 | 191 kgs | 170 kgs |
| <b>90/32</b>                          | 420 lbs                 | 400 lbs | 350 lbs |
|                                       | 191 kgs                 | 181 kgs | 159 kgs |
| <b>100/38</b>                         | 385 lbs                 | 350 lbs | 325 lbs |
|                                       | 175 kgs                 | 159 kgs | 147 kgs |
| <b>110/43</b>                         | 365 lbs                 | 325 lbs | 300 lbs |
|                                       | 166 kgs                 | 147 kgs | 136 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-325 psig<br>17.9-22.4 bar | 60-36 psig<br>4.1-2.5 bar |
| <b>70/21</b>                          | 270-340 psig<br>18.6-23.4 bar | 65-37 psig<br>4.5-2.6 bar |
| <b>80/27</b>                          | 275-380 psig<br>19.0-26.2 bar | 65-37 psig<br>4.5-2.6 bar |
| <b>90/32</b>                          | 340-400 psig<br>23.4-27.6 bar | 75-38 psig<br>5.2-2.6 bar |
| <b>100/38</b>                         | 380-500 psig<br>26.2-34.5 bar | 80-42 psig<br>5.5-2.9 bar |
| <b>110/43</b>                         | 440-520 psig<br>30.3-35.9 bar | 80-44 psig<br>5.5-3.0 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 140-175 psig<br>9.7-12.1 bar  | 100-120 psig<br>6.9-8.3 bar   |
| <b>70/21</b>                          | 150-185 psig<br>10.3-12.8 bar | 105-130 psig<br>7.2-9.0 bar   |
| <b>80/27</b>                          | 165-200 psig<br>11.4-13.8 bar | 110-150 psig<br>7.6-10.3 bar  |
| <b>90/32</b>                          | 190-220 psig<br>13.1-15.2 bar | 130-160 psig<br>9.0-11.0 bar  |
| <b>100/38</b>                         | 280-320 psig<br>19.3-22.1 bar | 180-235 psig<br>12.4-16.2 bar |
| <b>110/43</b>                         | 290-330 psig<br>20.0-22.8 bar | 185-240 psig<br>12.8-16.5 bar |

## KT0500W SELF-CONTAINED WATER-COOLED

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.7-11.4                | 12.0-14.0 | 13.0-15.2 | 1.0-2.5         |
| 80/27                                       | 12.0-13.8               | 13.7-15.7 | 15.5-17.9 |                 |
| 90/32                                       | 12.4-14.3               | 12.6-14.8 | 16.4-18.7 |                 |
| 100/38                                      | 12.7-14.6               | 14.5-16.5 | 16.6-19.0 |                 |
| 110/43                                      | 13.1-15.0               | 14.7-16.8 | 16.9-19.3 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 530 lbs                 | 440 lbs | 410 lbs |
|                                          | 240 kgs                 | 200 kgs | 186 kgs |
| 80/27                                    | 490 lbs                 | 435 lbs | 385 lbs |
|                                          | 222 kgs                 | 197 kgs | 175 kgs |
| 90/32                                    | 475 lbs                 | 420 lbs | 370 lbs |
|                                          | 215 kgs                 | 191 kgs | 168 kgs |
| 100/38                                   | 465 lbs                 | 415 lbs | 365 lbs |
|                                          | 211 kgs                 | 188 kgs | 166 kgs |
| 110/43                                   | 455 lbs                 | 410 lbs | 360 lbs |
|                                          | 206 kgs                 | 186 kgs | 163 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)

Water regulating valve set to maintain 330 PSI discharge pressure

Condenser Water usage per 100 lbs ice = 160 gal (45 kg = 606 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-38 psig<br>4.8-2.6 bar |
| <b>70/21</b>                          | 325-335 psig<br>22.4-23.1 bar | 70-39 psig<br>4.8-2.7 bar |
| <b>80/27</b>                          | 325-335 psig<br>22.4-23.1 bar | 75-39 psig<br>5.2-2.7 bar |
| <b>90/32</b>                          | 325-340 psig<br>22.4-23.4 bar | 80-39 psig<br>5.5-2.7 bar |
| <b>100/38</b>                         | 325-340 psig<br>22.4-23.4 bar | 80-39 psig<br>5.5-2.7 bar |
| <b>110/43</b>                         | 325-345 psig<br>22.4-23.8 bar | 80-39 psig<br>5.5-2.7 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 145-175 psig<br>10.0-12.1 bar | 105-130 psig<br>7.2-9.0 bar |
| <b>70/21</b>                          | 150-180 psig<br>10.3-12.4 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>80/27</b>                          | 150-185 psig<br>10.3-12.8 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>90/32</b>                          | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>100/38</b>                         | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |
| <b>110/43</b>                         | 150-190 psig<br>10.3-13.1 bar | 110-135 psig<br>7.6-9.3 bar |

## K0600A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 8.5-11.0                | 11.5-13.2 | 12.4-14.3 | 1.0-2.5         |
| 80/27                                       | 10.5-12.1               | 12.0-13.8 | 12.7-14.6 |                 |
| 90/32                                       | 11.7-13.5               | 12.2-13.9 | 13.9-15.9 |                 |
| 100/38                                      | 12.9-14.8               | 13.2-15.1 | 14.1-16.1 |                 |
| 110/43                                      | 13.6-15.5               | 14.1-16.1 | 14.5-16.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                    |                    |
|---------------------------------------|-------------------------|--------------------|--------------------|
|                                       | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                          | 600 lbs<br>272 kgs      | 510 lbs<br>231 kgs | 475 lbs<br>215 kgs |
| <b>80/27</b>                          | 550 lbs<br>249 kgs      | 490 lbs<br>222 kgs | 465 lbs<br>211 kgs |
| <b>90/32</b>                          | 500 lbs<br>227 kgs      | 485 lbs<br>220 kgs | 430 lbs<br>195 kgs |
| <b>100/38</b>                         | 460 lbs<br>209 kgs      | 450 lbs<br>204 kgs | 425 lbs<br>193 kgs |
| <b>110/43</b>                         | 440 lbs<br>200 kgs      | 425 lbs<br>193 kgs | 415 lbs<br>188 kgs |

Based on average ice slab weight of 4.6 – 5.2 lb (2.1 – 2.4 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-325 psig<br>17.9-22.4 bar | 60-28 psig<br>4.1-1.9 bar |
| <b>70/21</b>                          | 275-350 psig<br>19.0-24.1 bar | 65-30 psig<br>4.5-2.1 bar |
| <b>80/27</b>                          | 275-380 psig<br>19.0-26.2 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>90/32</b>                          | 350-415 psig<br>24.1-28.6 bar | 75-35 psig<br>5.2-2.4 bar |
| <b>100/38</b>                         | 380-520 psig<br>26.2-35.9 bar | 80-36 psig<br>5.5-2.5 bar |
| <b>110/43</b>                         | 440-540 psig<br>30.3-37.2 bar | 80-36 psig<br>5.5-2.5 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 140-175 psig<br>9.7-12.1 bar  | 90-120 psig<br>6.2-8.3 bar    |
| <b>70/21</b>                          | 165-200 psig<br>11.4-13.8 bar | 100-130 psig<br>6.9-9.0 bar   |
| <b>80/27</b>                          | 165-210 psig<br>11.4-14.5 bar | 105-150 psig<br>7.2-10.3 bar  |
| <b>90/32</b>                          | 310-370 psig<br>21.4-25.5 bar | 170-215 psig<br>11.7-14.8 bar |
| <b>100/38</b>                         | 310-375 psig<br>21.4-25.9 bar | 170-235 psig<br>11.7-16.2 bar |
| <b>110/43</b>                         | 310-375 psig<br>21.4-25.9 bar | 170-225 psig<br>11.7-15.5 bar |

## K0600W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.5-11.0                | 10.9-12.5 | 11.5-13.2 | 1.0-2.5         |
| 80/27                                       | 9.8-11.3                | 11.1-12.8 | 11.7-13.5 |                 |
| 90/32                                       | 10.9-12.5               | 11.2-12.9 | 12.7-14.6 |                 |
| 100/38                                      | 11.9-13.6               | 12.2-13.9 | 12.9-14.8 |                 |
| 110/43                                      | 12.4-14.3               | 12.9-14.8 | 13.2-15.1 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| 70/21                                    | 600 lbs<br>272 kgs      | 535 lbs<br>243 kgs | 510 lbs<br>231 kgs |
| 80/27                                    | 585 lbs<br>265 kgs      | 525 lbs<br>238 kgs | 500 lbs<br>227 kgs |
| 90/32                                    | 535 lbs<br>243 kgs      | 520 lbs<br>236 kgs | 465 lbs<br>211 kgs |
| 100/38                                   | 495 lbs<br>225 kgs      | 485 lbs<br>220 kgs | 460 lbs<br>209 kgs |
| 110/43                                   | 475 lbs<br>215 kgs      | 460 lbs<br>209 kgs | 450 lbs<br>204 kgs |

Based on average ice slab weight of 4.6 – 5.2 lb (2.1 – 2.4 kg)

Water regulating valve set to maintain 320 PSI discharge pressure

Condenser Water usage per 100 lbs ice = 170 gal (45 kg = 644 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 315-325 psig<br>21.7-22.4 bar | 55-31 psig<br>3.8-2.1 bar |
| <b>70/21</b>                          | 315-325 psig<br>21.7-22.4 bar | 55-32 psig<br>3.8-2.2 bar |
| <b>80/27</b>                          | 315-325 psig<br>21.7-22.4 bar | 60-32 psig<br>4.1-2.2 bar |
| <b>90/32</b>                          | 315-325 psig<br>21.7-22.4 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>100/38</b>                         | 315-325 psig<br>21.7-22.4 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>110/43</b>                         | 315-325 psig<br>21.7-22.4 bar | 65-32 psig<br>4.5-2.2 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 160-210 psig<br>11.0-14.5 bar | 100-135 psig<br>6.9-9.3 bar |
| <b>70/21</b>                          | 180-225 psig<br>12.4-15.5 bar | 100-140 psig<br>6.9-9.7 bar |
| <b>80/27</b>                          | 180-230 psig<br>12.4-15.9 bar | 105-140 psig<br>7.2-9.7 bar |
| <b>90/32</b>                          | 180-230 psig<br>12.4-15.9 bar | 105-140 psig<br>7.2-9.7 bar |
| <b>100/38</b>                         | 180-230 psig<br>12.4-15.9 bar | 105-140 psig<br>7.2-9.7 bar |
| <b>110/43</b>                         | 180-230 psig<br>12.4-15.9 bar | 105-140 psig<br>7.2-9.7 bar |

## KP0700A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 7.1 - 8.5               | 8.6 - 10.2  | 9.5 - 11.0  | 1.0-2.5         |
| 80/27                                       | 8.0 - 9.2               | 9.0 - 10.7  | 10.5 - 12.3 |                 |
| 90/32                                       | 8.8 - 10.5              | 9.5 - 11.3  | 11.5 - 13.7 |                 |
| 100/38                                      | 9.8 - 11.5              | 11.0 - 12.7 | 13.5 - 15.6 |                 |
| 110/43                                      | 11.9 - 13.2             | 12.4 - 14.2 | 14.0 - 16.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| 70/21                                 | 725 lbs                 | 620 lbs | 530 lbs |
|                                       | 329 kgs                 | 281 kgs | 240 kgs |
| 80/27                                 | 675 lbs                 | 600 lbs | 500 lbs |
|                                       | 306 kgs                 | 272 kgs | 227 kgs |
| 90/32                                 | 625 lbs                 | 585 lbs | 470 lbs |
|                                       | 283 kgs                 | 265 kgs | 213 kgs |
| 100/38                                | 550 lbs                 | 510 lbs | 440 lbs |
|                                       | 249 kgs                 | 231 kgs | 200 lbs |
| 110/43                                | 470 lbs                 | 440 lbs | 415 lbs |
|                                       | 213 kgs                 | 200 kgs | 188 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                             |
|---------------------------------------|-------------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 145 - 200 psig<br>(10.0 - 13.8 bar) | 37-15 psig<br>(2.6-1.0 bar) |
| <b>70/21</b>                          | 150 - 210 psig<br>(10.3 - 14.5 bar) | 38-16 psig<br>(2.6-1.1 bar) |
| <b>80/27</b>                          | 160 - 215 psig<br>(11.0 - 14.8 bar) | 40-18 psig<br>(2.8-1.2 bar) |
| <b>90/32</b>                          | 180 - 220 psig<br>(12.4 - 15.2 bar) | 43-20 psig<br>(3.0-1.4 bar) |
| <b>100/38</b>                         | 215 - 280 psig<br>(14.8 - 19.3 bar) | 48-20 psig<br>(3.3-1.4 bar) |
| <b>110/43</b>                         | 250 - 300 psig<br>(17.2 - 20.7 bar) | 55-22 psig<br>(3.8-1.5 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 85 - 110 psig<br>(5.9 - 7.6 bar)  | 50 - 60 psig<br>(3.4 - 4.1 bar) |
| <b>70/21</b>                          | 86 - 110 psig<br>(5.9 - 7.6 bar)  | 52 - 62 psig<br>(3.6 - 4.3 bar) |
| <b>80/27</b>                          | 95 - 110 psig<br>(6.5 - 7.6 bar)  | 52 - 64 psig<br>(3.6 - 4.4 bar) |
| <b>90/32</b>                          | 100 - 120 psig<br>(6.5 - 7.6 bar) | 55 - 68 psig<br>(3.8 - 4.7 bar) |
| <b>100/38</b>                         | 110 - 120 psig<br>(6.5 - 7.6 bar) | 60 - 70 psig<br>(4.1 - 5.8 bar) |
| <b>110/43</b>                         | 120 - 150 psig<br>(6.5 - 7.6 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |

## KP0700W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 7.6 - 8.5               | 8.1 - 10.0  | 10.8 - 11.4 | 1.0-2.5         |
| 80/27                                       | 7.8 - 9.1               | 8.7 - 10.3  | 9.7 - 11.5  |                 |
| 90/32                                       | 8.1 - 9.4               | 9.4 - 10.8  | 10.1 - 11.8 |                 |
| 100/38                                      | 8.4 - 9.8               | 9.8 - 11.4  | 10.2 - 12.0 |                 |
| 110/43                                      | 8.8 - 10.5              | 10.2 - 12.2 | 11.6 - 12.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| 70/21                                    | 710 lbs<br>322 kgs      | 610 lbs<br>277 kgs | 515 lbs<br>234 kgs |
| 80/27                                    | 675 lbs<br>306 kgs      | 590 lbs<br>268 kgs | 505 lbs<br>229 kgs |
| 90/32                                    | 640 lbs<br>290 kgs      | 585 lbs<br>265 kgs | 495 lbs<br>224 kgs |
| 100/38                                   | 605 lbs<br>274 kgs      | 555 lbs<br>252 kgs | 485 lbs<br>220 kgs |
| 110/43                                   | 570 lbs<br>259 kgs      | 525 lbs<br>238 kgs | 475 lbs<br>215 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)  
Water regulating valve set to maintain 170 PSI discharge pressure  
Condenser Water usage per 100 lbs ice = 125 gal (45 kg = 473 L)

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                        |                             |
|---------------------------------------|-------------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 31-15 psig<br>(2.1-1.0 bar) |
| <b>70/21</b>                          | 176 - 185 psig<br>(12.1 - 12.8 bar) | 34-15 psig<br>(2.3-1.1 bar) |
| <b>80/27</b>                          | 177 - 185 psig<br>(12.1 - 12.8 bar) | 36-16 psig<br>(2.5-1.2 bar) |
| <b>90/32</b>                          | 180 - 190 psig<br>(12.4 - 13.1 bar) | 37-17 psig<br>(2.6-1.2 bar) |
| <b>100/38</b>                         | 181 - 190 psig<br>(12.4 - 13.1 bar) | 38-17 psig<br>(2.6-1.2 bar) |
| <b>110/43</b>                         | 182 - 190 psig<br>(12.4 - 13.1 bar) | 40-17 psig<br>(2.8-1.2 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                     |                                 |
|---------------------------------------|-----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG        | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 85 - 115 psig<br>(5.9 - 7.9 bar)  | 50 - 60 psig<br>(3.4 - 4.1 bar) |
| <b>70/21</b>                          | 85 - 115 psig<br>(5.9 - 7.9 bar)  | 52 - 62 psig<br>(3.6 - 4.3 bar) |
| <b>80/27</b>                          | 85 - 115 psig<br>(5.9 - 7.9 bar)  | 52 - 64 psig<br>(3.6 - 4.4 bar) |
| <b>90/32</b>                          | 85 - 115 psig<br>(5.9 - 7.9 bar)  | 55 - 68 psig<br>(3.8 - 4.7 bar) |
| <b>100/38</b>                         | 90 - 120 psig<br>(6.5. - 7.6 bar) | 60 - 70 psig<br>(4.1 - 5.8 bar) |
| <b>110/43</b>                         | 90 - 120 psig<br>(6.5. - 7.6 bar) | 65 - 75 psig<br>(4.5 - 5.2 bar) |

## KT0700A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 7.3-8.6                 | 8.7-10.2  | 9.3-10.9  | 1.0-2.5         |
| 80/27                                       | 8.0-9.4                 | 9.2-10.8  | 10.4-12.2 |                 |
| 90/32                                       | 8.8-10.4                | 9.7-11.4  | 11.7-13.7 |                 |
| 100/38                                      | 9.8-11.5                | 10.9-12.8 | 13.4-15.6 |                 |
| 110/43                                      | 11.0-12.9               | 12.3-14.4 | 14.3-16.7 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| 70/21                                 | 675 lbs                 | 585 lbs | 550 lbs |
|                                       | 306 kgs                 | 265 kgs | 249 kgs |
| 80/27                                 | 625 lbs                 | 555 lbs | 500 lbs |
|                                       | 283 kgs                 | 252 kgs | 227 kgs |
| 90/32                                 | 575 lbs                 | 530 lbs | 450 lbs |
|                                       | 261 kgs                 | 240 kgs | 204 kgs |
| 100/38                                | 525 lbs                 | 480 lbs | 400 lbs |
|                                       | 238 kgs                 | 218 kgs | 181 kgs |
| 110/43                                | 475 lbs                 | 430 lbs | 375 lbs |
|                                       | 215 kgs                 | 195 kgs | 170 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 260-340 psig<br>17.9-23.4 bar | 60-28 psig<br>4.1-1.9 bar |
| <b>70/21</b>                          | 275-350 psig<br>19.0-24.1 bar | 65-30 psig<br>4.5-2.1 bar |
| <b>80/27</b>                          | 275-380 psig<br>19.0-26.2 bar | 70-31 psig<br>4.8-2.1 bar |
| <b>90/32</b>                          | 350-415 psig<br>24.1-28.6 bar | 75-35 psig<br>5.2-2.4 bar |
| <b>100/38</b>                         | 380-520 psig<br>26.2-35.9 bar | 80-36 psig<br>5.5-2.5 bar |
| <b>110/43</b>                         | 440-540 psig<br>30.3-37.2 bar | 80-36 psig<br>5.5-2.5 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 150-175 psig<br>10.3-12.1 bar | 115-130 psig<br>7.9-9.0 bar   |
| <b>70/21</b>                          | 165-200 psig<br>11.4-13.8 bar | 115-130 psig<br>7.9-9.0 bar   |
| <b>80/27</b>                          | 175-200 psig<br>12.1-13.8 bar | 115-135 psig<br>7.9-9.3 bar   |
| <b>90/32</b>                          | 185-200 psig<br>12.8-13.8 bar | 135-145 psig<br>9.3-10.0 bar  |
| <b>100/38</b>                         | 200-215 psig<br>13.8-14.8 bar | 140-160 psig<br>9.7-11.0 bar  |
| <b>110/43</b>                         | 210-220 psig<br>14.5-15.2 bar | 155-175 psig<br>10.7-12.1 bar |

## KT0700W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 7.5-8.9                 | 8.2-9.7   | 9.6-11.3  | 1.0-2.5         |
| 80/27                                       | 7.8-9.2                 | 8.5-10.0  | 9.8-11.5  |                 |
| 90/32                                       | 7.9-9.4                 | 9.3-10.9  | 10.0-11.8 |                 |
| 100/38                                      | 8.4-9.9                 | 9.8-11.5  | 10.3-12.0 |                 |
| 110/43                                      | 8.7-10.2                | 10.4-12.2 | 11.0-12.9 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| 70/21                                    | 660 lbs<br>299 kgs      | 610 lbs<br>277 kgs | 535 lbs<br>243 kgs |
| 80/27                                    | 640 lbs<br>290 kgs      | 595 lbs<br>270 kgs | 525 lbs<br>238 kgs |
| 90/32                                    | 630 lbs<br>286 kgs      | 550 lbs<br>249 kgs | 515 lbs<br>234 kgs |
| 100/38                                   | 600 lbs<br>272 kgs      | 525 lbs<br>238 kgs | 505 lbs<br>229 kgs |
| 110/43                                   | 585 lbs<br>265 kgs      | 500 lbs<br>227 kgs | 475 lbs<br>215 kgs |

Based on average ice slab weight of 4.125 – 4.75 lb (1.87 – 2.15 kg)  
Water regulating valve set to maintain 300 PSI discharge pressure  
Condenser Water usage per 100 lbs ice = 140 gal (45 kg = 530 L)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 295-305 psig<br>20.3-21.0 bar | 55-31 psig<br>3.8-2.1 bar |
| <b>70/21</b>                          | 295-305 psig<br>20.3-21.0 bar | 55-32 psig<br>3.8-2.2 bar |
| <b>80/27</b>                          | 295-305 psig<br>20.3-21.0 bar | 60-32 psig<br>4.1-2.2 bar |
| <b>90/32</b>                          | 295-305 psig<br>20.3-21.0 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>100/38</b>                         | 300-325 psig<br>20.7-22.4 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>110/43</b>                         | 300-325 psig<br>20.7-22.4 bar | 65-32 psig<br>4.5-2.2 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 145-180 psig<br>10.0-12.4 bar | 115-140 psig<br>7.9-9.7 bar  |
| <b>70/21</b>                          | 155-190 psig<br>10.7-13.1 bar | 120-140 psig<br>8.3-9.7 bar  |
| <b>80/27</b>                          | 155-190 psig<br>10.7-13.1 bar | 120-140 psig<br>8.3-9.7 bar  |
| <b>90/32</b>                          | 155-190 psig<br>10.7-13.1 bar | 120-150 psig<br>8.3-10.3 bar |
| <b>100/38</b>                         | 160-190 psig<br>11.0-13.1 bar | 125-150 psig<br>8.6-10.3 bar |
| <b>110/43</b>                         | 165-190 psig<br>11.4-13.1 bar | 130-150 psig<br>9.0-10.3 bar |

## K1000A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 8.5-10.1                | 9.9-11.7  | 11.6-12.6 | 1.0-2.5         |
| 80/27                                       | 9.4-11.1                | 10.2-12.1 | 10.9-12.9 |                 |
| 90/32                                       | 10.2-12.1               | 11.0-13.0 | 12.0-14.2 |                 |
| 100/38                                      | 11.1-13.1               | 12.6-14.8 | 13.1-15.5 |                 |
| 110/43                                      | 12.1-14.3               | 13.0-15.4 | 13.9-16.4 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 895 lbs                 | 785 lbs | 735 lbs |
|                                       | 406 kgs                 | 356 kgs | 333 kgs |
| <b>80/27</b>                          | 820 lbs                 | 765 lbs | 720 lbs |
|                                       | 372 kgs                 | 347 kgs | 327 kgs |
| <b>90/32</b>                          | 765 lbs                 | 715 lbs | 660 lbs |
|                                       | 347 kgs                 | 324 kgs | 299 kgs |
| <b>100/38</b>                         | 710 lbs                 | 635 lbs | 610 lbs |
|                                       | 322 kgs                 | 288 kgs | 277 kgs |
| <b>110/43</b>                         | 655 lbs                 | 615 lbs | 580 lbs |
|                                       | 297 kgs                 | 279 kgs | 263 kgs |

Based on average ice slab weight of 6.2 – 7.2 lb (2.8 – 3.3 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 280-375 psig<br>19.3-25.9 bar | 60-28 psig<br>4.1-1.9 bar |
| <b>70/21</b>                          | 300-390 psig<br>20.7-26.9 bar | 65-28 psig<br>4.5-1.9 bar |
| <b>80/27</b>                          | 320-400 psig<br>22.1-27.6 bar | 70-32 psig<br>4.8-2.2 bar |
| <b>90/32</b>                          | 350-415 psig<br>24.1-28.6 bar | 75-33 psig<br>5.2-2.3 bar |
| <b>100/38</b>                         | 450-520 psig<br>31.0-35.9 bar | 80-37 psig<br>5.5-2.6 bar |
| <b>110/43</b>                         | 440-540 psig<br>30.3-37.2 bar | 85-39 psig<br>5.9-2.7 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 140-200 psig<br>9.7-13.8 bar  | 100-140 psig<br>6.9-9.7 bar  |
| <b>70/21</b>                          | 145-200 psig<br>10.0-13.8 bar | 105-140 psig<br>7.2-9.7 bar  |
| <b>80/27</b>                          | 150-205 psig<br>10.3-14.1 bar | 105-150 psig<br>7.2-10.3 bar |
| <b>90/32</b>                          | 160-210 psig<br>11.0-14.5 bar | 110-150 psig<br>7.6-10.3 bar |
| <b>100/38</b>                         | 170-240 psig<br>11.7-16.5 bar | 115-155 psig<br>7.9-10.7 bar |
| <b>110/43</b>                         | 200-250 psig<br>13.8-17.2 bar | 125-160 psig<br>8.6-11.0 bar |

## K1000W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 8.3-9.8                 | 8.8-10.4  | 9.7-11.5  | 1.0-2.5         |
| 80/27                                       | 9.0-10.7                | 9.7-11.5  | 10.8-12.8 |                 |
| 90/32                                       | 9.9-11.8                | 10.7-12.7 | 11.0-13.0 |                 |
| 100/38                                      | 10.2-12.1               | 11.1-13.1 | 11.4-13.5 |                 |
| 110/43                                      | 10.8-12.8               | 11.3-13.4 | 11.8-14.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 915 lbs                 | 870 lbs | 800 lbs |
|                                          | 415 kgs                 | 395 kgs | 363 kgs |
| 80/27                                    | 850 lbs                 | 800 lbs | 725 lbs |
|                                          | 386 kgs                 | 363 kgs | 329 kgs |
| 90/32                                    | 780 lbs                 | 730 lbs | 715 lbs |
|                                          | 354 kgs                 | 331 kgs | 324 kgs |
| 100/38                                   | 765 lbs                 | 710 lbs | 690 lbs |
|                                          | 347 kgs                 | 322 kgs | 313 kgs |
| 110/43                                   | 725 lbs                 | 695 lbs | 670 lbs |
|                                          | 329 kgs                 | 315 kgs | 304 kgs |

Based on average ice slab weight of 6.2 – 7.2 lb (2.8 – 3.3 kg)  
Water regulating valve set to maintain 320 PSI discharge pressure.  
Condenser Water usage per 100 lbs ice = 180 gal (45 kg = 681 L)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 295-310 psig<br>20.3-21.4 bar | 65-30 psig<br>4.5-2.1 bar |
| <b>70/21</b>                          | 295-310 psig<br>20.3-21.4 bar | 65-30 psig<br>4.5-2.1 bar |
| <b>80/27</b>                          | 295-310 psig<br>20.3-21.4 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>90/32</b>                          | 295-310 psig<br>20.3-21.4 bar | 65-32 psig<br>4.5-2.2 bar |
| <b>100/38</b>                         | 300-330 psig<br>20.7-22.8 bar | 68-33 psig<br>4.7-2.3 bar |
| <b>110/43</b>                         | 310-345 psig<br>21.4-23.8 bar | 70-34 psig<br>4.8-2.3 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 140-220 psig<br>9.7-15.2 bar  | 100-155 psig<br>6.9-10.7 bar |
| <b>70/21</b>                          | 140-220 psig<br>9.7-15.2 bar  | 100-155 psig<br>6.9-10.7 bar |
| <b>80/27</b>                          | 145-225 psig<br>10.0-15.5 bar | 100-160 psig<br>6.9-11.0 bar |
| <b>90/32</b>                          | 150-225 psig<br>10.3-15.5 bar | 105-160 psig<br>7.2-11.0 bar |
| <b>100/38</b>                         | 150-230 psig<br>10.3-15.9 bar | 105-165 psig<br>7.2-11.4 bar |
| <b>110/43</b>                         | 150-235 psig<br>10.3-16.2 bar | 105-165 psig<br>7.2-11.4 bar |

## K1000N REMOTE AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 8.2-9.7                 | 8.5-10.1  | 9.4-11.1  | 1.0-2.5         |
| 80/27                                       | 9.1-10.8                | 9.9-11.7  | 10.2-12.1 |                 |
| 90/32                                       | 9.7-11.5                | 10.8-12.5 | 11.3-13.3 |                 |
| 100/38                                      | 10.6-12.5               | 11.4-13.5 | 12.2-14.5 |                 |
| 110/43                                      | 12.0-14.2               | 12.5-14.7 | 13.4-15.8 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 925 lbs                 | 890 lbs | 820 lbs |
|                                       | 420 kgs                 | 404 kgs | 372 kgs |
| <b>80/27</b>                          | 845 lbs                 | 785 lbs | 760 lbs |
|                                       | 383 kgs                 | 356 kgs | 345 kgs |
| <b>90/32</b>                          | 800 lbs                 | 725 lbs | 700 lbs |
|                                       | 363 kgs                 | 329 kgs | 318 kgs |
| <b>100/38</b>                         | 740 lbs                 | 690 lbs | 650 lbs |
|                                       | 336 kgs                 | 313 kgs | 295 kgs |
| <b>110/43</b>                         | 660 lbs                 | 640 lbs | 600 lbs |
|                                       | 299 kgs                 | 290 kgs | 272 kgs |

Based on average ice slab weight of 6.2 – 7.2 lb (2.8 – 3.3 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 300-350 psig<br>20.7-24.1 bar | 60-36 psig<br>4.1-2.5 bar |
| <b>70/21</b>                          | 310-365 psig<br>21.4-25.2 bar | 60-38 psig<br>4.1-2.6 bar |
| <b>80/27</b>                          | 315-370 psig<br>21.7-25.5 bar | 65-38 psig<br>4.5-2.6 bar |
| <b>90/32</b>                          | 320-375 psig<br>22.1-25.9 bar | 65-38 psig<br>4.5-2.6 bar |
| <b>100/38</b>                         | 380-500 psig<br>26.2-34.5 bar | 70-45 psig<br>4.8-3.1 bar |
| <b>110/43</b>                         | 405-520 psig<br>27.9-35.9 bar | 75-46 psig<br>5.2-3.2 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 190-210 psig<br>13.1-14.5 bar | 110-130 psig<br>7.6-9.0 bar  |
| <b>70/21</b>                          | 200-220 psig<br>13.8-15.2 bar | 120-140 psig<br>8.3-9.7 bar  |
| <b>80/27</b>                          | 205-225 psig<br>14.1-15.5 bar | 120-150 psig<br>8.3-10.3 bar |
| <b>90/32</b>                          | 210-225 psig<br>14.5-15.5 bar | 130-150 psig<br>9.0-10.3 bar |
| <b>100/38</b>                         | 220-250 psig<br>15.2-17.2 bar | 135-155 psig<br>9.3-10.7 bar |
| <b>110/43</b>                         | 230-250 psig<br>15.9-17.2 bar | 140-160 psig<br>9.7-11.0 bar |

## KP1000A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 10.5 - 11.5             | 12.1 - 13.2 | 13.3 - 14.8 | 1.0-2.5         |
| 80/27                                       | 11.7 - 12.5             | 12.6 - 13.9 | 13.9 - 15.7 |                 |
| 90/32                                       | 12.6 - 13.4             | 12.9 - 14.6 | 14.5 - 16.2 |                 |
| 100/38                                      | 13.0 - 14.5             | 14.5 - 15.7 | 15.9 - 16.7 |                 |
| 110/43                                      | 13.3 - 14.4             | 15.1 - 16.3 | 16.5 - 18.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 890 lbs                 | 850 lbs | 810 lbs |
|                                       | 404 kgs                 | 385 kgs | 367 kgs |
| <b>80/27</b>                          | 850 lbs                 | 820 lbs | 790 lbs |
|                                       | 385 kgs                 | 372 kgs | 358 kgs |
| <b>90/32</b>                          | 810 lbs                 | 790 lbs | 750 lbs |
|                                       | 367 kgs                 | 358 kgs | 340 kgs |
| <b>100/38</b>                         | 750 lbs                 | 730 lbs | 710 lbs |
|                                       | 340 kgs                 | 331 kgs | 322 kgs |
| <b>110/43</b>                         | 700 lbs                 | 680 lbs | 670 lbs |
|                                       | 317 kgs                 | 308 kgs | 304 kgs |

Based on average ice slab weight of 7.25 – 7.75 lb (3.3 – 3.5 kg)

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 150 - 210 psig<br>(10.3 - 14.5 bar) | 37 - 18 psig<br>(2.6 - 1.2 bar) |
| <b>70/21</b>                          | 150 - 210 psig<br>(10.3 - 14.5 bar) | 37 - 18 psig<br>(2.6 - 1.2 bar) |
| <b>80/27</b>                          | 160 - 220 psig<br>(11.0 - 15.2 bar) | 39 - 19 psig<br>(2.7 - 1.3 bar) |
| <b>90/32</b>                          | 175 - 225 psig<br>(12.1 - 15.5 bar) | 44 - 20 psig<br>(3.0 - 1.4 bar) |
| <b>100/38</b>                         | 200 - 235 psig<br>(13.8 - 16.2 bar) | 49 - 20 psig<br>(3.4 - 1.4 bar) |
| <b>110/43</b>                         | 215 - 300 psig<br>(14.8 - 20.7 bar) | 55 - 21 psig<br>(3.8 - 1.4 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                      |                                 |
|---------------------------------------|------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG         | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 65 - 105 psig<br>(4.5 - 7.2 bar)   | 45 - 58 psig<br>(3.1 - 4.0 bar) |
| <b>70/21</b>                          | 70 - 110 psig<br>(4.8 - 7.6 bar)   | 48 - 60 psig<br>(3.3 - 4.1 bar) |
| <b>80/27</b>                          | 75 - 115 psig<br>(5.2 - 7.9 bar)   | 50 - 60 psig<br>(3.4 - 4.1 bar) |
| <b>90/32</b>                          | 100 - 125 psig<br>(6.9 - 8.6 bar)  | 52 - 78 psig<br>(3.6 - 5.4 bar) |
| <b>100/38</b>                         | 110 - 140 psig<br>(7.6 - 9.7 bar)  | 54 - 82 psig<br>(3.7 - 5.7 bar) |
| <b>110/43</b>                         | 115 - 150 psig<br>(7.9 - 10.3 bar) | 60 - 90 psig<br>(4.1 - 6.2 bar) |

## KP1000W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |             |             | Harvest<br>Time |
|---------------------------------------------|-------------------------|-------------|-------------|-----------------|
|                                             | Water Temperature °F/°C |             |             |                 |
|                                             | 50/10                   | 70/21       | 90/32       |                 |
| 70/21                                       | 9.5 - 10.4              | 11.5 - 12.5 | 12.4 - 13.1 | 1.0-2.5         |
| 80/27                                       | 9.7 - 10.5              | 11.8 - 12.7 | 12.5 - 13.3 |                 |
| 90/32                                       | 10.1 - 10.9             | 11.9 - 12.9 | 12.8 - 13.6 |                 |
| 100/38                                      | 10.8 - 11.7             | 12.1 - 13.1 | 12.9 - 13.8 |                 |
| 110/43                                      | 11.0 - 12.2             | 12.3 - 13.3 | 13.1 - 14.1 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                    |                    |
|------------------------------------------|-------------------------|--------------------|--------------------|
|                                          | 50/10                   | 70/21              | 90/32              |
| <b>70/21</b>                             | 910 lbs<br>413 kgs      | 880 lbs<br>399 kgs | 760 lbs<br>399 kgs |
| <b>80/27</b>                             | 900 lbs<br>408 kgs      | 870 lbs<br>395 kgs | 870 lbs<br>395 kgs |
| <b>90/32</b>                             | 890 lbs<br>404 kgs      | 860 lbs<br>390 kgs | 740 lbs<br>336 kgs |
| <b>100/38</b>                            | 880 lbs<br>399 kgs      | 850 lbs<br>385 kgs | 730 lbs<br>331 kgs |
| <b>110/43</b>                            | 870 lbs<br>395 kgs      | 840 lbs<br>381 kgs | 720 lbs<br>327 kgs |

Based on average ice slab weight of 7.25 – 7.75 lb (3.3 – 3.5 kg)  
Water regulating valve set to maintain 300 PSI discharge pressure.  
Condenser Water usage per 100 lbs ice = 125 gal (45 kg = 473 L)

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                        |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG          | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 32 - 16 psig<br>(2.2 -1.1 bar)  |
| <b>70/21</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 32 - 16 psig<br>(2.2 -1.1 bar)  |
| <b>80/27</b>                          | 175 - 185 psig<br>(12.1 - 12.8 bar) | 35 - 19 psig<br>(2.4 - 1.3 bar) |
| <b>90/32</b>                          | 180 - 190 psig<br>(12.4 - 13.1 bar) | 35 - 22 psig<br>(2.4 - 1.5 bar) |
| <b>100/38</b>                         | 180 - 190 psig<br>(12.4 - 13.1 bar) | 37 - 24 psig<br>(2.6 - 1.7 bar) |
| <b>110/43</b>                         | 180 - 190 psig<br>(12.4 - 13.1 bar) | 38 - 25 psig<br>(2.6 - 1.7 bar) |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                    |                                 |
|---------------------------------------|----------------------------------|---------------------------------|
|                                       | Discharge Pressure<br>PSIG       | Suction Pressure<br>PSIG        |
| <b>50/10</b>                          | 75 - 100 psig<br>(5.2 - 6.9 bar) | 50 - 60 psig<br>(3.4 - 4.1 bar) |
| <b>70/21</b>                          | 75 - 100 psig<br>(5.2 - 6.9 bar) | 50 - 60 psig<br>(3.4 - 4.1 bar) |
| <b>80/27</b>                          | 75 - 100 psig<br>(5.2 - 6.9 bar) | 52 - 62 psig<br>(3.6 - 4.3 bar) |
| <b>90/32</b>                          | 80 - 100 psig<br>(5.5 - 6.9 bar) | 55 - 66 psig<br>(3.8 - 4.6 bar) |
| <b>100/38</b>                         | 85 - 105 psig<br>(5.9 - 7.2 bar) | 56 - 58 psig<br>(3.9 - 4.0 bar) |
| <b>110/43</b>                         | 85 - 105 psig<br>(5.9 - 7.2 bar) | 57 - 70 psig<br>(3.9 - 4.8 bar) |

## KT1000A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.2-11.0               | 11.6-12.5 | 12.6-13.6 | 1.0-2.5         |
| 80/27                                       | 11.2-12.1               | 12.2-13.2 | 13.4-14.4 |                 |
| 90/32                                       | 12.1-13.0               | 13.9-14.9 | 14.8-15.9 |                 |
| 100/38                                      | 13.2-14.2               | 14.2-15.3 | 16.2-17.4 |                 |
| 110/43                                      | 14.3-15.4               | 16.3-17.6 | 17.8-19.2 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |         |         |
|---------------------------------------|-------------------------|---------|---------|
|                                       | 50/10                   | 70/21   | 90/32   |
| <b>70/21</b>                          | 890 lbs                 | 800 lbs | 740 lbs |
|                                       | 404 kgs                 | 363 kgs | 336 kgs |
| <b>80/27</b>                          | 820 lbs                 | 760 lbs | 700 lbs |
|                                       | 372 kgs                 | 345 kgs | 318 kgs |
| <b>90/32</b>                          | 770 lbs                 | 680 lbs | 640 lbs |
|                                       | 349 kgs                 | 308 kgs | 290 kgs |
| <b>100/38</b>                         | 710 lbs                 | 665 lbs | 590 lbs |
|                                       | 322 kgs                 | 302 kgs | 268 kgs |
| <b>110/43</b>                         | 660 lbs                 | 585 lbs | 540 lbs |
|                                       | 299 kgs                 | 265 kgs | 245 kgs |

Based on average ice slab weight of 7.25 – 7.75 lb (3.3 – 3.5 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 280-350 psig<br>19.3-24.1 bar | 60-36 psig<br>4.1-2.5 bar |
| <b>70/21</b>                          | 280-350 psig<br>19.3-24.1 bar | 65-36 psig<br>4.5-2.5 bar |
| <b>80/27</b>                          | 300-400 psig<br>20.7-27.6 bar | 70-38 psig<br>4.8-2.6 bar |
| <b>90/32</b>                          | 350-420 psig<br>24.1-29.0 bar | 75-39 psig<br>5.2-2.7 bar |
| <b>100/38</b>                         | 425-520 psig<br>29.3-35.9 bar | 80-40 psig<br>5.5-2.8 bar |
| <b>110/43</b>                         | 440-540 psig<br>30.3-37.2 bar | 85-41 psig<br>5.9-2.8 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 135-150 psig<br>9.3-10.3 bar  | 100-140 psig<br>6.9-9.7 bar  |
| <b>70/21</b>                          | 135-155 psig<br>9.3-10.7 bar  | 105-140 psig<br>7.2-9.7 bar  |
| <b>80/27</b>                          | 150-180 psig<br>10.3-12.4 bar | 105-150 psig<br>7.2-10.3 bar |
| <b>90/32</b>                          | 160-210 psig<br>11.0-14.5 bar | 120-150 psig<br>8.3-10.3 bar |
| <b>100/38</b>                         | 170-240 psig<br>11.7-16.5 bar | 130-155 psig<br>9.0-10.7 bar |
| <b>110/43</b>                         | 190-250 psig<br>13.1-17.2 bar | 135-160 psig<br>9.3-11.0 bar |

## KT1000W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 11.0-11.9               | 11.6-12.5 | 13.4-14.4 | 1.0-2.5         |
| 80/27                                       | 11.2-12.0               | 11.5-12.4 | 13.5-14.6 |                 |
| 90/32                                       | 11.4-12.3               | 13.0-14.0 | 13.6-14.7 |                 |
| 100/38                                      | 11.6-12.5               | 13.3-14.3 | 13.9-14.9 |                 |
| 110/43                                      | 11.7-12.6               | 13.5-14.6 | 14.1-15.2 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |         |         |
|------------------------------------------|-------------------------|---------|---------|
|                                          | 50/10                   | 70/21   | 90/32   |
| 70/21                                    | 835 lbs                 | 800 lbs | 700 lbs |
|                                          | 379 kgs                 | 363 kgs | 318 kgs |
| 80/27                                    | 825 lbs                 | 805 lbs | 695 lbs |
|                                          | 374 kgs                 | 365 kgs | 315 kgs |
| 90/32                                    | 810 lbs                 | 720 lbs | 690 lbs |
|                                          | 367 kgs                 | 327 kgs | 313 kgs |
| 100/38                                   | 800 lbs                 | 705 lbs | 680 lbs |
|                                          | 363 kgs                 | 320 kgs | 308 kgs |
| 110/43                                   | 790 lbs                 | 695 lbs | 670 lbs |
|                                          | 358 kgs                 | 315 kgs | 304 kgs |

Based on average ice slab weight of 7.25 – 7.75 lb (3.3 – 3.5 kg)  
Water regulating valve set to maintain 300 PSI discharge pressure.  
Condenser Water usage per 100 lbs ice = 131 gal (45 kg = 496 L)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 290-305 psig<br>20.0-21.0 bar | 64-36 psig<br>4.4-2.5 bar |
| <b>70/21</b>                          | 290-305 psig<br>20.0-21.0 bar | 64-36<br>4.4-2.5 bar      |
| <b>80/27</b>                          | 290-310 psig<br>20.0-21.4 bar | 68-37 psig<br>4.7-2.6 bar |
| <b>90/32</b>                          | 295-335 psig<br>20.3-23.1 bar | 72-39 psig<br>5.0-2.7 bar |
| <b>100/38</b>                         | 305-335 psig<br>21.0-23.1 bar | 73-41 psig<br>5.0-2.8 bar |
| <b>110/43</b>                         | 310-345 psig<br>21.4-23.8 bar | 74-44 psig<br>5.1-3.0 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 150-165 psig<br>10.3-11.4 bar | 100-125 psig<br>6.9-8.6 bar |
| <b>70/21</b>                          | 150-165 psig<br>10.3-11.4 bar | 100-125 psig<br>6.9-8.6 bar |
| <b>80/27</b>                          | 155-175 psig<br>10.7-12.1 bar | 100-125 psig<br>6.9-8.6 bar |
| <b>90/32</b>                          | 160-180 psig<br>11.0-12.4 bar | 110-125 psig<br>7.6-8.6 bar |
| <b>100/38</b>                         | 160-180 psig<br>11.0-12.4 bar | 110-130 psig<br>7.6-9.0 bar |
| <b>110/43</b>                         | 165-185 psig<br>11.4-12.8 bar | 115-130 psig<br>7.9-9.0 bar |

## KT1000N REMOTE AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.8-11.6               | 11.2-12.1 | 11.4-12.3 | 1.0-2.5         |
| 80/27                                       | 10.9-11.7               | 11.8-12.7 | 13.0-14.0 |                 |
| 90/32                                       | 11.5-12.4               | 13.4-14.4 | 13.6-14.7 |                 |
| 100/38                                      | 11.9-12.8               | 13.9-14.9 | 15.1-16.2 |                 |
| 110/43                                      | 13.5-14.6               | 14.9-16.1 | 16.3-17.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                    |                    |
|---------------------------------------|-------------------------|--------------------|--------------------|
|                                       | 50/10                   | 70/21              | 90/32              |
| <b>-20-50/-29-10</b>                  | 850 lbs<br>386 kgs      | 820 lbs<br>372 kgs | 810 lbs<br>367 kgs |
| <b>70/21</b>                          | 845 lbs<br>383 kgs      | 785 lbs<br>356 kgs | 720 lbs<br>327 kgs |
| <b>80/27</b>                          | 805 lbs<br>365 kgs      | 745 lbs<br>338 kgs | 690 lbs<br>313 kgs |
| <b>90/32</b>                          | 780 lbs<br>354 kgs      | 700 lbs<br>318 kgs | 660 lbs<br>299 kgs |
| <b>100/38</b>                         | 735 lbs<br>333 kgs      | 680 lbs<br>308 kgs | 630 lbs<br>286 kgs |
| <b>110/43</b>                         | 695 lbs<br>315 kgs      | 635 lbs<br>288 kgs | 585 lbs<br>265 kgs |

Based on average ice slab weight of 7.25 – 7.75 lb (3.3 – 3.5 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>-20/-29</b>                        | 260-280 psig<br>17.9-19.3 bar | 65-42 psig<br>4.5-2.9 bar |
| <b>70/21</b>                          | 300-315 psig<br>20.7-21.7 bar | 65-43 psig<br>4.5-3.0 bar |
| <b>80/27</b>                          | 350-320 psig<br>24.1-22.1 bar | 68-44 psig<br>4.7-3.0 bar |
| <b>90/32</b>                          | 370-325 psig<br>25.5-22.4 bar | 70-45 psig<br>4.8-3.1 bar |
| <b>100/38</b>                         | 470-420 psig<br>32.4-29.0 bar | 80-50 psig<br>5.5-3.4 bar |
| <b>110/43</b>                         | 480-425 psig<br>33.1-29.3 bar | 95-50 psig<br>6.6-3.4 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>-20/-29</b>                        | 160-180 psig<br>11.0-12.4 bar | 120-130 psig<br>8.3-9.0 bar  |
| <b>70/21</b>                          | 180-195 psig<br>12.4-13.4 bar | 130-145 psig<br>9.0-10.0 bar |
| <b>80/27</b>                          | 180-195 psig<br>12.4-13.4 bar | 130-145 psig<br>9.0-10.0 bar |
| <b>90/32</b>                          | 180-195 psig<br>12.4-13.4 bar | 130-145 psig<br>9.0-10.0 bar |
| <b>100/38</b>                         | 195-200 psig<br>13.4-13.8 bar | 130-145 psig<br>9.0-10.0 bar |
| <b>110/43</b>                         | 200-210 psig<br>13.8-14.5 bar | 135-150 psig<br>9.3-10.3 bar |

## K1350A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.7-12.6               | 12.1-14.2 | 13.8-16.2 | 1.0-2.5         |
| 80/27                                       | 11.2-13.2               | 12.5-14.7 | 13.1-15.4 |                 |
| 90/32                                       | 11.7-13.8               | 12.9-15.2 | 14.1-16.6 |                 |
| 100/38                                      | 12.8-15.1               | 14.1-16.6 | 15.5-18.2 |                 |
| 110/43                                      | 14.4-16.9               | 16.2-19.0 | 18.9-22.1 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| <b>70/21</b>                          | 1540 lbs<br>699 kgs     | 1350 lbs<br>612 kgs | 1190 lbs<br>540 kgs |
| <b>80/27</b>                          | 1350 lbs<br>612 kgs     | 1215 lbs<br>551 kgs | 1090 lbs<br>494 kgs |
| <b>90/32</b>                          | 1235 lbs<br>560 kgs     | 1145 lbs<br>519 kgs | 990 lbs<br>449 kgs  |
| <b>100/38</b>                         | 1160 lbs<br>526 kgs     | 1080 lbs<br>490 kgs | 920 lbs<br>417 kgs  |
| <b>110/43</b>                         | 1040 lbs<br>472 kgs     | 950 lbs<br>431 kgs  | 870 lbs<br>395 kgs  |

Based on average ice slab weight of 12.75 - 14.75 lb (5.78–6.69 kg)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                            |
|---------------------------------------|-------------------------------|----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG   |
| <b>50/10</b>                          | 300-380 psig<br>20.7-26.2 bar | 66-34 psig<br>4.6-2.3 bar  |
| <b>70/21</b>                          | 300-380 psig<br>20.7-26.2 bar | 66-34 psig<br>4.6-2.3 bar  |
| <b>80/27</b>                          | 315-410 psig<br>21.7-28.3 bar | 73-36 psig<br>5.0-2.5 bar  |
| <b>90/32</b>                          | 330-450 psig<br>22.8-31.0 bar | 81-39 psig<br>5.6-2.7 bar  |
| <b>100/38</b>                         | 375-490 psig<br>25.9-33.8 bar | 91-42 psig<br>6.3-2.9 bar  |
| <b>110/43</b>                         | 420-530 psig<br>29.0-36.5 bar | 101-46 psig<br>7.0-3.2 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 165-190 psig<br>11.4-13.1 bar | 125-135 psig<br>8.6-9.3 bar   |
| <b>70/21</b>                          | 165-190 psig<br>11.4-13.1 bar | 125-135 psig<br>8.6-9.3 bar   |
| <b>80/27</b>                          | 175-205 psig<br>12.1-14.1 bar | 130-140 psig<br>9.0-9.7 bar   |
| <b>90/32</b>                          | 185-220 psig<br>12.8-15.2 bar | 135-150 psig<br>9.3-10.3 bar  |
| <b>100/38</b>                         | 200-240 psig<br>13.8-16.5 bar | 150-170 psig<br>10.3-11.7 bar |
| <b>110/43</b>                         | 230-260 psig<br>15.9-17.9 bar | 165-185 psig<br>11.4-12.8 bar |

## K1350W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.7-12.7               | 11.2-13.1 | 11.6-13.7 | 1.0-2.5         |
| 80/27                                       | 10.9-12.8               | 11.3-13.3 | 11.7-13.7 |                 |
| 90/32                                       | 11.0-13.0               | 11.4-13.4 | 11.8-13.8 |                 |
| 100/38                                      | 11.3-13.4               | 11.7-13.8 | 12.2-14.9 |                 |
| 110/43                                      | 11.6-13.7               | 12.1-14.2 | 12.7-14.9 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                     |                     |
|------------------------------------------|-------------------------|---------------------|---------------------|
|                                          | 50/10                   | 70/21               | 90/32               |
| 70/21                                    | 1510 lbs<br>685 kgs     | 1290 lbs<br>585 kgs | 1215 lbs<br>551 kgs |
| 80/27                                    | 1500 lbs<br>680 kgs     | 1280 lbs<br>581 kgs | 1205 lbs<br>547 kgs |
| 90/32                                    | 1495 lbs<br>678 kgs     | 1225 lbs<br>556 kgs | 1190 lbs<br>540 kgs |
| 100/38                                   | 1485 lbs<br>674 kgs     | 1210 lbs<br>549 kgs | 1170 lbs<br>531 kgs |
| 110/43                                   | 1470 lbs<br>667 kgs     | 1190 lbs<br>540 kgs | 1140 lbs<br>517 kgs |

Based on average ice slab weight of 12.75 - 14.75 lb (5.78 – 6.69 kg)

Water regulating valve set to maintain 300 PSIG discharge pressure

Condenser Water usage per 100 lbs ice = 160 gal (45 kg = 606 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 290-305 psig<br>20.0-21.0 bar | 64-36 psig<br>4.4-2.5 bar |
| <b>70/21</b>                          | 290-305 psig<br>20.0-21.0 bar | 64-36 psig<br>4.4-2.5 bar |
| <b>80/27</b>                          | 290-310 psig<br>20.0-21.4 bar | 68-37 psig<br>4.7-2.6 bar |
| <b>90/32</b>                          | 295-335 psig<br>20.3-23.1 bar | 72-39 psig<br>5.0-2.7 bar |
| <b>100/38</b>                         | 305-335 psig<br>21.0-23.1 bar | 73-41 psig<br>5.0-2.8 bar |
| <b>110/43</b>                         | 310-340 psig<br>21.4-23.4 bar | 74-44 psig<br>5.1-3.0 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 150-165 psig<br>10.3-11.4 bar | 110-125 psig<br>7.6-8.6 bar |
| <b>70/21</b>                          | 150-165 psig<br>10.3-11.4 bar | 110-125 psig<br>7.6-8.6 bar |
| <b>80/27</b>                          | 155-175 psig<br>10.7-12.1 bar | 110-125 psig<br>7.6-8.6 bar |
| <b>90/32</b>                          | 160-180 psig<br>11.0-12.4 bar | 110-125 psig<br>7.6-8.6 bar |
| <b>100/38</b>                         | 160-180 psig<br>11.0-12.4 bar | 110-130 psig<br>7.6-9.0 bar |
| <b>110/43</b>                         | 165-185 psig<br>11.4-12.8 bar | 115-130 psig<br>7.9-9.0 bar |

## K1350N REMOTE AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 10.6-12.5               | 12.0-14.2 | 12.2-14.3 | 1.0-2.5         |
| 80/27                                       | 11.1-13.0               | 11.6-13.6 | 12.8-15.0 |                 |
| 90/32                                       | 11.2-13.2               | 11.3-13.4 | 12.5-16.0 |                 |
| 100/38                                      | 11.9-14.0               | 12.7-14.9 | 14.4-16.9 |                 |
| 110/43                                      | 12.8-15.0               | 13.9-16.3 | 15.3-18.0 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| <b>70/21</b>                          | 1470 lbs<br>667 kgs     | 1295 lbs<br>587 kgs | 1195 lbs<br>542 kgs |
| <b>80/27</b>                          | 1410 lbs<br>640 kgs     | 1250 lbs<br>567kgs  | 1175 lbs<br>533 kgs |
| <b>90/32</b>                          | 1340 lbs<br>608 kgs     | 1200 lbs<br>544 kgs | 1130 lbs<br>513 kgs |
| <b>100/38</b>                         | 1280 lbs<br>581 kgs     | 1115 lbs<br>kgs506  | 1040 lbs<br>472 kgs |
| <b>110/43</b>                         | 1160 lbs<br>526 kgs     | 1095 lbs<br>497kgs  | 975 lbs<br>442 kgs  |

Based on average ice slab weight of 12.75 - 14.75 lb (4.65 – 5.22 kg)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 300-365 psig<br>20.7-25.2 bar | 70-33 psig<br>4.8-2.3 bar |
| <b>70/21</b>                          | 300-365 psig<br>20.7-25.2 bar | 70-33 psig<br>4.8-2.3 bar |
| <b>80/27</b>                          | 305-370 psig<br>21.0-25.5 bar | 75-35 psig<br>5.2-2.4 bar |
| <b>90/32</b>                          | 305-380 psig<br>21.0-26.2 bar | 75-38 psig<br>5.2-2.6 bar |
| <b>100/38</b>                         | 330-410 psig<br>22.8-28.3 bar | 82-42 psig<br>5.7-2.9 bar |
| <b>110/43</b>                         | 400-490 psig<br>27.6-33.8 bar | 95-48 psig<br>6.6-3.3 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 165-190 psig<br>11.4-13.1 bar | 115-140 psig<br>7.9-9.7 bar  |
| <b>70/21</b>                          | 165-190 psig<br>11.4-13.1 bar | 115-140 psig<br>7.9-9.7 bar  |
| <b>80/27</b>                          | 170-190 psig<br>11.7-13.1 bar | 115-140 psig<br>7.9-9.7 bar  |
| <b>90/32</b>                          | 170-195 psig<br>11.7-13.4 bar | 120-145 psig<br>8.3-10.0 bar |
| <b>100/38</b>                         | 175-195 psig<br>12.1-13.4 bar | 125-145 psig<br>8.6-10.0 bar |
| <b>110/43</b>                         | 180-200 psig<br>12.4-13.8 bar | 130-150 psig<br>9.0-10.3 bar |

## KT1700A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.1-10.3                | 9.7-11.1  | 10.3-11.7 | 1.0-2.5         |
| 80/27                                       | 10.5-11.9               | 11.3-12.9 | 12.5-14.2 |                 |
| 90/32                                       | 11.8-13.4               | 12.6-14.3 | 14.3-16.2 |                 |
| 100/38                                      | 13.1-14.8               | 14.1-16.0 | 16.1-18.2 |                 |
| 110/43                                      | 15.6-17.7               | 17.1-19.4 | 18.2-20.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| <b>70/21</b>                          | 1800 lbs<br>816 kgs     | 1690 lbs<br>767 kgs | 1610 lbs<br>730 kgs |
| <b>80/27</b>                          | 1590 lbs<br>721 kgs     | 1480 lbs<br>671 kgs | 1360 lbs<br>617 kgs |
| <b>90/32</b>                          | 1430 lbs<br>649 kgs     | 1350 lbs<br>612 kgs | 1205 lbs<br>547 kgs |
| <b>100/38</b>                         | 1305 lbs<br>592 kgs     | 1215 lbs<br>551 kgs | 1080 lbs<br>490 kgs |
| <b>110/43</b>                         | 1110 lbs<br>503 kgs     | 1020 lbs<br>463 kgs | 965 lbs<br>438 kgs  |

Based on average ice slab weight of 13.20 - 14.80 lb (5.99 – 6.71 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                            |
|---------------------------------------|-------------------------------|----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG   |
| <b>50/10</b>                          | 255-340 psig<br>17.6-23.4 bar | 70-33 psig<br>4.8-2.3 bar  |
| <b>70/21</b>                          | 275-350 psig<br>19.0-24.1 bar | 75-35 psig<br>5.2-2.4 bar  |
| <b>80/27</b>                          | 300-380 psig<br>20.7-26.2 bar | 80-40 psig<br>5.5-2.8 bar  |
| <b>90/32</b>                          | 330-400 psig<br>22.8-27.6 bar | 80-45 psig<br>5.5-3.1 bar  |
| <b>100/38</b>                         | 500-415 psig<br>34.5-28.6 bar | 85-48 psig<br>5.9-3.3 bar  |
| <b>110/43</b>                         | 530-425 psig<br>36.5-29.3 bar | 100-50 psig<br>6.9-3.4 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 150-160 psig<br>10.3-11.0 bar | 110-115 psig<br>7.6-7.9 bar   |
| <b>70/21</b>                          | 165-170 psig<br>11.4-11.7 bar | 120-125 psig<br>8.3-8.6 bar   |
| <b>80/27</b>                          | 185-200 psig<br>12.8-13.8 bar | 135-145 psig<br>9.3-10.0 bar  |
| <b>90/32</b>                          | 200-205 psig<br>13.8-14.1 bar | 145-150 psig<br>10.0-10.3 bar |
| <b>100/38</b>                         | 230-245 psig<br>15.9-16.9 bar | 165-180 psig<br>11.4-12.4 bar |
| <b>110/43</b>                         | 245-255 psig<br>16.9-17.6 bar | 175-190 psig<br>12.1-13.1 bar |

## KT1700W SELF-CONTAINED WATER-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Around Ice<br>Machine<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.3-10.6                | 9.6-10.9  | 11.3-12.6 | 1.0-2.5         |
| 80/27                                       | 9.8-11.1                | 10.0-11.4 | 11.7-13.2 |                 |
| 90/32                                       | 9.9-11.3                | 11.5-13.1 | 12.0-13.6 |                 |
| 100/38                                      | 10.0-11.3               | 12.1-13.7 | 12.5-14.2 |                 |
| 110/43                                      | 10.0-11.4               | 12.3-14.0 | 12.9-14.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp.<br>Around Ice<br>Machine °F/°C | Water Temperature °F/°C |                     |                     |
|------------------------------------------|-------------------------|---------------------|---------------------|
|                                          | 50/10                   | 70/21               | 90/32               |
| 70/21                                    | 1765 lbs<br>801 kgs     | 1720 lbs<br>780 kgs | 1515 lbs<br>687 kgs |
| 80/27                                    | 1685 lbs<br>764 kgs     | 1650 lbs<br>748 kgs | 1445 lbs<br>655 kgs |
| 90/32                                    | 1670 lbs<br>757 kgs     | 1460 lbs<br>662 kgs | 1410 lbs<br>640 kgs |
| 100/38                                   | 1660 lbs<br>753 kgs     | 1400 lbs<br>635 kgs | 1355 lbs<br>615 kgs |
| 110/43                                   | 1650 lbs<br>748 kgs     | 1375 lbs<br>624 kgs | 1320 lbs<br>599 kgs |

Based on average ice slab weight of 13.20 - 14.80 lb (5.99 – 6.71 kg)

Water regulating valve set to maintain 310 PSIG discharge pressure

Condenser Water usage per 100 lbs ice = 139 gal (45 kg = 526 L)

230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Around<br>Ice Machine °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 310-320 psig<br>21.4-22.1 bar | 68-40 psig<br>4.7-2.8 bar |
| <b>70/21</b>                          | 310-320 psig<br>21.4-22.1 bar | 72-40 psig<br>5.0-2.8 bar |
| <b>80/27</b>                          | 310-320 psig<br>21.4-22.1 bar | 75-40 psig<br>5.2-2.8 bar |
| <b>90/32</b>                          | 310-325 psig<br>21.4-22.4 bar | 80-40 psig<br>5.5-2.8 bar |
| <b>100/38</b>                         | 310-335 psig<br>21.4-23.1 bar | 81-45 psig<br>5.6-3.1 bar |
| <b>110/43</b>                         | 320-370 psig<br>22.1-25.5 bar | 82-50 psig<br>5.7-3.4 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Around<br>Ice Machine °F/°C | Harvest Cycle                 |                             |
|---------------------------------------|-------------------------------|-----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG    |
| <b>50/10</b>                          | 145-160 psig<br>10.0-11.0 bar | 110-115 psig<br>7.6-7.9 bar |
| <b>70/21</b>                          | 165-180 psig<br>11.4-12.4 bar | 120-130 psig<br>8.3-9.0 bar |
| <b>80/27</b>                          | 165-180 psig<br>11.4-12.4 bar | 120-130 psig<br>8.3-9.0 bar |
| <b>90/32</b>                          | 165-180 psig<br>11.4-12.4 bar | 120-130 psig<br>8.3-9.0 bar |
| <b>100/38</b>                         | 170-180 psig<br>11.7-12.4 bar | 120-130 psig<br>8.3-9.0 bar |
| <b>110/43</b>                         | 175-180 psig<br>12.1-12.4 bar | 125-135 psig<br>8.6-9.3 bar |

## KT1700N REMOTE AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.8-11.2                | 10.2-14.8 | 10.6-12.1 | 1.0-2.5         |
| 80/27                                       | 10.0-11.4               | 10.6-12.1 | 11.5-13.1 |                 |
| 90/32                                       | 10.7-12.2               | 11.9-13.5 | 13.4-15.2 |                 |
| 100/38                                      | 12.3-13.9               | 12.6-14.3 | 14.5-16.4 |                 |
| 110/43                                      | 12.6-14.3               | 13.6-15.4 | 15.2-17.2 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| 70/21                                 | 1650 lbs<br>748 kgs     | 1565 lbs<br>710 kgs | 1460 lbs<br>662 kgs |
| 80/27                                 | 1560 lbs<br>708 kgs     | 1480 lbs<br>671 kgs | 1370 lbs<br>621 kgs |
| 90/32                                 | 1470 lbs<br>667 kgs     | 1420 lbs<br>644 kgs | 1280 lbs<br>581 kgs |
| 100/38                                | 1380 lbs<br>626 kgs     | 1345 lbs<br>610 kgs | 1190 lbs<br>540 kgs |
| 110/43                                | 1345 lbs<br>610 kgs     | 1260 lbs<br>572 kgs | 1140 lbs<br>517 kgs |

Based on average ice slab weight of 13.20 - 14.80 lb (5.99 – 6.71 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge<br>Pressure PSIG    | Suction Pressure<br>PSIG  |
| <b>-20-50/-29-10</b>                  | 270-285 psig<br>18.6-19.7 bar | 60-38 psig<br>4.1-2.6 bar |
| <b>70/21</b>                          | 300-320 psig<br>20.7-22.1 bar | 60-38 psig<br>4.1-2.6 bar |
| <b>80/27</b>                          | 300-340 psig<br>20.7-23.4 bar | 60-39 psig<br>4.1-2.7 bar |
| <b>90/32</b>                          | 310-380 psig<br>21.4-26.2 bar | 70-40 psig<br>4.8-2.8 bar |
| <b>100/38</b>                         | 380-460 psig<br>26.2-31.7 bar | 80-41 psig<br>5.5-2.8 bar |
| <b>110/43</b>                         | 400-480 psig<br>27.6-33.1 bar | 85-42 psig<br>5.9-2.9 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>-20-50/-29-10</b>                  | 170-190 psig<br>11.7-13.1 bar | 120-135 psig<br>8.3-9.3 bar  |
| <b>70/21</b>                          | 180-210 psig<br>12.4-14.5 bar | 130-140 psig<br>9.0-9.7 bar  |
| <b>80/27</b>                          | 180-210 psig<br>12.4-14.5 bar | 130-140 psig<br>9.0-9.7 bar  |
| <b>90/32</b>                          | 180-210 psig<br>12.4-14.5 bar | 130-140 psig<br>9.0-9.7 bar  |
| <b>100/38</b>                         | 200-210 psig<br>13.8-14.5 bar | 135-150 psig<br>9.3-10.3 bar |
| <b>110/43</b>                         | 210-220 psig<br>14.5-15.2 bar | 140-155 psig<br>9.7-10.7 bar |

## K1800A SELF-CONTAINED AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.1-10.5                | 9.8-11.2  | 10.6-12.1 | 1.0-2.5         |
| 80/27                                       | 9.9-11.4                | 10.6-12.1 | 11.6-13.2 |                 |
| 90/32                                       | 11.0-12.5               | 11.4-13.0 | 12.7-14.5 |                 |
| 100/38                                      | 12.2-13.9               | 12.9-14.7 | 14.5-16.5 |                 |
| 110/43                                      | 13.6-15.5               | 14.9-16.9 | 16.4-18.6 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| <b>70/21</b>                          | 1735 lbs<br>787 kgs     | 1630 lbs<br>739 kgs | 1520 lbs<br>689 kgs |
| <b>80/27</b>                          | 1610 lbs<br>730 kgs     | 1520 lbs<br>689 kgs | 1410 lbs<br>640 kgs |
| <b>90/32</b>                          | 1480 lbs<br>671 kgs     | 1430 lbs<br>649 kgs | 1295 lbs<br>587 kgs |
| <b>100/38</b>                         | 1350 lbs<br>612 kgs     | 1280 lbs<br>581 kgs | 1155 lbs<br>524 kgs |
| <b>110/43</b>                         | 1220 lbs<br>553 kgs     | 1125 lbs<br>510 kgs | 1030 lbs<br>467 kgs |

Based on average ice slab weight of 12.80 - 14.4 lb (5.8– 6.5 kg).  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                            |
|---------------------------------------|-------------------------------|----------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG   |
| <b>50/10</b>                          | 295-395 psig<br>20.3-27.2 bar | 85-35 psig<br>5.9-2.4 bar  |
| <b>70/21</b>                          | 295-395 psig<br>20.3-27.2 bar | 85-35 psig<br>5.9-2.4 bar  |
| <b>80/27</b>                          | 310-410 psig<br>21.4-28.3 bar | 85-36 psig<br>5.9-2.5 bar  |
| <b>90/32</b>                          | 330-430 psig<br>22.8-29.6 bar | 85-38 psig<br>5.9-2.6 bar  |
| <b>100/38</b>                         | 400-500 psig<br>27.6-34.5 bar | 90-40 psig<br>6.2-2.8 bar  |
| <b>110/43</b>                         | 430-555 psig<br>29.6-38.3 bar | 110-45 psig<br>7.6-3.1 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                               |
|---------------------------------------|-------------------------------|-------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG      |
| <b>50/10</b>                          | 175-205 psig<br>12.1-14.1 bar | 115-145 psig<br>7.9-10.0 bar  |
| <b>70/21</b>                          | 175-205 psig<br>12.1-14.1 bar | 115-145 psig<br>7.9-10.0 bar  |
| <b>80/27</b>                          | 185-215 psig<br>12.8-14.8 bar | 125-150 psig<br>8.6-10.3 bar  |
| <b>90/32</b>                          | 195-225 psig<br>13.4-15.5 bar | 135-155 psig<br>9.3-10.7 bar  |
| <b>100/38</b>                         | 210-250 psig<br>14.5-17.2 bar | 150-170 psig<br>10.3-11.7 bar |
| <b>110/43</b>                         | 230-290 psig<br>15.9-20.0 bar | 160-190 psig<br>11.0-13.1 bar |

## K1800N REMOTE AIR-COOLED

NOTE: These characteristics may vary depending on operating conditions.

### CYCLE TIMES

Freeze Time + Harvest Time = Total Cycle Time

| Air Temp.<br>Entering<br>Condenser<br>°F/°C | Freeze Time             |           |           | Harvest<br>Time |
|---------------------------------------------|-------------------------|-----------|-----------|-----------------|
|                                             | Water Temperature °F/°C |           |           |                 |
|                                             | 50/10                   | 70/21     | 90/32     |                 |
| 70/21                                       | 9.5-10.8                | 10.1-11.5 | 10.7-12.2 | 1.0-2.5         |
| 80/27                                       | 10.0-11.5               | 10.7-12.2 | 11.5-13.1 |                 |
| 90/32                                       | 10.7-12.2               | 11.5-13.2 | 12.4-14.1 |                 |
| 100/38                                      | 11.4-13.0               | 12.3-14.0 | 13.3-15.2 |                 |
| 110/43                                      | 12.2-13.9               | 13.2-15.1 | 14.5-16.5 |                 |

Times in minutes

### 24 HOUR ICE PRODUCTION

| Air Temp. Entering<br>Condenser °F/°C | Water Temperature °F/°C |                     |                     |
|---------------------------------------|-------------------------|---------------------|---------------------|
|                                       | 50/10                   | 70/21               | 90/32               |
| <b>70/21</b>                          | 1680 lbs<br>762 kgs     | 1595 lbs<br>723 kgs | 1510 lbs<br>685 kgs |
| <b>80/27</b>                          | 1600 lbs<br>726 kgs     | 1510 lbs<br>685 kgs | 1420 lbs<br>644 kgs |
| <b>90/32</b>                          | 1515 lbs<br>687 kgs     | 1415 lbs<br>642 kgs | 1330 lbs<br>603 kgs |
| <b>100/38</b>                         | 1430 lbs<br>649 kgs     | 1335 lbs<br>606 kgs | 1245 lbs<br>565 kgs |
| <b>110/43</b>                         | 1345 lbs<br>610 kgs     | 1250 lbs<br>567 kgs | 1150 lbs<br>522 kgs |

Based on average ice slab weight of 12.8 - 14.4 lb (5.8 - 6.5 kg)  
230/50/1 production is approximately 12% lower than 230/60/1.

## OPERATING PRESSURES

| Air Temp. Entering<br>Condenser °F/°C | Freeze Cycle                  |                           |
|---------------------------------------|-------------------------------|---------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG  |
| <b>50/10</b>                          | 300-365 psig<br>20.7-25.2 bar | 70-35 psig<br>4.8-2.4 bar |
| <b>70/21</b>                          | 300-365 psig<br>20.7-25.2 bar | 70-35 psig<br>4.8-2.4 bar |
| <b>80/27</b>                          | 300-380 psig<br>20.7-26.2 bar | 75-37 psig<br>5.2-2.6 bar |
| <b>90/32</b>                          | 300-400 psig<br>20.7-27.6 bar | 80-38 psig<br>5.5-2.6 bar |
| <b>100/38</b>                         | 350-480 psig<br>24.1-33.1 bar | 90-40 psig<br>6.2-2.8 bar |
| <b>110/43</b>                         | 450-520 psig<br>31.0-35.9 bar | 95-42 psig<br>6.6-2.9 bar |

Suction pressure drops gradually throughout the freeze cycle

| Air Temp. Entering<br>Condenser °F/°C | Harvest Cycle                 |                              |
|---------------------------------------|-------------------------------|------------------------------|
|                                       | Discharge Pressure<br>PSIG    | Suction Pressure<br>PSIG     |
| <b>50/10</b>                          | 175-195 psig<br>12.1-13.4 bar | 110-135 psig<br>7.6-9.3 bar  |
| <b>70/21</b>                          | 175-195 psig<br>12.1-13.4 bar | 110-135 psig<br>7.6-9.3 bar  |
| <b>80/27</b>                          | 180-200 psig<br>12.4-13.8 bar | 115-140 psig<br>7.9-9.7 bar  |
| <b>90/32</b>                          | 180-205 psig<br>12.4-14.1 bar | 120-140 psig<br>8.3-9.7 bar  |
| <b>100/38</b>                         | 190-215 psig<br>13.1-14.8 bar | 125-145 psig<br>8.6-10.0 bar |
| <b>110/43</b>                         | 205-225 psig<br>14.1-15.5 bar | 135-150 psig<br>9.3-10.3 bar |

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# Diagrams

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## Wiring Diagrams

The following pages contain electrical wiring diagrams. Be sure you are referring to the correct diagram for the ice machine you are servicing.



Always disconnect power before working on electrical circuitry.

## Wiring Diagram Legend

The following symbols are used on all of the wiring diagrams:

- \* Internal Compressor Overload  
(Some models have external compressor overloads)
- \*\* Fan Motor Run Capacitor  
(Some models do not incorporate fan motor run capacitor)
- ( ) Wire Number Designation  
(The number is marked at each end of the wire)
- >>— Multi-pin Connection  
(Electrical Box Side)—>  
(Compressor Compartment Side)>—

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**K0250, KT0300, K0350, KT400, K0420, KT0420, K0500,  
K0600, KT0700, K1000, KT1000**

**Without PTCR**

**1 Ph Self-contained Air/Water-cooled**

| <b>Number</b>                                             | <b>Component</b>                       |
|-----------------------------------------------------------|----------------------------------------|
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 11                                                        | Compressor Run Capacitor               |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest               |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

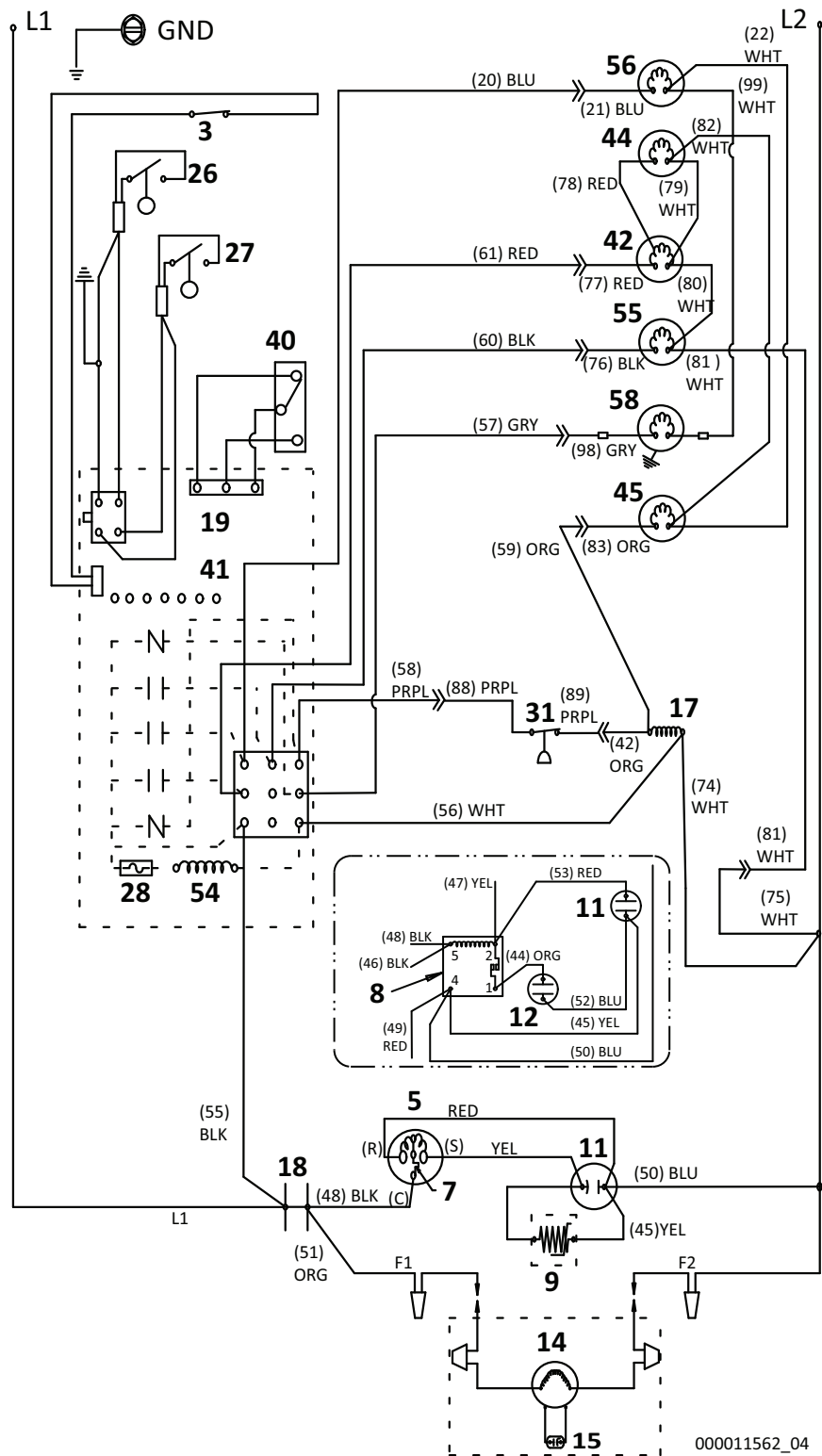
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**K0250, KT0300, K0350, KT400, K0420, KT0420, K0500,  
KT0500, KT0700, K1000, KT1000  
WITH PTCR**

**1 Ph Self-contained Air/Water-cooled**

| <b>Number</b>                                             | <b>Component</b>                       |
|-----------------------------------------------------------|----------------------------------------|
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 9                                                         | Compressor PTCR                        |
| 11                                                        | Compressor Run Capacitor               |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest               |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

K1000, KT1000  
1PH REMOTE AIR-COOLED CONDENSER



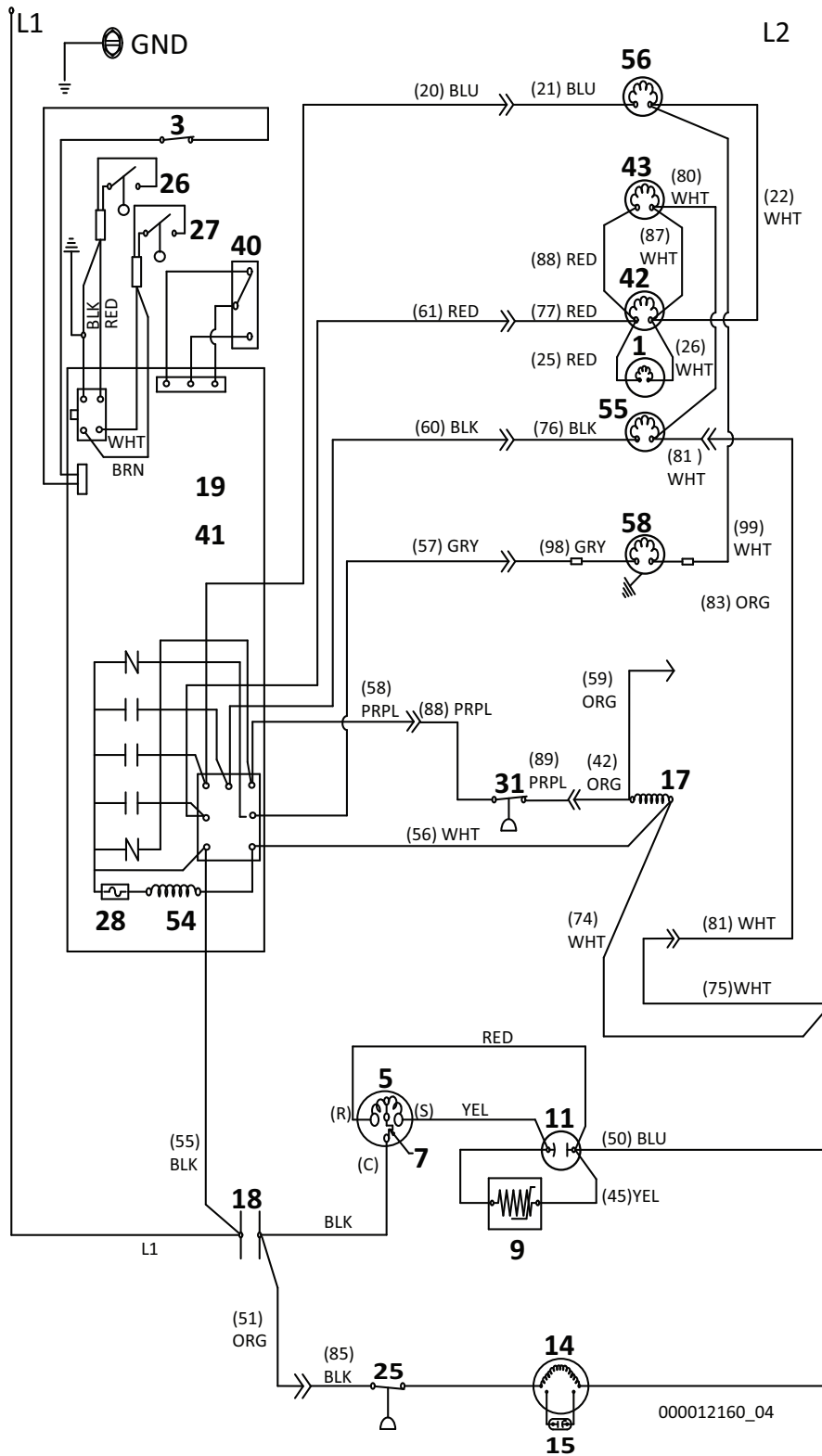
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**K1000, KT1000****1Ph Remote Air-cooled Condenser**

| <b>Number</b>                                             | <b>Component</b>                             |
|-----------------------------------------------------------|----------------------------------------------|
| 3                                                         | Bin Switch                                   |
| 5                                                         | Compressor                                   |
| 7                                                         | Compressor Overload                          |
| 8                                                         | Compressor Potential Relay - When Used       |
| 9                                                         | Compressor PTCR - When Used                  |
| 11                                                        | Compressor Run Capacitor                     |
| 12                                                        | Compressor Start Capacitor - When Used       |
| 14                                                        | Condenser Fan Motor                          |
| 15                                                        | Condenser Fan Motor Run Capacitor            |
| 17                                                        | Contactor Coil                               |
| 18                                                        | Contactor Contacts                           |
| 19                                                        | Control Board                                |
| 26                                                        | Harvest Float Switch                         |
| 27                                                        | Water Level Float Switch                     |
| 28                                                        | Fuse                                         |
| 31                                                        | High Pressure Cutout                         |
| 40                                                        | On/Off/Clean Switch                          |
| 41                                                        | See Control Board Schematic For Detail       |
| 42                                                        | Solenoid Valve - Harvest                     |
| 44                                                        | Solenoid Valve - Harvest Pressure Regulating |
| 45                                                        | Solenoid Valve - Liquid Line Solenoid        |
| 54                                                        | Transformer                                  |
| 55                                                        | Water Dump Valve                             |
| 56                                                        | Water Inlet Valve                            |
| 58                                                        | Water Pump                                   |
|                                                           |                                              |
| <b>Wire Colors</b>                                        |                                              |
| BLK                                                       | Black                                        |
| BLU                                                       | Blue                                         |
| BRN                                                       | Brown                                        |
| GRY                                                       | Grey                                         |
| ORG                                                       | Orange                                       |
| PRPL                                                      | Purple                                       |
| RED                                                       | Red                                          |
| WHT                                                       | White                                        |
| YEL                                                       | Yellow                                       |
| Refer to control board schematic for control board detail |                                              |

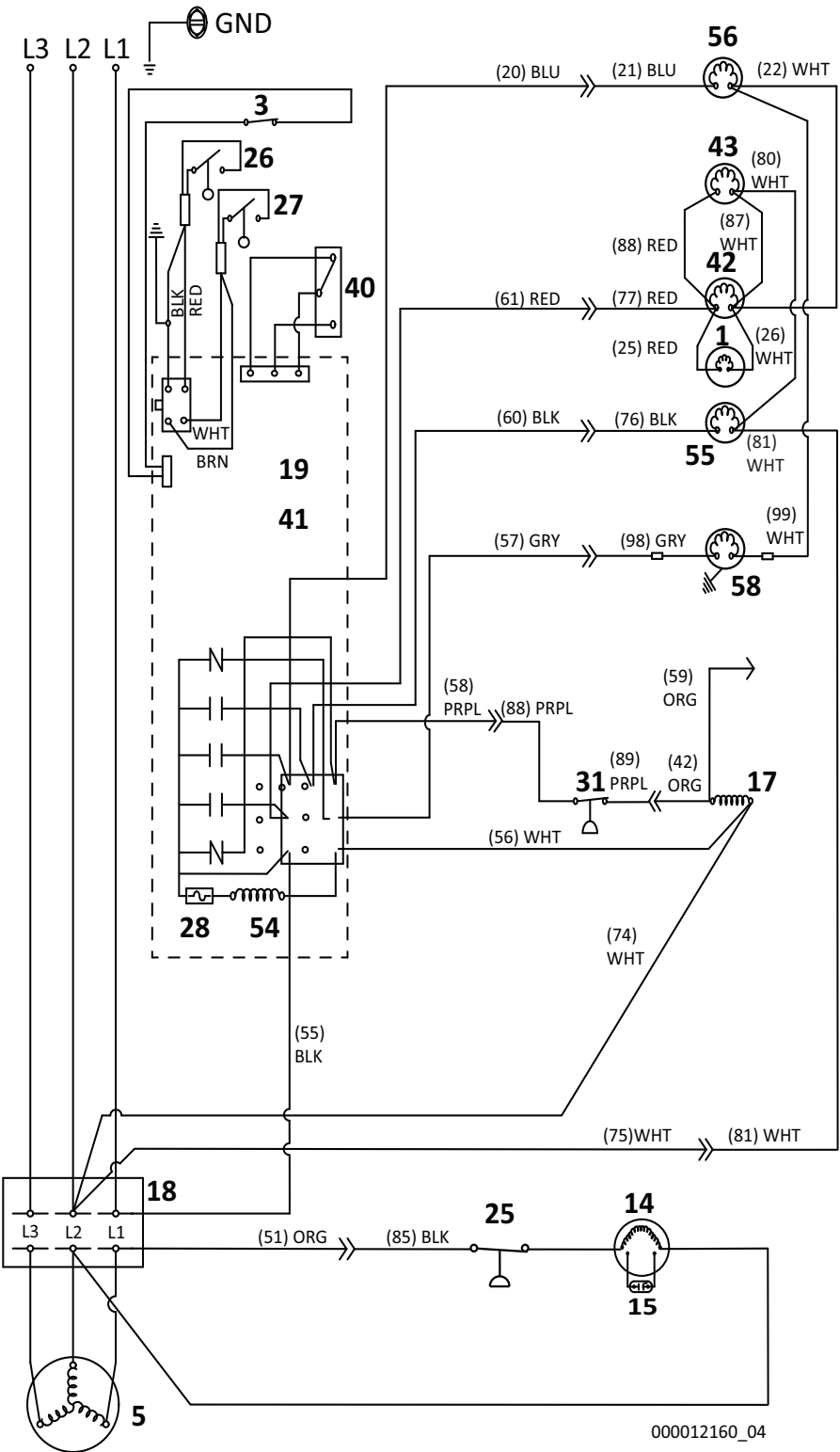
**K1350, KT1700, K1800**  
**1 PH SELF-CONTAINED AIR/WATER-COOLED**



**K1350, KT1700, K1800****1 Ph Self-contained Air/Water-cooled**

| <b>Number</b>                                             | <b>Component</b>                       |
|-----------------------------------------------------------|----------------------------------------|
| 1                                                         | Air Pump Harvest Assist                |
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 9                                                         | Compressor PTCR                        |
| 11                                                        | Compressor Run Capacitor               |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest Left Hand     |
| 43                                                        | Solenoid Valve - Harvest Right Hand    |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

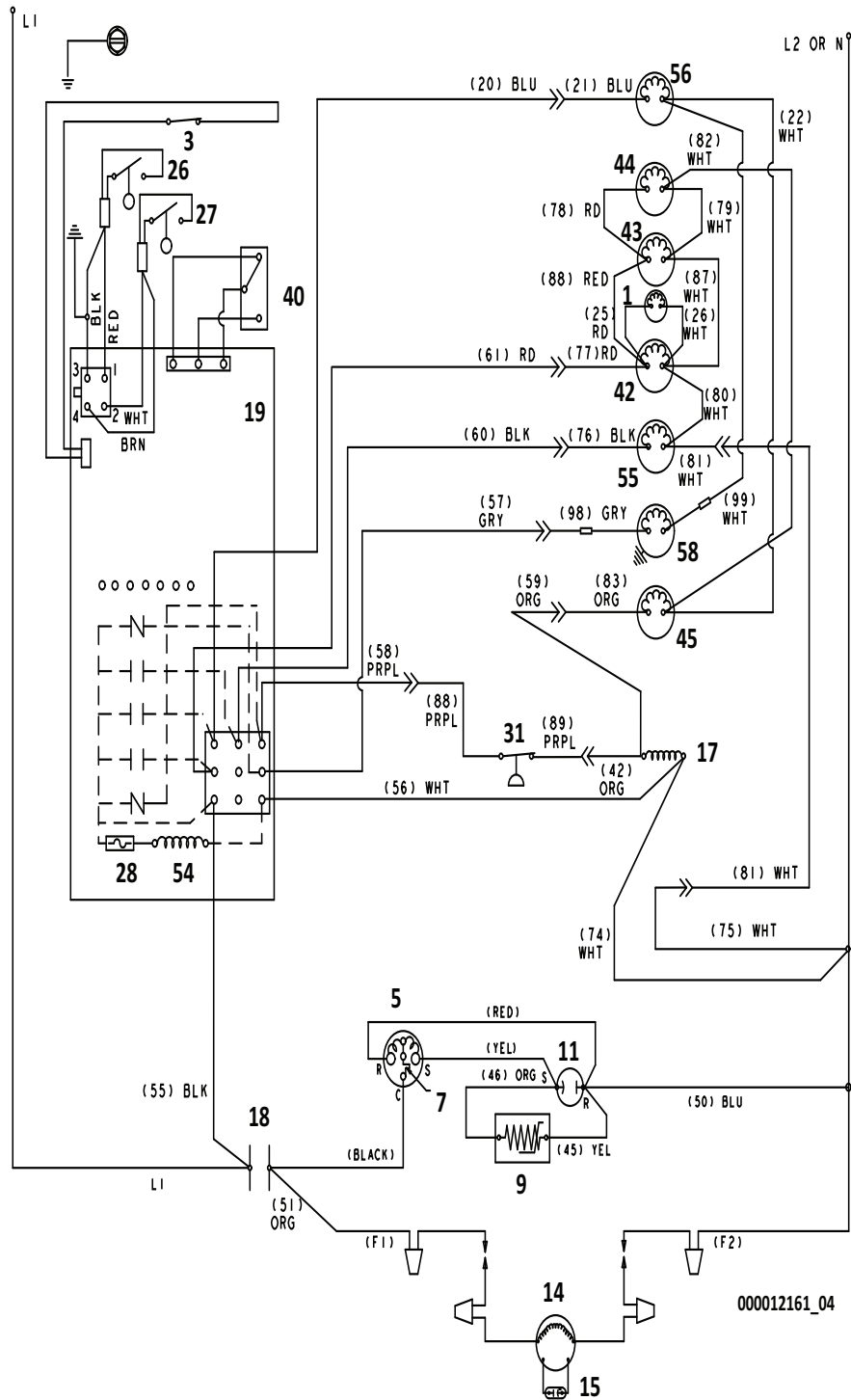
**K1350, KT1700, K1800**  
**3 PH SELF-CONTAINED AIR/WATER-COOLED**



**K1350, KT1700, K1800****3 Ph Self-contained Air/Water-cooled**

| <b>Number</b>                                             | <b>Component</b>                       |
|-----------------------------------------------------------|----------------------------------------|
| 1                                                         | Air Pump Harvest Assist                |
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest Left Hand     |
| 43                                                        | Solenoid Valve - Harvest Right Hand    |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

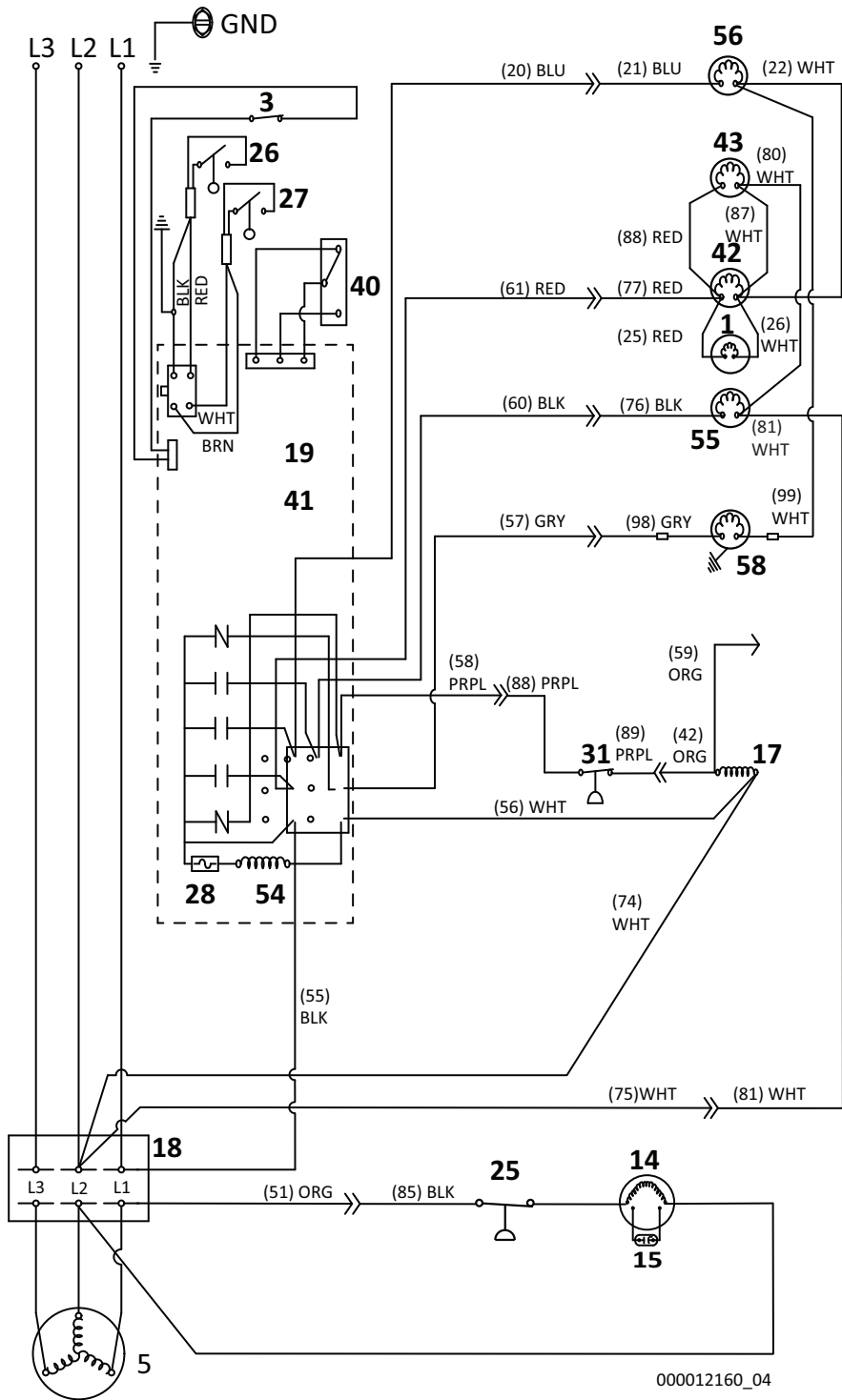
K1350, KT1700, K1800  
1PH REMOTE AIR-COOLED CONDENSER



**K1350, KT1700, K1800****1Ph Remote Air-cooled Condenser**

| <b>Number</b>                                             | <b>Component</b>                             |
|-----------------------------------------------------------|----------------------------------------------|
| 1                                                         | Air Pump Harvest Assist                      |
| 3                                                         | Bin Switch                                   |
| 5                                                         | Compressor                                   |
| 7                                                         | Compressor Overload                          |
| 9                                                         | Compressor PTCR                              |
| 11                                                        | Compressor Run Capacitor                     |
| 14                                                        | Condenser Fan Motor                          |
| 15                                                        | Condenser Fan Motor Run Capacitor            |
| 17                                                        | Contactor Coil                               |
| 18                                                        | Contactor Contacts                           |
| 19                                                        | Control Board                                |
| 25                                                        | Fan Cycle Control                            |
| 26                                                        | Harvest Float Switch                         |
| 27                                                        | Water Level Float Switch                     |
| 28                                                        | Fuse                                         |
| 31                                                        | High Pressure Cutout                         |
| 40                                                        | On/Off/Clean Switch                          |
| 41                                                        | See Control Board Schematic For Detail       |
| 42                                                        | Solenoid Valve - Harvest Left Hand           |
| 43                                                        | Solenoid Valve - Harvest Right Hand          |
| 44                                                        | Solenoid Valve - Harvest Pressure Regulating |
| 45                                                        | Solenoid Valve - Liquid Line                 |
| 54                                                        | Transformer                                  |
| 55                                                        | Water Dump Valve                             |
| 56                                                        | Water Inlet Valve                            |
| 58                                                        | Water Pump                                   |
| <b>Wire Colors</b>                                        |                                              |
| BLK                                                       | Black                                        |
| BLU                                                       | Blue                                         |
| BRN                                                       | Brown                                        |
| GRY                                                       | Grey                                         |
| ORG                                                       | Orange                                       |
| PRPL                                                      | Purple                                       |
| RED                                                       | Red                                          |
| WHT                                                       | White                                        |
| YEL                                                       | Yellow                                       |
| Refer to control board schematic for control board detail |                                              |

**K1350, KT1700, K1800**  
**3 PH REMOTE AIR-COOLED CONDENSER**

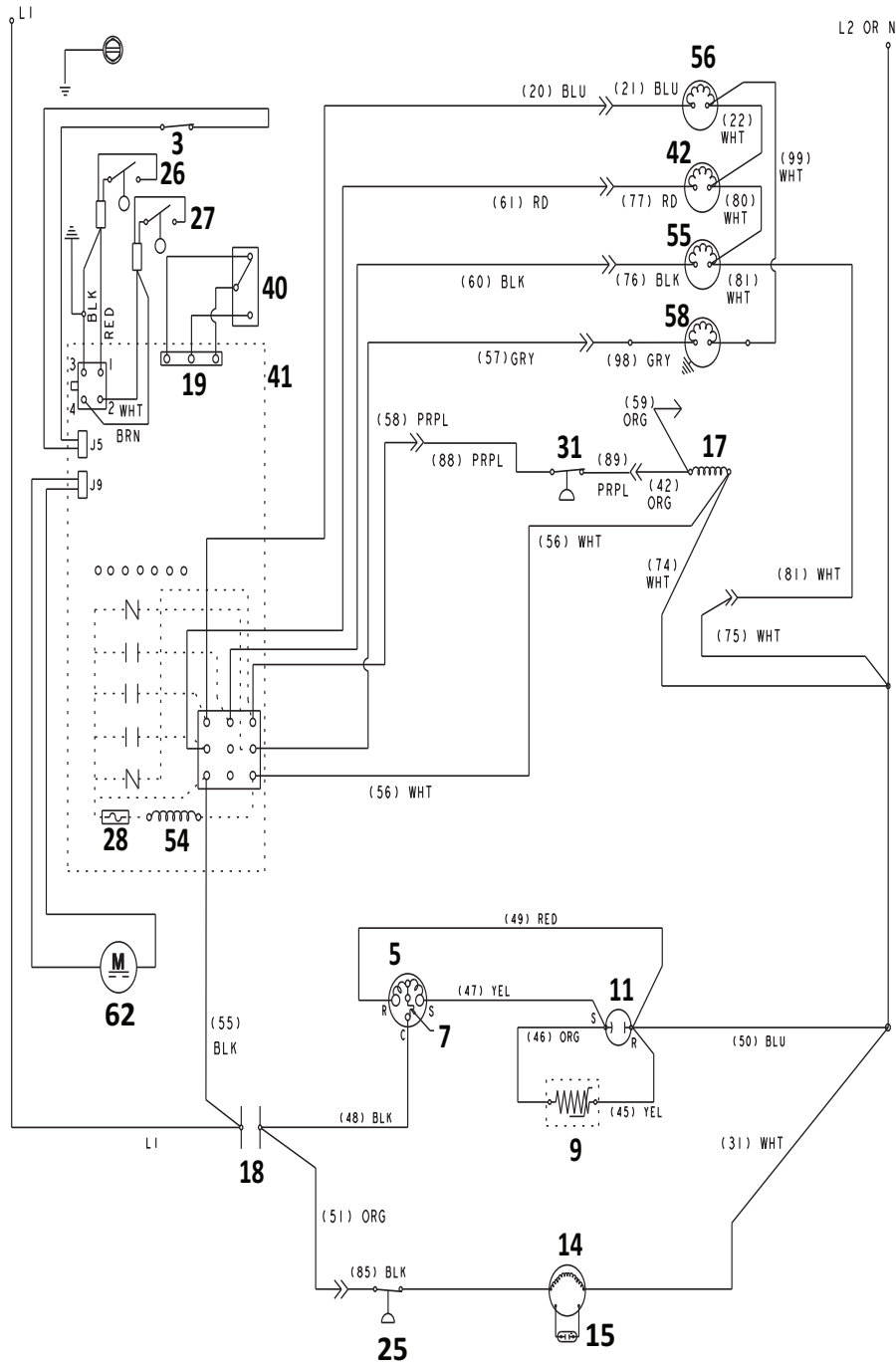


**K1350, KT1700, K1800****3 Ph Remote Air-cooled Condenser**

| <b>Number</b>                                             | <b>Component</b>                             |
|-----------------------------------------------------------|----------------------------------------------|
| 1                                                         | Air Pump Harvest Assist                      |
| 3                                                         | Bin Switch                                   |
| 5                                                         | Compressor                                   |
| 14                                                        | Condenser Fan Motor                          |
| 15                                                        | Condenser Fan Motor Run Capacitor            |
| 17                                                        | Contactor Coil                               |
| 18                                                        | Contactor Contacts                           |
| 19                                                        | Control Board                                |
| 25                                                        | Fan Cycle Control                            |
| 26                                                        | Harvest Float Switch                         |
| 27                                                        | Water Level Float Switch                     |
| 28                                                        | Fuse                                         |
| 31                                                        | High Pressure Cutout                         |
| 40                                                        | On/Off/Clean Switch                          |
| 41                                                        | See Control Board Schematic For Detail       |
| 42                                                        | Solenoid Valve - Harvest Left Hand           |
| 43                                                        | Solenoid Valve - Harvest Right Hand          |
| 44                                                        | Solenoid Valve - Harvest Pressure Regulating |
| 45                                                        | Solenoid Valve - Liquid Line                 |
| 54                                                        | Transformer                                  |
| 55                                                        | Water Dump Valve                             |
| 56                                                        | Water Inlet Valve                            |
| 58                                                        | Water Pump                                   |
| <b>Wire Colors</b>                                        |                                              |
| BLK                                                       | Black                                        |
| BLU                                                       | Blue                                         |
| BRN                                                       | Brown                                        |
| GRY                                                       | Grey                                         |
| ORG                                                       | Orange                                       |
| PRPL                                                      | Purple                                       |
| RED                                                       | Red                                          |
| WHT                                                       | White                                        |
| YEL                                                       | Yellow                                       |
| Refer to control board schematic for control board detail |                                              |

# KP0300/KP0400/KP0500/KP0700/KP1000

## 1 Ph Self-contained Air/Water-cooled



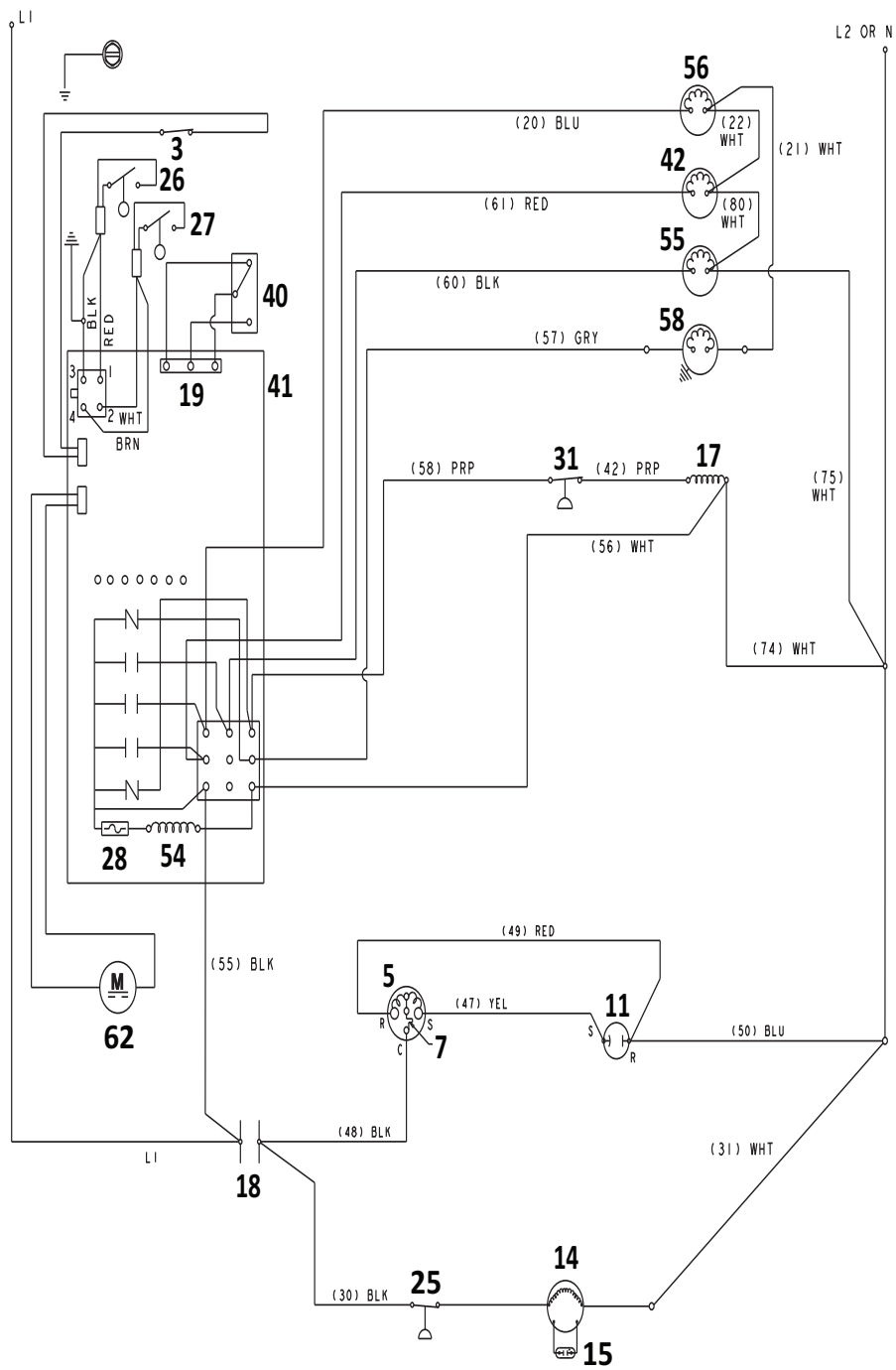
## KP0300/KP0400/KP0500/KP0700/KP1000

### 1 Ph Self-contained Air/Water-cooled

| Number                                                    | Component                              |
|-----------------------------------------------------------|----------------------------------------|
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 9                                                         | Compressor PTCR (when used)            |
| 11                                                        | Compressor Run Capacitor               |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest               |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| 62                                                        | Vent Fan (when used)                   |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

**KP0420**

## 1 Ph Self-contained Air/Water-cooled



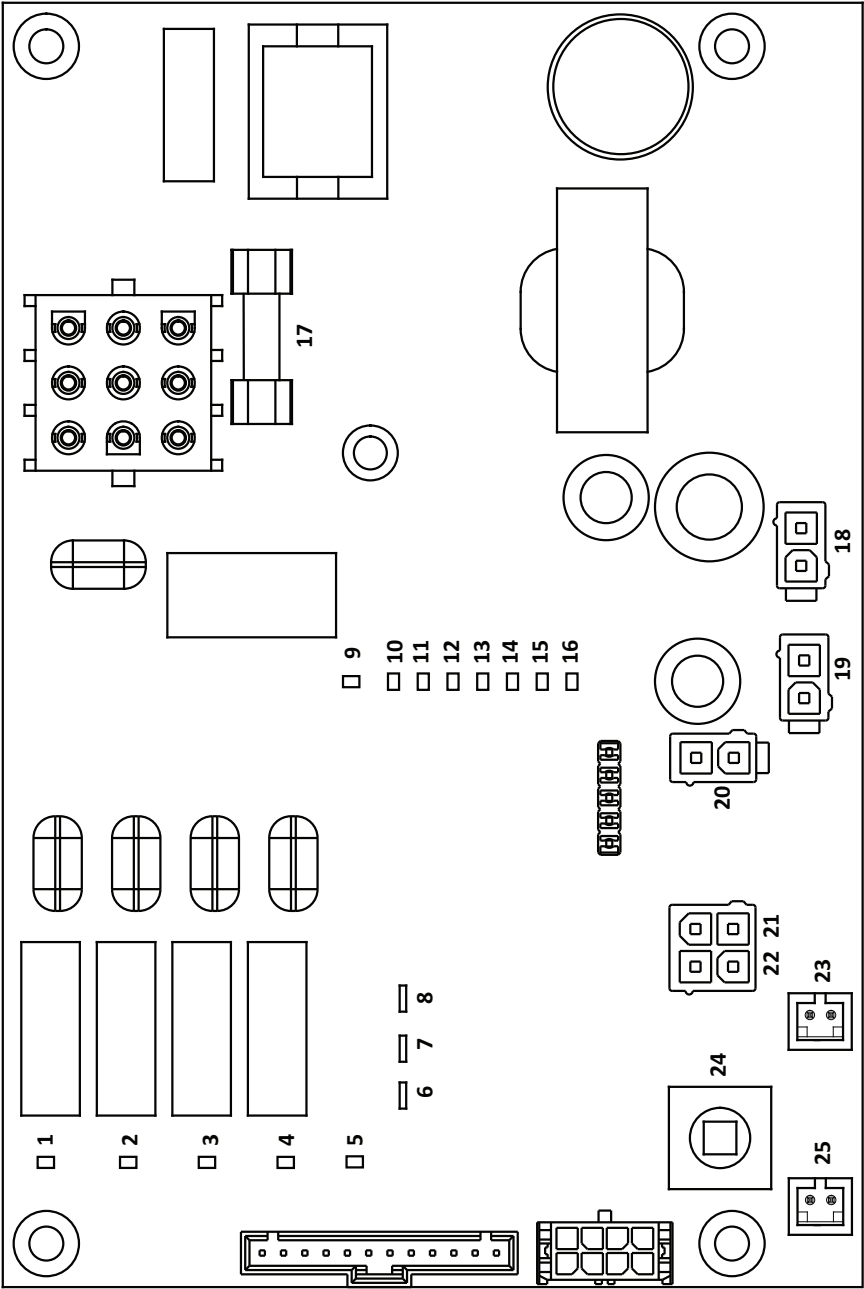
## KP0420

### 1 Ph Self-contained Air/Water-cooled

| Number                                                    | Component                              |
|-----------------------------------------------------------|----------------------------------------|
| 3                                                         | Bin Switch                             |
| 5                                                         | Compressor                             |
| 7                                                         | Compressor Overload                    |
| 11                                                        | Compressor Run Capacitor               |
| 14                                                        | Condenser Fan Motor                    |
| 15                                                        | Condenser Fan Motor Run Capacitor      |
| 17                                                        | Contactor Coil                         |
| 18                                                        | Contactor Contacts                     |
| 19                                                        | Control Board                          |
| 25                                                        | Fan Cycle Control                      |
| 26                                                        | Harvest Float Switch                   |
| 27                                                        | Water Level Float Switch               |
| 28                                                        | Fuse                                   |
| 31                                                        | High Pressure Cutout                   |
| 40                                                        | On/Off/Clean Switch                    |
| 41                                                        | See Control Board Schematic For Detail |
| 42                                                        | Solenoid Valve - Harvest               |
| 54                                                        | Transformer                            |
| 55                                                        | Water Dump Valve                       |
| 56                                                        | Water Inlet Valve                      |
| 58                                                        | Water Pump                             |
| 62                                                        | Vent Fan (when used)                   |
| <b>Wire Colors</b>                                        |                                        |
| BLK                                                       | Black                                  |
| BLU                                                       | Blue                                   |
| BRN                                                       | Brown                                  |
| GRY                                                       | Grey                                   |
| ORG                                                       | Orange                                 |
| PRPL                                                      | Purple                                 |
| RED                                                       | Red                                    |
| WHT                                                       | White                                  |
| YEL                                                       | Yellow                                 |
| Refer to control board schematic for control board detail |                                        |

# Electronic Control Board

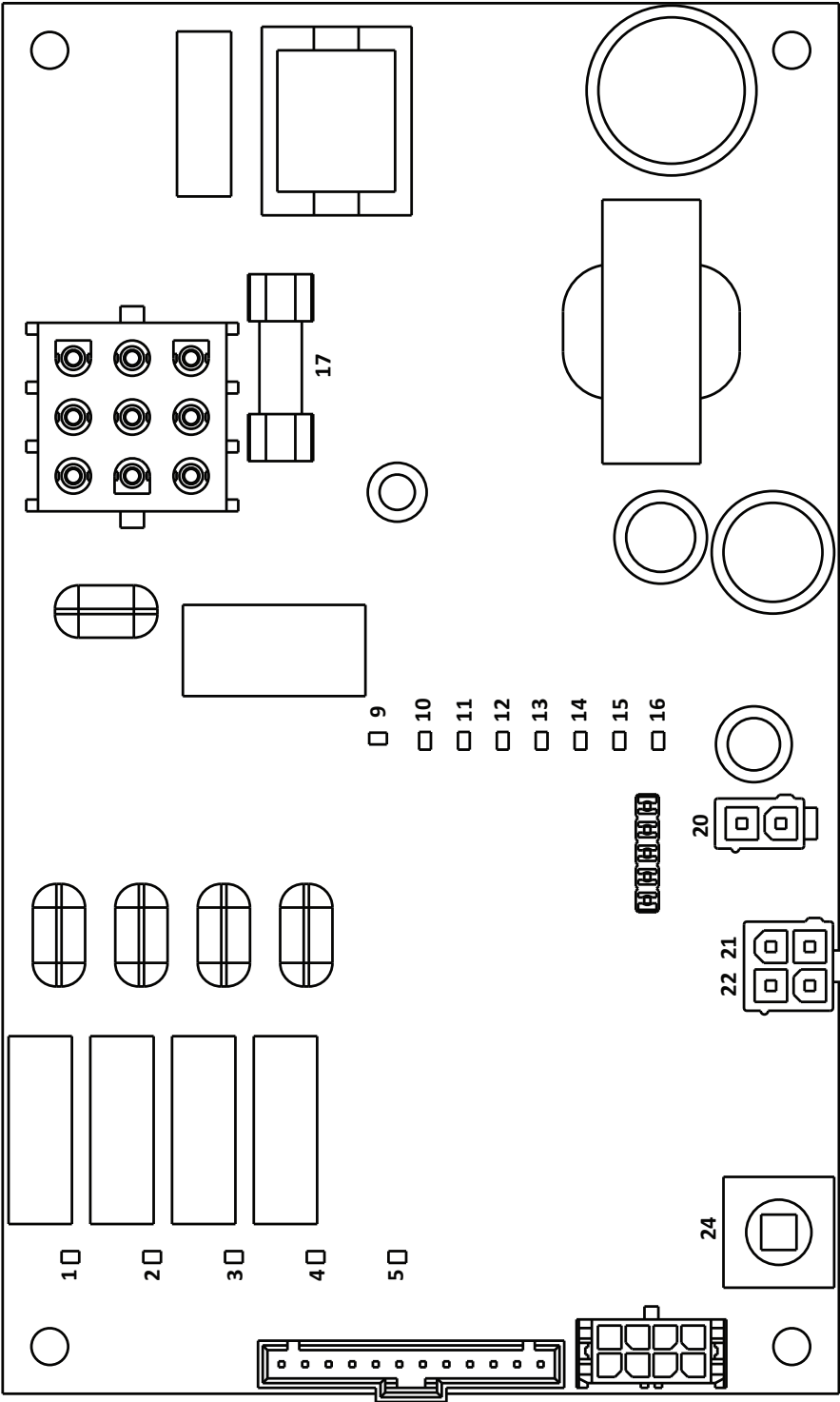
## KP & KT MODELS



## Electronic Control Board

| Number | Component                  |
|--------|----------------------------|
| 1      | LED Water Pump Relay       |
| 2      | LED Compressor Relay       |
| 3      | LED Water Dump Valve Relay |
| 4      | LED Harvest Solenoid Valve |
| 5      | LED Clean                  |
| 6      | Thermistor                 |
| 7      | Thermistor                 |
| 8      | Thermistor                 |
| 9      | LED Water Fill Valve       |
| 10     | LED Harvest Float          |
| 11     | LED Water Level Float      |
| 12     | LED Bin Switch             |
| 13     | LED Safety Limit 2         |
| 14     | LED Safety Limit 1         |
| 15     | LED Harvest                |
| 16     | LED Test Mode              |
| 17     | Fuse                       |
| 18     | Motor Connector            |
| 19     | EC Fan Motor Connector     |
| 20     | Bin Switch Connector       |
| 21     | Float Switch Water Level   |
| 22     | Float Switch Harvest       |
| 23     | Thermistor 2               |
| 24     | Test Switch                |
| 25     | Thermistor 1               |

K MODELS



## Electronic Control Board

| Number | Component                  |
|--------|----------------------------|
| 1      | LED Water Pump Relay       |
| 2      | LED Compressor Relay       |
| 3      | LED Water Dump Valve Relay |
| 4      | LED Harvest Solenoid Valve |
| 5      | LED Clean                  |
| 9      | LED Water Fill Valve       |
| 10     | LED Harvest Float          |
| 11     | LED Water Level Float      |
| 12     | LED Bin Switch             |
| 13     | LED Safety Limit 2         |
| 14     | LED Safety Limit 1         |
| 15     | LED Harvest                |
| 16     | LED Test Mode              |
| 17     | Fuse 3.15 Amp              |
| 20     | Bin Switch Connector       |
| 21     | Float Switch Water Level   |
| 22     | Float Switch Harvest       |
| 24     | Test Switch                |

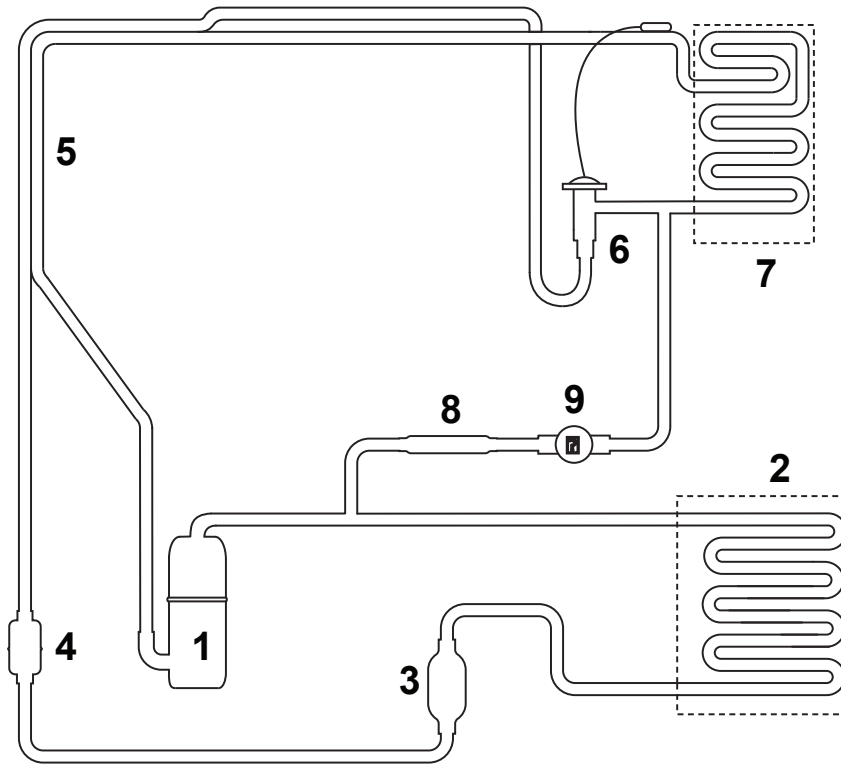
## Refrigeration Tubing Schematics

**SELF-CONTAINED AIR OR WATER-COOLED**

**K0250, K0350, K0420, K0500, K0600, K1000**

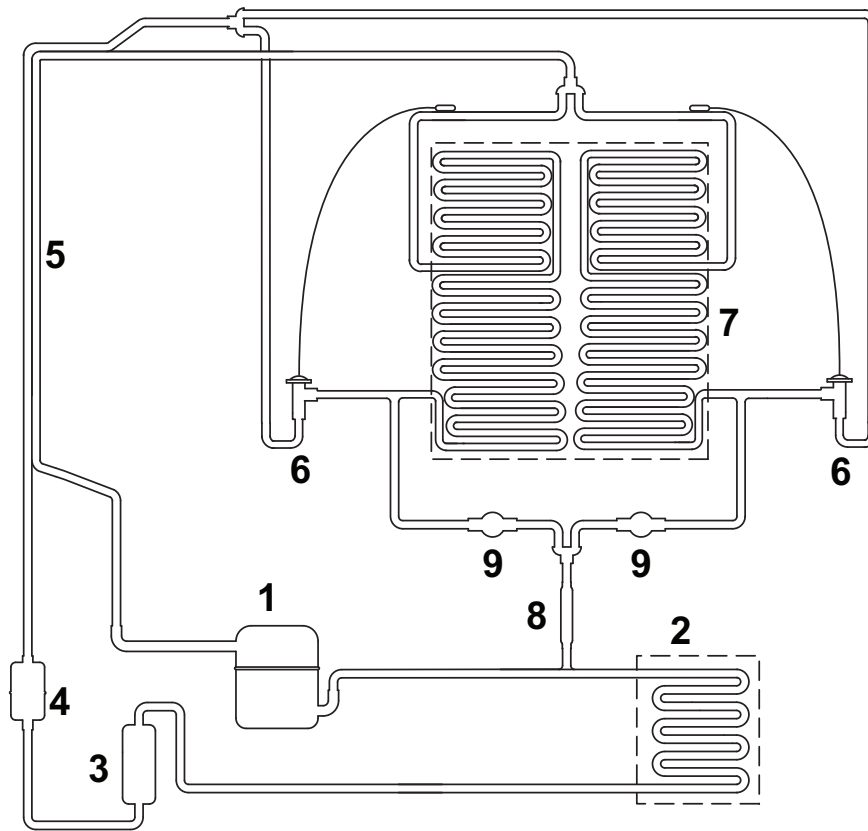
**KP0300, KP0400, KP0420, KP0500, KP0700, KP1000**

**KT0300, KT0400, KT0420, KT0500, KT0700, KT1000**



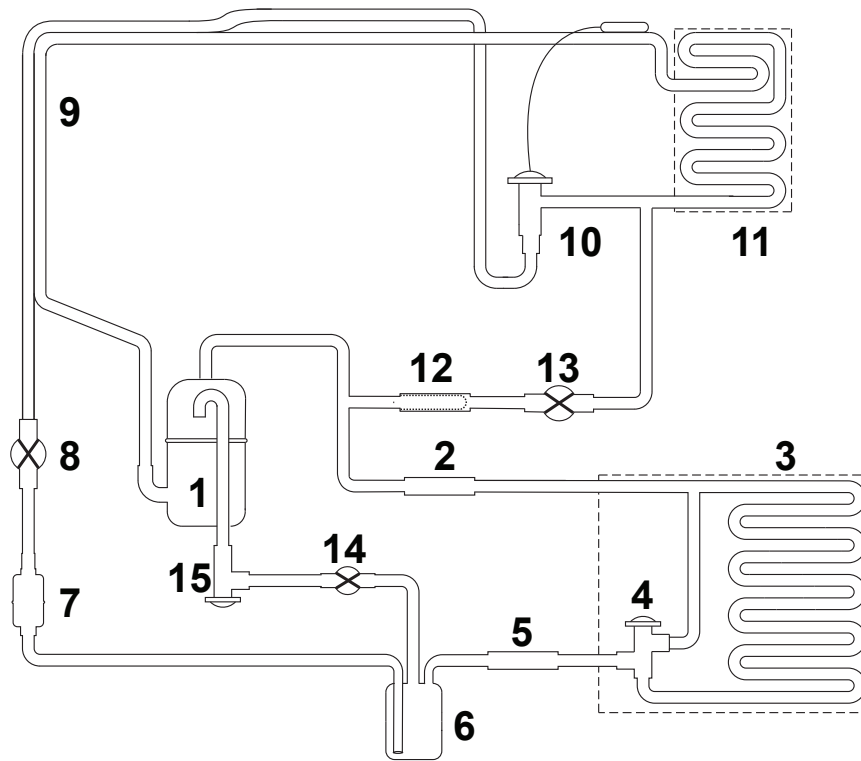
| Number | Component                          |
|--------|------------------------------------|
| 1      | Compressor                         |
| 2      | Condenser-Air or Water-cooled      |
| 3      | Receiver - Water-cooled Only       |
| 4      | Liquid Line Filter Drier           |
| 5      | Heat Exchanger                     |
| 6      | TXV - Thermostatic Expansion Valve |
| 7      | Evaporator                         |
| 8      | Strainer                           |
| 9      | Harvest Solenoid Valve             |

**K1350, KT1700, K1800**  
**SELF-CONTAINED AIR OR WATER-COOLED**



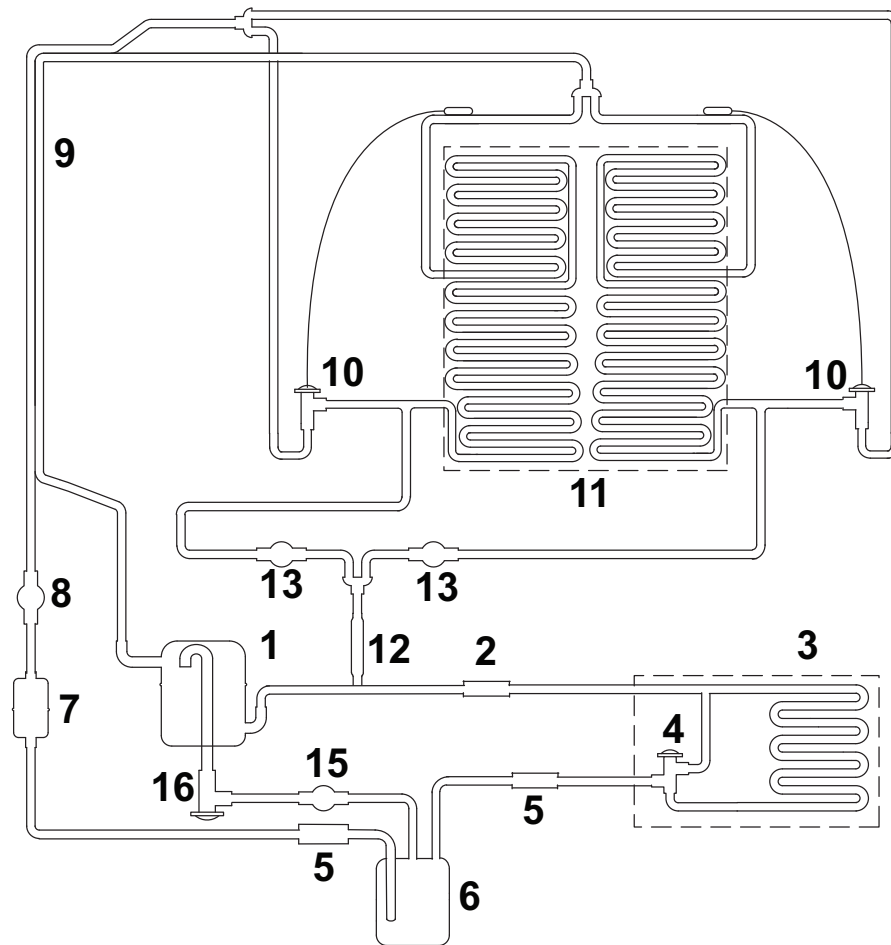
| Number | Component                          |
|--------|------------------------------------|
| 1      | Compressor                         |
| 2      | Condenser-Air or Water-cooled      |
| 3      | Receiver - Water-cooled Only       |
| 4      | Liquid Line Filter Drier           |
| 5      | Heat Exchanger                     |
| 6      | TXV - Thermostatic Expansion Valve |
| 7      | Evaporator                         |
| 8      | Strainer                           |
| 9      | Harvest Solenoid Valve             |

## K1000, KT1000 REMOTE AIR-COOLED CONDENSER



| Number | Component                          |
|--------|------------------------------------|
| 1      | Compressor                         |
| 2      | Discharge Check Valve              |
| 3      | Condenser - Remote Air-Cooled      |
| 4      | Head Pressure Control Valve        |
| 5      | Liquid Line Check Valve            |
| 6      | Receiver                           |
| 7      | Liquid Line Filter Drier           |
| 8      | Liquid Line Solenoid Valve         |
| 9      | Heat Exchanger                     |
| 10     | TXV - Thermostatic Expansion Valve |
| 11     | Evaporator                         |
| 12     | Strainer                           |
| 13     | Harvest Solenoid Valve             |
| 14     | Harvest Pressure Solenoid Valve    |
| 15     | Harvest Pressure Regulating Valve  |

**K1350, KT1700, K1800**  
**REMOTE AIR-COOLED CONDENSER**



| Number | Component                          |
|--------|------------------------------------|
| 1      | Compressor                         |
| 2      | Discharge Check Valve              |
| 3      | Condenser - Remote Air-Cooled      |
| 4      | Head Pressure Control Valve        |
| 5      | Liquid Line Check Valve            |
| 6      | Receiver                           |
| 7      | Liquid Line Filter Drier           |
| 8      | Liquid Line Solenoid Valve         |
| 9      | Heat Exchanger                     |
| 10     | TXV - Thermostatic Expansion Valve |
| 11     | Evaporator                         |
| 12     | Strainer                           |
| 13     | Harvest Solenoid Valve             |
| 14     | Harvest Pressure Solenoid Valve    |
| 15     | Harvest Pressure Regulating Valve  |

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