



**500AR-L
and
500SM-L**

*with 5.5 hp
Condensing Unit*



**HOLIDAY ICE, INC. • 204 Short Avenue • Longwood, FL 32750-5130
Phone (407) 831-2077 • FAX (407) 834-3359
www.arctic-temp.com**

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Arctic-Temp® Industrial Ice Machines

Manufactured by:
Holiday Ice, Inc.
204 Short Avenue
Longwood, FL 32750

WARRANTY REGISTRATION INFORMATION Services & Support

Arctic-Temp® Ice Machines are covered by a Limited Warranty supplied by Holiday Ice, Inc. Our Limited Warranty and related information is provided in the service and installation manual shipped with your machine.

Most ice machine parts and components provided on your equipment are stocked and supplied by Holiday Ice, Inc. Major purchased components, such as compressors, condensing units, and condensers may be available through a national wholesaler in your local area.

WARRANTY REGISTRATION IS REQUIRED TO ASSURE PROMPT & ACCURATE SERVICE. MACHINE SERIAL NUMBERS & START-UP DATES ARE REQUIRED.

For technical support and warranty issues please contact us at:

- (800) 362-3243 Toll Free
- (407) 831-2077 Direct Line
- (407) 834-3359 Facsimile

Ice Machine Model Number:	<input type="text"/>	Ice Machine Serial Number:	<input type="text"/>
Date of Purchase:	<input type="text"/>	Date of Start-Up:	<input type="text"/>
Company Name:	<input type="text"/>	Contact Name:	<input type="text"/>
Street Address:	<input type="text"/>	Telephone:	<input type="text"/>
City, State & Zip:	<input type="text"/>	Cell Phone:	<input type="text"/>

Equipment Location:

If purchased from a dealer, provide dealer name and address:

Name: City: St:

Comments:

FOREWORD

Holiday Ice, Inc., strives to provide a quality product that is time-tested and will provide years of dependable service to its customers.

Skilled craftsmen have carefully assembled your Arctic-Temp® ice maker using material components and parts available from the leading vendors and producers of the highest quality refrigeration equipment in our industry. You have invested in quality equipment, and we pledge to support your needs and requirements after the sale.

This manual is provided to aid the service technician and users in the installation, operation, and maintenance of your equipment. Before attempting to install and start the machine, the installer should read and understand each section of this manual.

If, at any time, you encounter conditions that we have not addressed in this manual, we welcome you to write or call Holiday Ice and we will give your questions our immediate attention and reply.

Holiday Ice, Inc., reserves the right to alter specifications and design without prior written notice.

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General Information

HISTORY OF COMPANY

Arctic-Temp® is the result of an evolution of mid-range, vertical tube ice machines that originated in Longwood, Florida, in 1958. Our predecessors conceived a dependable, rugged, easy-to-service machine...and Holiday Ice is committed to maintaining that tradition.

In 1976, we chose to specialize in the 2,000 to 20,000 pounds per day capacity range, and our initial efforts were targeted to the booming fishing and tourism industries associated with Florida. Operating in the southern latitudes dictates that our machines be realistically rated for maximum performance. This is imperative during the scorching summer months when demand is the greatest. You will find that our machines are conservatively rated and our reputation is well established.

In a day of high-tech equipment with high priced repairs, you will be glad to know Arctic-Temp® is engineered to deliver hard ice year after year at minimum upkeep and expense. Our refrigeration system utilizes Copeland compressors, Sporlan valves, Penn controls, and other standard refrigeration components that are stocked nationwide by wholesalers. This ensures that your operation is not inconvenienced or burdened by restricting you to using only factory replacement parts after the warranty has long expired.

With well over 13,000 vertical tube machines operating in the field, hundreds of repeat customers, and over sixty years in the same town, we are prepared to show you our well-established credentials.

HOLIDAY ICE, INC

LIMITED WARRANTY

Holiday Ice, Inc., maker of ARCTIC-TEMP® industrial ice machines, grants this limited warranty to the original purchaser of same, subject to necessary terms, conditions, and limitations expressed herein. NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, are enforceable.

1. **Warranty.** HOLIDAY ICE warrants that its product is free from defects in materials and workmanship and will remain free of such defects for the periods as follows from the date of installation. The “grace” period from the date of sale to date of installation is limited to **30 days**.
 - Five years – Evaporator tubes
 - One Year – All other parts and components less compressors.
 - One year* – Compressor warranty limited to 12 month Copeland Factory warranty.
2. **Warranty Performance.** On proof satisfactory to HOLIDAY ICE that an item is covered by this warranty is defective, HOLIDAY ICE will, at its option, either repair or replace the item at no cost to the original purchaser, except for transportation and labor.
3. **Exclusions.** This limited warranty is issued in lieu of any other warranties, either expressed or implied. Further, the following exclusions and limitations apply:
 - a) This is not a warranty for labor or services and any payment for labor or services is subject to and governed by the Policy Advisement found in the applicable service manual.
 - b) Products operated at any time in adverse operation conditions defined in the owner’s service manual are no longer covered by this warranty.
 - c) Products or parts of products that have been altered, modified, abused, misused, neglected, or the subject of an accident.
 - d) The compressor warranty shall not apply when the machine refrigeration is modified with a condenser, heat reclaimed device, or parts and assemblies other than those manufactured or supplied by HOLIDAY ICE unless HOLIDAY ICE approved these modifications for specific installations in writing. Nothing contained in this subparagraph shall negate any exclusion contained in subparagraph c.
 - e) Damage in transit is excluded.
 - f) Damage occurring due to failure or surges in electrical power is excluded.
 - g) Failure of the water supply to the product.
 - h) Failure to clean and/or maintain the product in accordance with the manufacturer’s recommendations.
 - i) Improper installation and start-up. An installation or start-up is necessarily improper if not performed in accordance with the owner’s manual and all technical publications of HOLIDAY ICE.
 - j) Installation outside the United States of America or Canada.
 - k) Acts of God.
 - l) Routine maintenance, including refrigerant, oil, filters, sight glasses, and cleaning.

4. **Remedies.** This warranty is assignable only with the express written consent of HOLIDAY ICE, INC.

*All compressor warranty exchanges must be transacted at the purchaser’s local Copeland distributor.

WARRANTY IS EXPRESSLY LIMITED TO MACHINES SOLD AND OPERATING IN THE UNITED STATES OF AMERICA AND CANADA.

Limited Warranty 05-2024

HOLIDAY ICE, INC

POLICY ADVISEMENT FOR REPLACEMENT PARTS & LABOR REIMBURSEMENT

Limited Warranty. Our LIMITED WARRANTY covers defects in materials and workmanship on ARCTIC-TEMP® industrial ice machines. We expressly exclude any routine maintenance, cleaning, and labor charges in the warranty. A Policy Advisement for Labor is used at the discretion of Holiday Ice, Inc.

Replacement parts during the warranty period. Replacement parts to be used for warranty purposes should be ordered directly from HOLIDAY ICE, INC., unless advised otherwise. Normally, we can ship replacement parts on the same day ordered provided the order is received by 1:00 p.m. EST. UPS next day air delivery is available for emergency orders.

IT IS NECESSARY TO PROVIDE THE MACHINE SERIAL NUMBER WHEN ORDERING WARRANTY REPLACEMENT PARTS.

For additional warranty information, see our Limited Warranty.

Labor Service Advisement. In addition to our Limited Warranty, we will reimburse or pay directly, any bonafide labor service in order to remedy defects in materials and workmanship as outlined in our formal Limited Warranty for a period of one year* from the date of installation of the machine according to the below listed guidelines:

1. Any labor service reimbursement must be performed by a dealer of HOLIDAY ICE, INC., or a refrigeration service agency qualified and accepted by HOLIDAY ICE, INC.
2. Authorization and approval (excluding dealers) must be obtained from HOLIDAY ICE, INC., in order to be eligible for a labor service reimbursement, credit, or payment. We will not reimburse any unauthorized repair or charge.
3. Labor service payments will be calculated on a straight time labor charge only and shall exclude charges for travel time, mileage, or other premium charges.
4. Labor service charges must be submitted within fifteen days from the date of service and include the defective part(s) to be eligible for reimbursement, credit, or payment. It is necessary to include the machine serial number and a description of the work performed on the invoice or by attachment.
5. Labor reimbursement is limited to that which HOLIDAY ICE, INC. deems as usual and reasonable.
6. WARRANTY IS EXPRESSLY LIMITED TO MACHINES SOLD AND OPERATING IN THE UNITED STATES OF AMERICA AND CANADA.

*The grace period from date of sale (shipment) to the date of installation is limited to 30 days.

For warranty authorization, replacement parts, or questions regarding warranty,
please call us at:

Toll Free (800) 362-3243
Facsimile (407) 834-3359

Policy Advisement 5-2024

HOLIDAY ICE, INC

LIMITED WARRANTY OVERVIEW

See attached Limited Warranty and Policy Advisement for Limited Warranty and Labor Reimbursement.

Holiday Ice has an established Limited Warranty for the repair or replacement of the defective parts. Labor warranty is excluded from the Limited Warranty. However, a Policy Advisement for Labor is used at the discretion of Holiday Ice.

- 1) Replacement parts will be provided by Holiday Ice and DEFECTIVE PARTS MUST BE RETURNED TO HOLIDAY ICE FOR WARRANTY CREDIT.
- 2) Labor reimbursement will be paid according to our Labor Service Advisement at our discretion.
 - a) Unauthorized charges will not be reimbursed.
 - b) Exorbitant charges and premium charges will not be reimbursed.
 - c) A warranty authorization (HI-Number) will be issued pertaining to our Labor Service advisement.
 - d) Warranty invoices must include an itemized listing of labor and parts.
 - e) Written narratives that include a total price without itemizing the specific parts, labor, and other charges do not meet normal and acceptable business practices and will be rejected.
- 3) → **Machine serial numbers are required when requesting replacements parts or labor authorization.**
- 4) → **Installation dates must be registered with the factory when the machine is shipped to the ultimate customer.**
- 5) **Refrigerant loss is not a normal warranty item and will be evaluated on a case-by-case basis.**
- 6) Emergency situations are subject to additional consideration if the charges are fair and reasonable.
- 7) Installation: machine starting, testing, and monitoring system performance at start-up should involve a qualified refrigeration technician or equivalent. At start-up, the machine should be checked thoroughly to confirm that all operating pressures and control set points are accurate and correct.
NOTE: See Section B of our service manual.

NOTE: Refrigerant loss on start-up due to broken capillaries, refrigerant lines, and other parts and components damaged in transit by vibration are not subject to reimbursement. The refrigerant charge is contained in the receiver and the valves should not be opened until a pre-start inspection determines all lines and capillaries are intact.

NOTE: Opening the valves and letting refrigerant escape by mistake or error is not a warranty issue. Refrigerant loss and service valve replacement due to failure to properly open and close packing glands on service valves is not covered under warranty.

WARRANTY IS EXPRESSLY LIMITED TO MACHINES SOLD AND OPERATING IN THE UNITED STATES OF AMERICA AND CANADA.

Warranty Overview 5-2024

INSPECTION AND UNCRATING

1. Inspect exterior of shipping crate(s) and skid for any signs of shipping damage. Obvious damage should be immediately noted on the trucker's freight bill and a request for inspection made to the delivering freight line. Tip-N-Tell shipping devices are provided on each machine to alert the receiver if the machine has been tipped over in transit.
2. Carefully remove shipping crate and cartons and inspect machine and condensing unit for any signs of concealed shipping damage.
3. Remove front panels and top cover of the ice machine and make a visual inspection of all lines, tubing, and components to determine that transit vibration has not caused damage or breakage.
4. Loosen black knobs securing evaporator panels and remove panels in order to remove the dunnage (packing) securing the evaporator tubes. The evaporator tubes should be parallel and plumb. If necessary, align by using **hand pressure only**.
5. The machine was shipped with a full charge of the proper refrigerant stored in the receiver on the condensing unit. Thoroughly check the condensing unit for any obvious signs of leaks (oil residue) or any other apparent damage.
6. If any obvious or concealed damage is discovered, a freight claim should be filed. See Freight Claim procedures.

Note: In the event of freight or any other damage, please notify the selling dealer or Holiday Ice, Inc., in order that we may be involved in the resolution process.

7. Fill out and return the Installation and Warranty Card to the factory.

FREIGHT CLAIM PROCEDURES

Important

This equipment has been carefully inspected and packed in accordance with the carrier's packing specification. Responsibility for safe delivery has been assumed by the carrier. If loss or damage occurs, you, as consignee, must file a claim with the carrier and hold container for carrier's inspection.

Concealed Loss or Damage If loss or damage does not appear until equipment has been unpacked, make a written request for inspection by the carrier with fifteen (15) days of the delivery date. Then file a claim with the carrier.

Do not return damaged equipment to Holiday Ice without written permission. Inspect promptly and file claim without delay.

Visible Loss or Damage Any external evidence of loss or damage must be fully described and noted on your freight bill or express receipt and signed by the carrier's agent. Claim should then be filed on a form available from the carrier on request.

File your claim as above. Do not return damaged equipment to Holiday Ice, Inc., without authorization.

Installation Information

SPECIAL PRECAUTIONS

Important Safety Notice

The information presented in this manual regarding installing and servicing the Arctic-Temp® industrial ice machine is intended for use by individuals possessing adequate backgrounds of electrical, refrigeration, and mechanical experience. Any attempt to repair major equipment may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information nor can it assume any liability in connection with its use.

Special Precautions to Be Observed When Charging Refrigeration Systems

Only a technically qualified person, experienced and knowledgeable in the handling and operation of refrigerant systems, should perform the operations described in this manual. **Note: It is illegal to vent refrigerants into the atmosphere. Follow all Federal and local regulations when handling refrigerants.**

Safety goggles should be worn during refrigerant handling and charging operations.

If a refrigeration system is being charged from refrigerant cylinders, disconnect each cylinder when empty or system is fully charged. Install a gauge in the charging line to indicate refrigerant cylinder pressure. Close the refrigerant charging valve and cylinder valve before disconnecting the cylinder. Loosen the refrigerant charging line slowly to make sure refrigerant pressure between the cylinder valve and charging valve is relieved.

WARNING: Immediately close the system charging valve before the harvest cycle is initiated. Never leave a refrigerant cylinder connected to the system except during the charging operation. Failure to observe either of these precautions can result in possible overfilling of the refrigerant cylinder causing it to rupture because of pressure from expansion of the liquid refrigerant.

SPECIAL PRECAUTIONS FOR INSTALLATION

Remote and Skid Mounted Installations

DANGER: Electrical shock and/or injury from moving parts inside this machine can cause serious injury. Disconnect electrical supply voltage to machine prior to performing any adjustments or repairs.

Notes of Caution:

1. All installations must conform with local plumbing and electrical codes.
2. All power to equipment must be off during installation.
3. A separate electrical circuit must be provided specifically for the ice machine.
4. Voltage, current, and fusing size must meet requirements on model/serial number plate on rear of machine.

Water Inlet water pressure must range from 30-50 PSIG. A three-eighths inch (3/8") compression water supply inlet is standard for models 500, 750, 5200, and 1000. For model 1500, an one-quarter (1/4") MP connection is supplied.

Proper installation of your ARCTIC-TEMP® ice maker is of utmost importance to receive maximum performance under a wide variety of weather conditions and customer demand for ice on a continual basis. To ensure maximum performance from your machine, we recommend that you have an authorized dealer or qualified refrigeration and electrical contractors perform the installation.

The following points should be considered before proceeding with installation:

- Location of ice maker and condensing unit
- Electrical power and wiring requirements (see machine and condensing unit data plate)
- Provision of a dedicated electrical circuit for ice machine system only
- Location and size of electrical disconnect in accordance with national and local code
- Type of bin control required for the installation (see controls, pp. E-6)
- Grounding the entire system
- Testing and monitoring system performance at startup

WEIGHT OF MACHINES CHART

Remote Weights			Skid Mounted Weights	
Model	Evaporator	Condensing Unit	Model	Skid Mounted
500AR-L	215 lbs.	300 lbs.	500SM-L	650 lbs.
750AR-L	385 lbs.	580 lbs.	750SM-L	1,100 lbs.
1000AR-L	475 lbs.	946 lbs.	1000SM-L	1,680 lbs.
1500RCU	850 lbs.	1,400 lbs.	1500SM-B	2,750 lbs.

Contact the manufacturer of the ice bunker or a licensed building contractor to inspect the location to determine that the ice storage structure will support the intended weights. Weights of remote ice machines are listed in the following table.

REMOTE INSTALLATION

Model Specifications sheet and wiring diagrams for the specific machine you are installing - line sizing, electrical requirements, control settings, and other important information - are located in Section C. Please refer to this information before proceeding.

ARCTIC-TEMP® remote units are completely assembled, charged with the proper refrigerant, and tested prior to shipping. Controls, expansion valves, and limiting devices were set during testing. After testing, the refrigerant charge was "pumped down" into the receiver tank of the condensing unit.

Condensing Unit Place the condensing unit in a well-ventilated area, preferably below the elevation of the ice maker evaporator section. The condensing unit should be protected against rain, snow, and entrainment of air, and placed in a position to avoid direct winds which could result in a loss of head pressure necessary to provide sufficient hot gas to harvest the machine.

Ice Maker Position the ice maker evaporator section on the bin or ice bunker and secure in position by bolting or lags as required. The ice maker should be carefully positioned over the delivery chute opening (see bin template drawing, section D) to allow for installation of the ice delivery chute (p. D-4). Fasten the delivery chute with the provided plastic knob(s). After the machine has been permanently located, make certain that the evaporator section is level side to side and front to back. Leveling is essential for proper machine operation.

Tubing Specifications When performing remote installations, use ACR- and/or RST-type refrigeration tubing. For remote installations of less than thirty feet (30'), refer to Model Specifications sheet, p. C-2, for specific line sizes.

For piping runs of more than thirty feet (30'), refer to a credible piping manual, such as Copeland Manual AE 104.

Special Precaution Service and ball valves should be wrapped with a wet cloth prior to brazing to avoid damage to their internal components. All remote machines are installed with a ball valve on the hot gas line with an evacuation port installed. **CAUTION: Remove the Schrader core of this port before brazing.**

All brazing should be in accordance with accepted refrigeration principles and procedures. If the suction line has a vertical rise, it should be P-trapped at the base of the riser and at each twenty-foot (20') rise. Horizontal runs should have a drop of at least one-half inch (1/2") per ten feet (10') in the direction of the refrigerant flow. A properly sized liquid line drier and sight glass is supplied with each machine. We recommend using fifteen percent (15%) silver solder for brazed connections.

Leak Checking Leak check all field piping according to Environmental Protection Agency (EPA) requirements and regulations.

Line Insulation After leak checking, insulate the suction and hot gas lines with one-half inch (1/2") wall thickness Armaflex or Rubatex tube insulation. If the liquid line passes through an area warmer than the condensing temperature, it also must be insulated. **Note: Do not use plastic-foam type insulation.**

Evacuating the System on Models Remote condensing units are shipped with the refrigerant charge stored in the receiver tank. Special precautions should be taken to avoid accidental loss of refrigerant and allowing non-condensable gases to enter the system. The following procedure should be used for evacuating the system and opening the service valves.

1. Using manifold gauge set, connect vacuum pump to suction valve access and hot gas access tap on the hot gas ball valve outlet. **Note: The hot gas access port is provided to evacuate only the hot gas line. Purging refrigerants into the atmosphere is a violation of EPA regulations and Federal law.**
2. Do not open suction service valve. Leave front-seated. Start vacuum pump. Evacuate to 500 microns. Remove vacuum pump upon completion of evacuation process.
3. Open ball valve on hot gas line prior to removing evacuation hose in order to avoid allowing air to enter the system.
4. Fully backseat the suction service valve and then open the valve one full turn.
5. Open valve on compressor discharge line.
6. Backseat receiver tank service valve prior to making gauge connections in order to avoid personal injury and refrigerant loss. See warning below.

See drawing for location of valves, p. D-6.

WARNING - MODEL 500AR-L INSTRUCTIONS ONLY: Do not open the gauge port access on the receiver tank service valve if the service valve is front-

seated (closed). This valve must be backseated before gauge access is removed in order to prevent high pressure refrigerant loss and possible personal injury.

VALVES MUST BE OPEN BEFORE STARTING

	500	750/5200	1000	1500
Compressor Discharge	*	Y	Y	Y
Compressor Suction	N/A	Y	Y	Y
Hot Gas Ball Valve	Y	Y	Y	Y
Receiver Inlet	N/A	N/A	Y	Y
Receiver Outlet	Y	Y	Y	Y
Liquid Line King Valve	Y	Y	Y	Y
Suction Line King Valve	Y	N/A	N/A	N/A

Machines with Low Ambient Controls have three ball valves in addition to the above. They are shipped in "Summer" mode and need no action for start-up.

Prestart Check Before starting the unit, check the following:

1. Confirm that proper voltage is being applied to the unit.
2. Confirm that all service and ball valves are open properly.
3. Confirm that makeup water is being supplied to the sump and the water level is one and three-fourths inches (1 3/4") to two inches (2").
4. Confirm that the bin control is installed correctly.

Electrical Energizing Set toggle switch on the control panel to *OFF* position. Switch disconnect to *ON* position. Verify that the machine contactor and evaporator are correctly wired and receiving electrical power.

The crankcase heater is energized when the disconnect is in *ON* position.

CAUTION: The crankcase heater should be energized for two (2) hours prior to starting to ensure that all liquid refrigerant has been removed from the crankcase. Starting the compressor with liquid in the crankcase will cause "slugging" and compressor or valve failure.

After the crankcase heater has been energized for two (2) hours, the machine is ready to start. Place toggle switch in *PUMP* position (down) to verify that the water pump is supplying water to the inner and outer surfaces of the evaporator.

Starting the Machine Place toggle switch in *ICE* position (up) to start the machine. Allow three (3) to four (4) complete ice making cycles to observe the operating pressures while the machine balances itself. Refer to Model Specifications sheet, p. C_2, for control settings and operating pressures and verify that the machine is operating within these limits.

Normal operation is described as follows:

Freeze cycle Freezing time is approximately five to seven (5-7) minutes, depending on the model, and controlled by a repeating cycle timer with a single cam. During the freezing cycle, the compressor and water pump will operate with the hot gas solenoid valve closed and the ice crusher motor at rest. When the timer has reached the end of the freeze cycle, the roller on the microswitch will enter the detent position of the cam and initiate the harvest cycle.

Harvest cycle During the harvest cycle, the compressor continues to operate, the water pump is stopped, and the ice crusher motor is energized along with the hot gas solenoid valve(s). At the start of this cycle, the positive harvest control (PHC) pressure switch and its associated relay/pilot light will operate and hold the timer motor out of the electrical circuit until the suction pressure reaches the prescribed set point (see C-2), at which time the ice will start to drop and enter the crusher. All ice should be off the evaporators and through the crusher within ten (10) to fifteen (15) seconds. The harvest cycle will continue for another twenty- (20) to thirty-second (30) period which is called overrun. At completion of overrun, the freeze cycle is initiated.

The compressor runs throughout all phases of the cycle and continues to run until stopped by the bin control or until switched off manually at the toggle switch.

Adding Refrigerant Unless the refrigerant charge has been lost, do not add refrigerant until after several harvest cycles have been completed. **CAUTION: Before adding refrigerant, refer to Special Precautions, p. B-2, and Adding Refrigerant, p. E-15.**

SKID MOUNTED INSTALLATION 500SM-L, 750SM-L, AND 1000SM-L

Model Specifications sheet and wiring diagrams for the specific machine you are installing - line sizing, electrical requirements, control settings, and other important information - are located in Section C. Please refer to this information before proceeding.

ARCTIC-TEMP® skid-mounted units are completely assembled, charged with the proper refrigerant, and tested prior to shipping. Controls, expansion valves, and limiting devices were set during testing. After testing, the refrigerant charge was "pumped down" into the receiver tank of the condensing unit.

Determining Location and Weight Requirements A skid-mounted machine is an ice maker and condensing unit mounted on a common base plate (skid) constructed of mild steel and then galvanized. The evaporator and condensing unit have been piped, charged, and tested, and are ready to run with minimal installation requirements of electrical power and water. In order to use a skid mounted installation, you must meet the space and weight requirements and have an ice bunker or storage facility that will support the skid-mounted combined weight (See chart on B-3).

Machine Location Using the template provided on p. C-6, lay out the location for the skid-mounted ice machine and condensing unit and cut the hole in the ice bunker for the ice delivery chute.

Locate the skid-mounted unit in a well-ventilated area where it will be protected against rain, snow, and entrainment of air, and placed in a position to avoid direct winds which could result in a loss of head pressure necessary to provide sufficient hot gas to harvest the machine.

Position the unit on the ice bunker and secure in position by bolting or lags as required. The ice maker should be carefully positioned over the delivery chute opening (see bin template drawing, section D) to allow for installation of the ice delivery chute (p. D-4). Most skid-mounted installations will require a delivery chute extension in order to extend the length of the chute. Fasten the delivery chute with the provided plastic knob(s). After the machine has been permanently located, make certain that the skid is level side to side and front to back. Leveling is essential for proper machine operation.

VALVES MUST BE OPEN BEFORE STARTING

	500	750/5200	1000	1500
Compressor Discharge	*	Y	Y	Y
Compressor Suction	N/A	Y	Y	Y
Hot Gas Ball Valve	Y	Y	Y	Y
Receiver Inlet	N/A	N/A	Y	Y
Receiver Outlet	Y	Y	Y	Y
Liquid Line King Valve	Y	Y	Y	Y
Suction Line King Valve	Y	N/A	N/A	N/A

Machines with Low Ambient Controls have three ball valves in addition to the above. They are shipped in "Summer" mode and need no action for start-up.

Prestart Check Before starting the unit, check the following:

1. Confirm that proper voltage is being applied to the unit.
2. Confirm that all service and ball valves are properly open.
3. Confirm that makeup water is being supplied to the sump and the water level is one and three-fourths inches (1 3/4") to two inches (2").
4. Confirm that the bin control is installed correctly.

Opening Service and Ball Valves Skid-mounted machines are shipped with refrigerant charge stored in the receiver tank. Special precautions should be taken to avoid accidental loss of refrigerant and allowing non-condensable gases to enter the system. The following procedure should be used for opening the service and ball valves before connecting manifold gauges. Special precautions must be taken for the Model 500SM-L. See warning below.

1. Backseat suction service valve.
2. Open liquid line service valve outside condensing unit.
3. Backseat receiver tank service valve. See warning below.
4. Open ball valve in hot gas line.

WARNING - MODEL 500SM-L: Do not open the gauge port access on the receiver tank service valve on Model 500SM-L if the service valve is front-seated (closed). This valve must be back-seated (open) before gauge access is removed in order to prevent high pressure freon loss and possible personal injury.

After these valves have been backseated, connect manifold gauge set to suction and receiver valves and "crack" the valves to open gauge port.

See drawing for location of valves, p. D-6.

Electrical Energizing Set toggle switch on the control panel to OFF position. Switch disconnect to *ON* position.

The crankcase heater is energized when the disconnect is in *ON* position.

CAUTION: The crankcase heater should be energized for two (2) hours prior to starting to ensure that any liquid refrigerant has been removed from the crankcase. Starting the compressor with liquid in the crankcase will cause "slugging" and compressor or valve failure.

After the crankcase heater has been energized for two (2) hours, the machine is now ready to start. Place toggle switch in *PUMP* position (down) to verify that the water pump is supplying water to the inner and outer surfaces of the evaporator.

Starting the Machine Place toggle switch in *ICE* position (up) to start the machine. Allow three (3) to four (4) complete ice making cycles to observe the operating pressures while the machine balances itself. Refer to Model Specifications sheet, p. C-2, for control settings and operating pressures and verify that the machine is operating within these limits. Normal operation is described as follows:

Freeze cycle Freezing time is approximately five to seven (5-7) minutes, depending on the model, and controlled by a repeating cycle timer with a single cam. During the freezing cycle, the compressor and water pump will operate with the hot gas solenoid valve closed and the ice crusher motor at rest. When the timer has reached the end of the freeze cycle, the roller on the microswitch will enter the detent position of the cam and initiate the harvest cycle.

Harvest cycle During the harvest cycle, the compressor continues to operate, the water pump is stopped, and the ice crusher motor is energized along with the hot gas solenoid valve(s). At the start of this cycle, the positive harvest control (PHC) pressure switch and its associated relay/pilot light will operate and hold the timer motor out of the electrical circuit until the suction pressure reaches the prescribed set point (see C-2), at which time the ice will start to drop and enter the crusher. All ice should be off the evaporators and through the crusher within ten (10) to fifteen (15) seconds. The harvest cycle will continue for another twenty- (20) to thirty-second (30) period which is called overrun. At completion of overrun, the freeze cycle is initiated.

The compressor runs throughout all phases of the cycle and continues to run until stopped by the bin control or until switched off manually at the toggle switch.

Adding Refrigerant Unless the refrigerant charge has been lost, do not add refrigerant until after several harvest cycles have been completed.
CAUTION: Before adding refrigerant, refer to Special Precautions, p. B-2, and Adding Refrigerant, p. E-15.

Model Specifications and Wiring Diagrams

**ARCTIC-TEMP® ICE MAKER
MODEL SPECIFICATIONS**
SUPPLIED WITH LARKIN CONDENSING UNIT

**MODEL 500AR-L
MODEL 500SM-L
MODEL 500LSM-1**
LINE VOLTAGE: 208/230-1-60
CONTROL VOLTAGE: 208/230-1-60
R-404A

ELECTRICAL

Volts/Phase/Hertz	208/230-1-60
Total F.L.A. Rating, Machine and Compressor	34.5
Minimum Circuit Ampacity	42.0
Maximum Overcurrent Protection	64.0

COMPRESSOR

Compressor (Copeland®) Scroll	ZS38K4E-PFV
Voltage Range (208/230)	187-253
Nameplate Rating (Amperes)	25.8, 1-Phase
Locked Rotor Rating (Amperes)	169, 1-Phase
Refrigerant Oil	P.O.E. 32

FIELD CONNECTIONS (Remote Condensing Units Only)

Suction	7/8 ODS
Hot gas	5/8 ODS
Liquid	1/2 ODS
Sight Glass (Sporlan)	SA 13S
Filter Drier (Copeland)	C164S
Refrigerant Charge, 404A*	15 lbs.
Inlet Water Line (Compression)	3/8 OD COMP

CONTROL SETTINGS (approximate)

Fan Switch	P70AA-118	On/280 Off/245	PSIG
High Pressure	P70DA-1	415	PSIG
Low Pressure	P29NC-3 w/ Time Delay	20	PSIG
Low Ambient Control		Closes 225	PSIG
Suction Pressure	(At Harvest)	29	PSIG
Positive Harvest Control	Reverse Acting LP (Opens on Rise)	82	PSIG

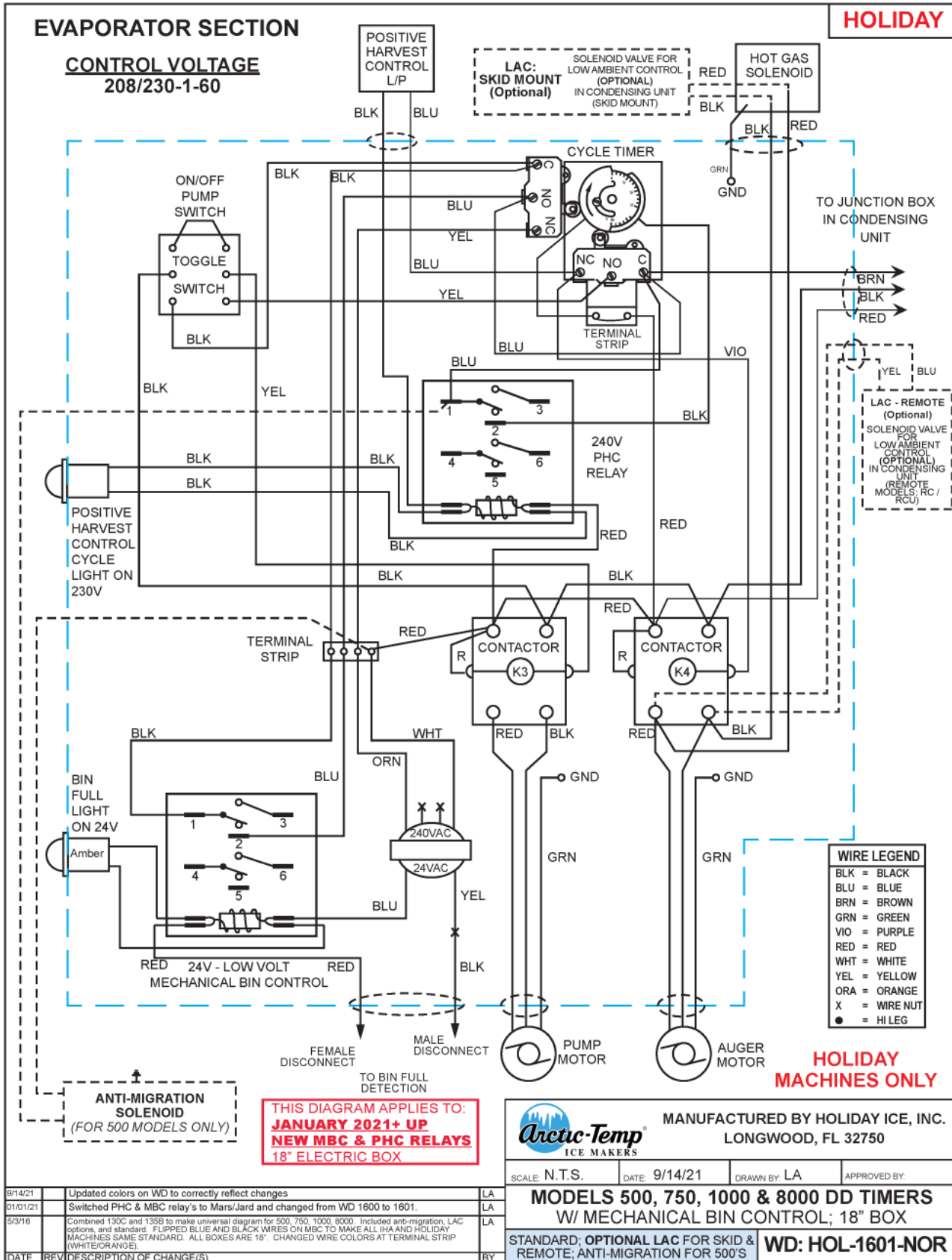
* Listed refrigerant charges are for close coupled and skid mounted machines as tested. Remote installations of extended length will require additional refrigerant.

Note: Crankcase heaters are installed on Arctic-Temp ice makers. Heater leads are connected to the L1/L2 -position -of the line contactor.

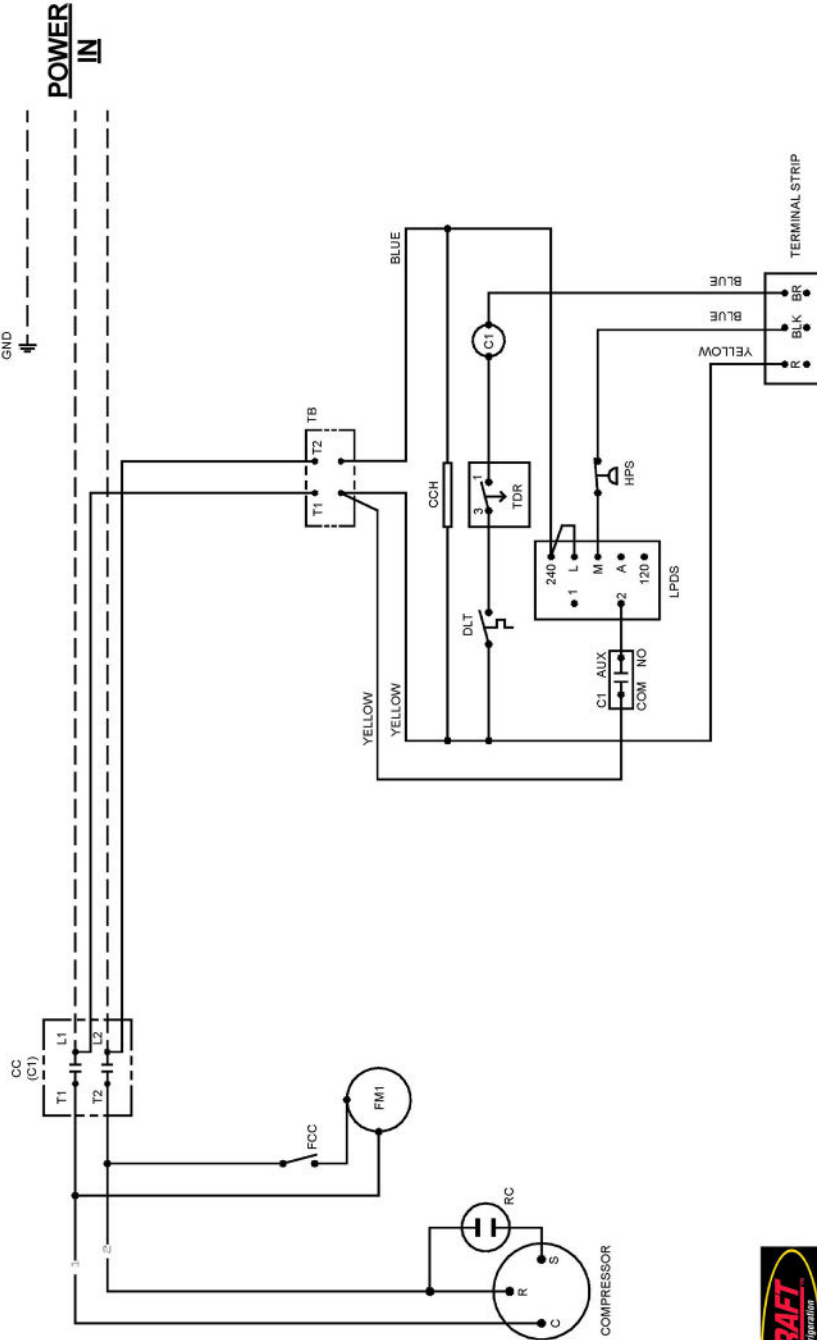
CRANKCASE HEATER SHOULD BE ENERGIZED FOR TWO HOURS PRIOR TO STARTING THE MACHINE.

Manufactured by HOLIDAY ICE, INC., Longwood, FL 32750
Specifications and design subject to change without notice.
Arctic-Temp is a registered trademark of Holiday Ice, Inc. 2012

FEB 2024
Saved as: 500AR-L_SM-L_LSM 404A - 2016 Larkin 1-PH



208-230V / 60hz / 1-PHASE CONDENSING UNITS- POWER CIRCUIT



Arctic-Temp
ICE MAKERS

MANUFACTURED BY HOLIDAY ICE, INC.
LONGWOOD, FL 32750

SCALE: N.T.S. DATE: 3-9-16 DRAWN BY: HeatCraft APPROVED BY:
500 & 400 SM-L, AR-L, LSM; 208/230-1-60
LARKIN SCROLL; LZT-050-M6B-SP AND LZT-055-M6B-SP

DRAWING NO. **WD-210**

NOTE: SAME C.U. DIAGRAM FOR BOTH 400 MODEL 1-PHASE SCROLLS; ONLY DIFFERENT COMPRESSORS.

- LZT-050-M6B-SP - ZS 33KAE SCROLL COMPRESSOR
- LZT-055-M6B-SP - ZS 38KAE SCROLL COMPRESSOR

USE COPPER CONDUCTORS ONLY

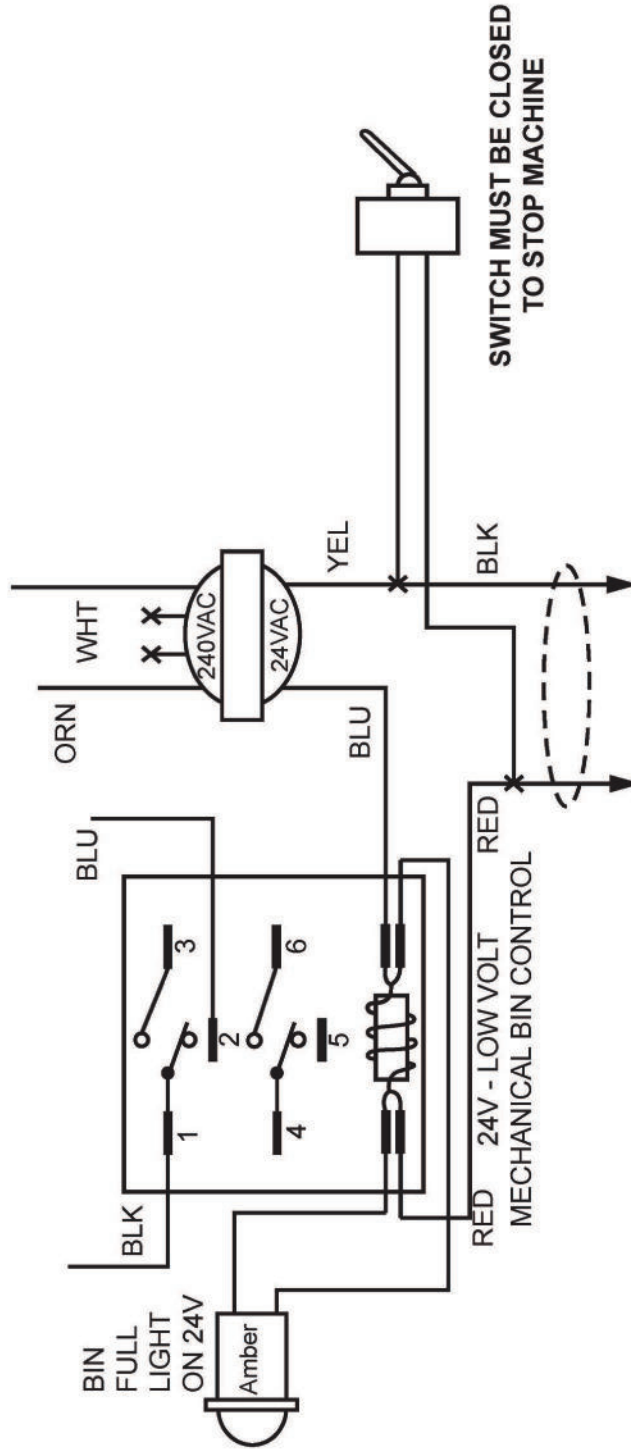
— FACTORY WIRING
- - - - - FIELD WIRING

5/6/16 DATE REV. DESCRIPTION OF CHANGE(S)
LA BY

- MODEL #: LZT-050-M6B-SP (REV 3.24)
LZT-055-M6B-SP (REV 3.26)
- LEGEND**
- CONTACTOR
 - CM - COMPRESSOR MODULE
 - CB - CIRCUIT BREAKER
 - FCS - FAN CYCLING SWITCH
 - FM - FAN MOTOR
 - HIGH PRESSURE SWITCH
 - LPDS - LOW PRESSURE SWITCH W/ TIME DELAY RELAY
 - OPS - OIL PRESSURE SWITCH



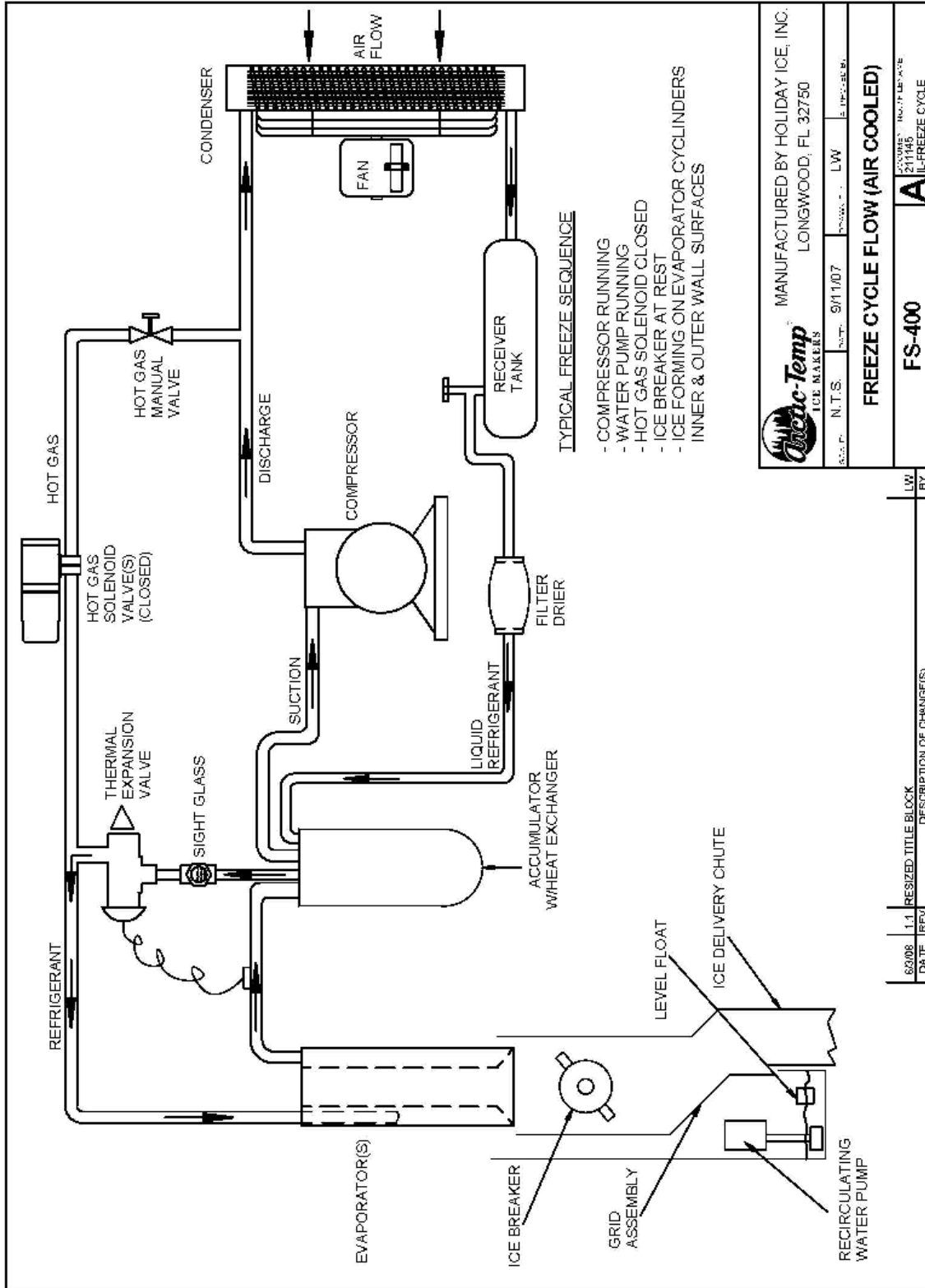
ON / OFF REMOTE SWITCH



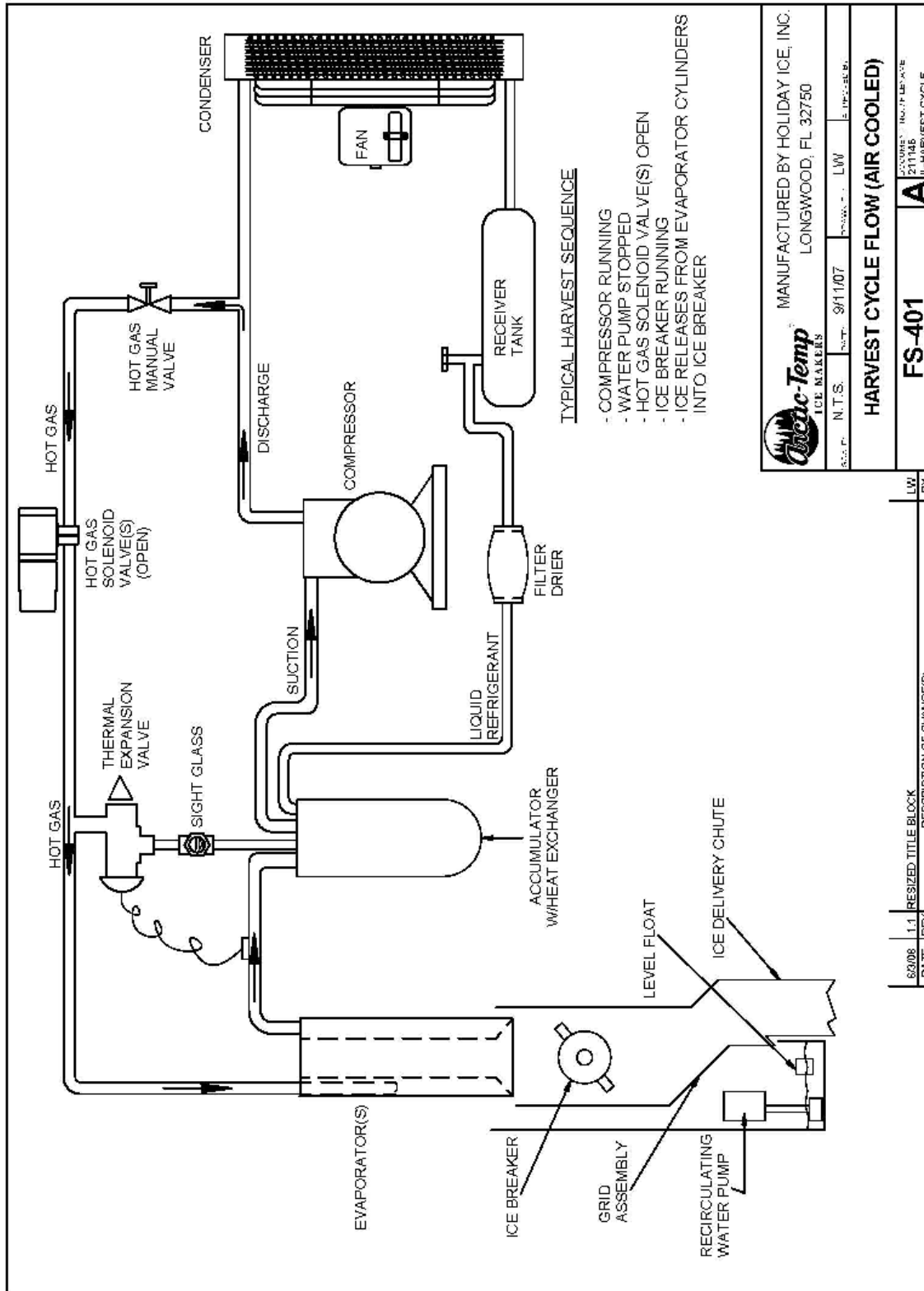
		MANUFACTURED BY HOLIDAY ICE, INC. LONGWOOD, FL 32750	
SCALE: N.T.S.	DATE: 10/12/23	DRAWN BY: LA	APPROVED BY:
DOCUMENT NO. WIRING MODIFICATION		DRAWING NO. A	
BIN LOCKOUT REMOTE SWITCH			

Diagrams and Illustrations

FREEZE CYCLE SCHEMATIC

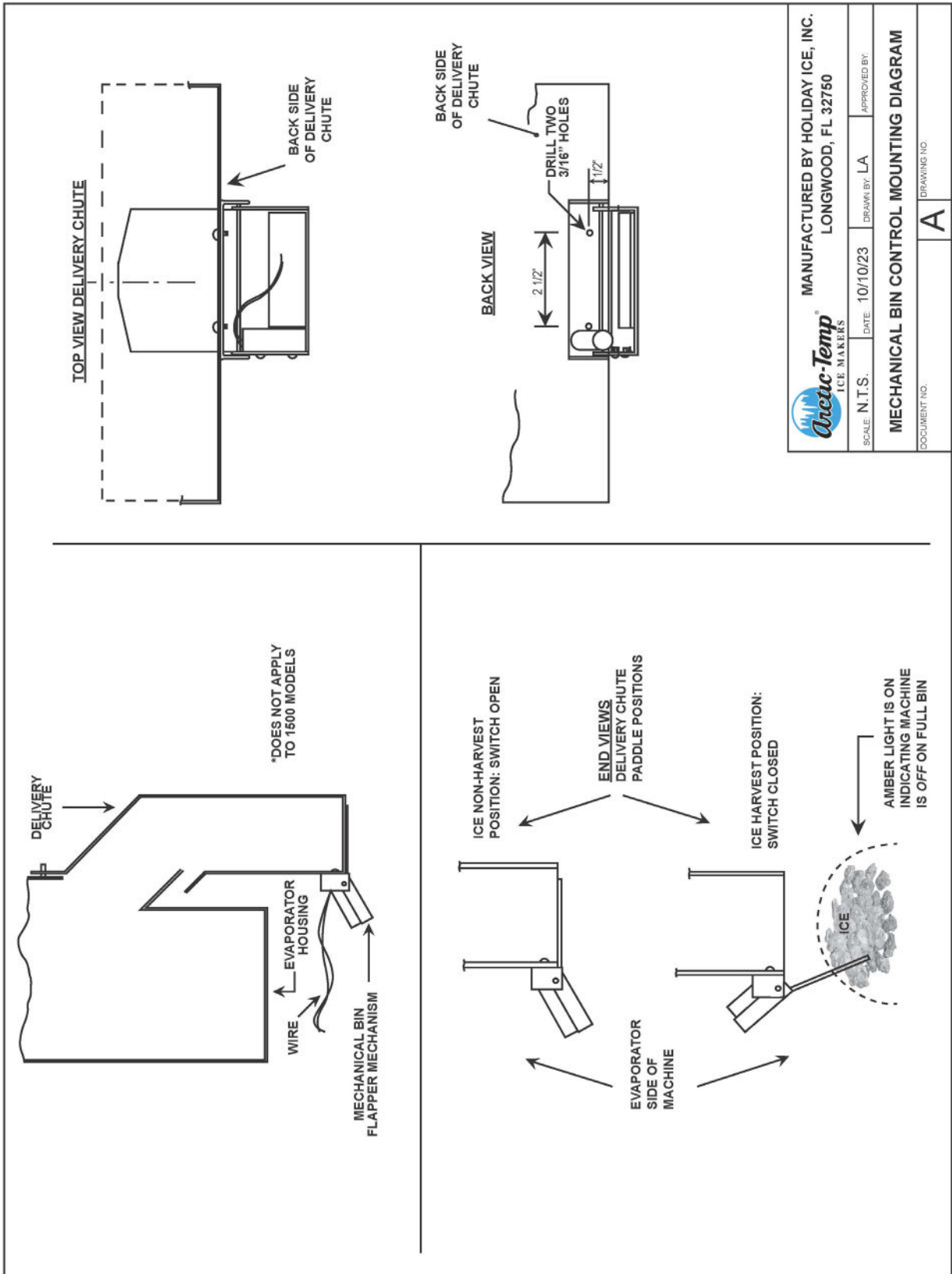


HARVEST CYCLE SCHEMATIC



6/2/08	1.1	REVISED TITLE BLOCK	LW	BT
DATE	REV	DESCRIPTION OF CHANGE(S)		

MECHANICAL BIN CONTROL MOUNTING



Arctic-Temp
ICE MAKERS

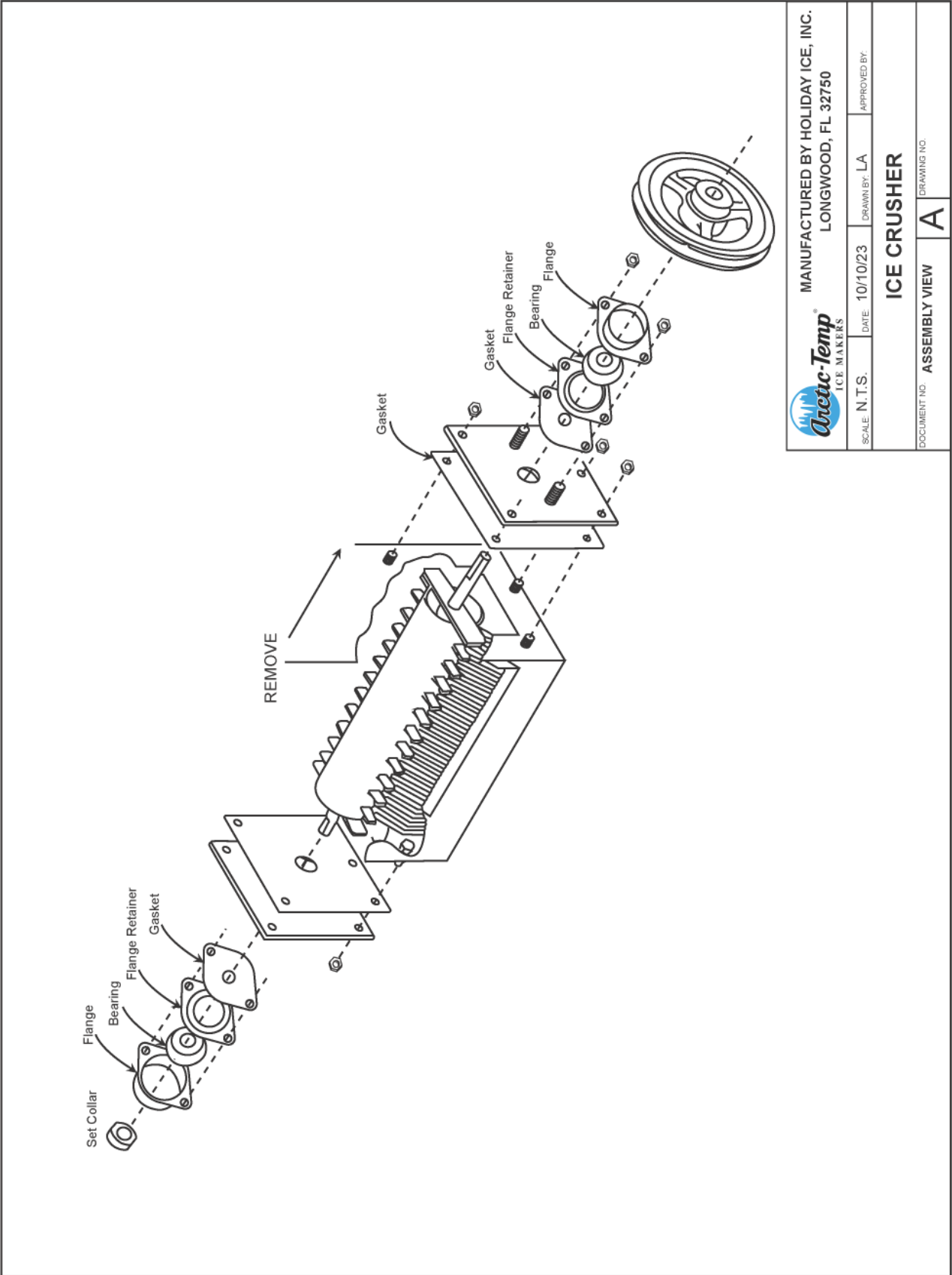
MANUFACTURED BY HOLIDAY ICE, INC.
LONGWOOD, FL 32750

SCALE: N.T.S. | DATE: 10/10/23 | DRAWN BY: LA | APPROVED BY:

MECHANICAL BIN CONTROL MOUNTING DIAGRAM

DOCUMENT NO. | DRAWING NO. **A**

ICE CRUSHER ASSEMBLY VIEW

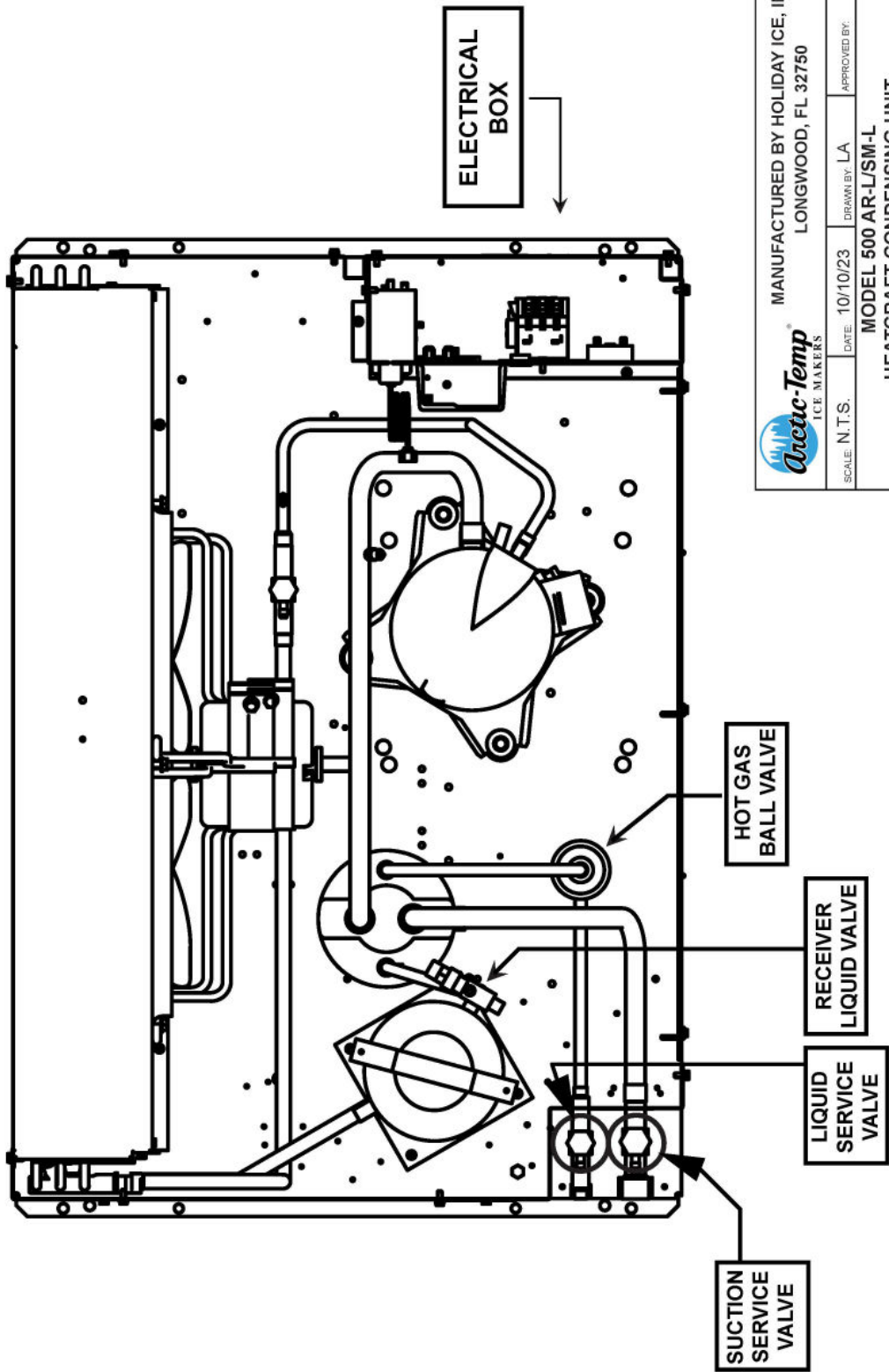


Arctic-Temp
ICE MAKERS

MANUFACTURED BY HOLIDAY ICE, INC.
LONGWOOD, FL 32750

SCALE: N.T.S.	DATE: 10/10/23	DRAWN BY: LA	APPROVED BY:
DOCUMENT NO. ASSEMBLY VIEW			DRAWING NO. A

SERVICE AND BALL VALVE LOCATIONS

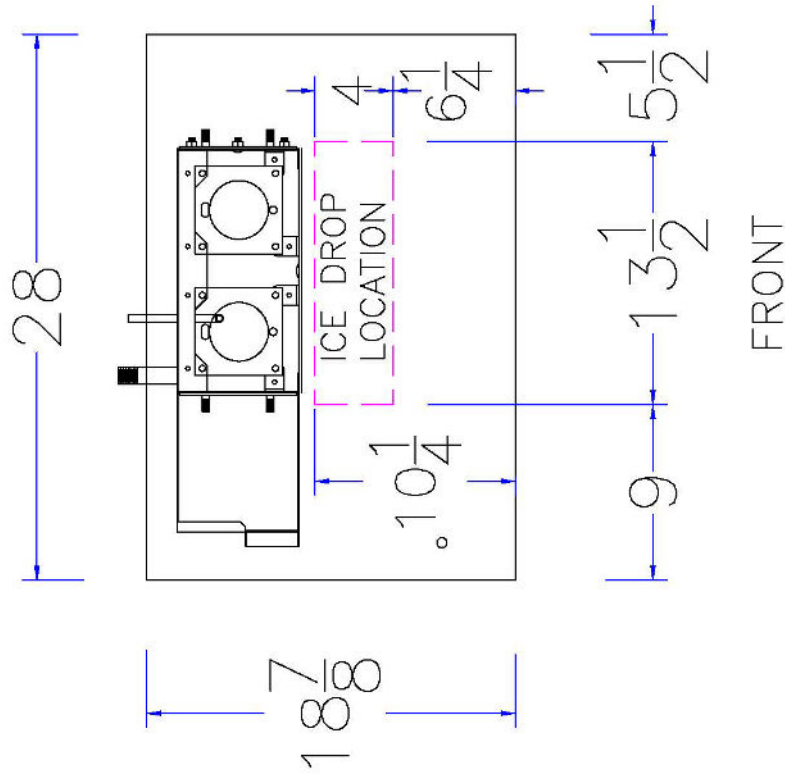


Arctic-Temp
ICE MAKERS

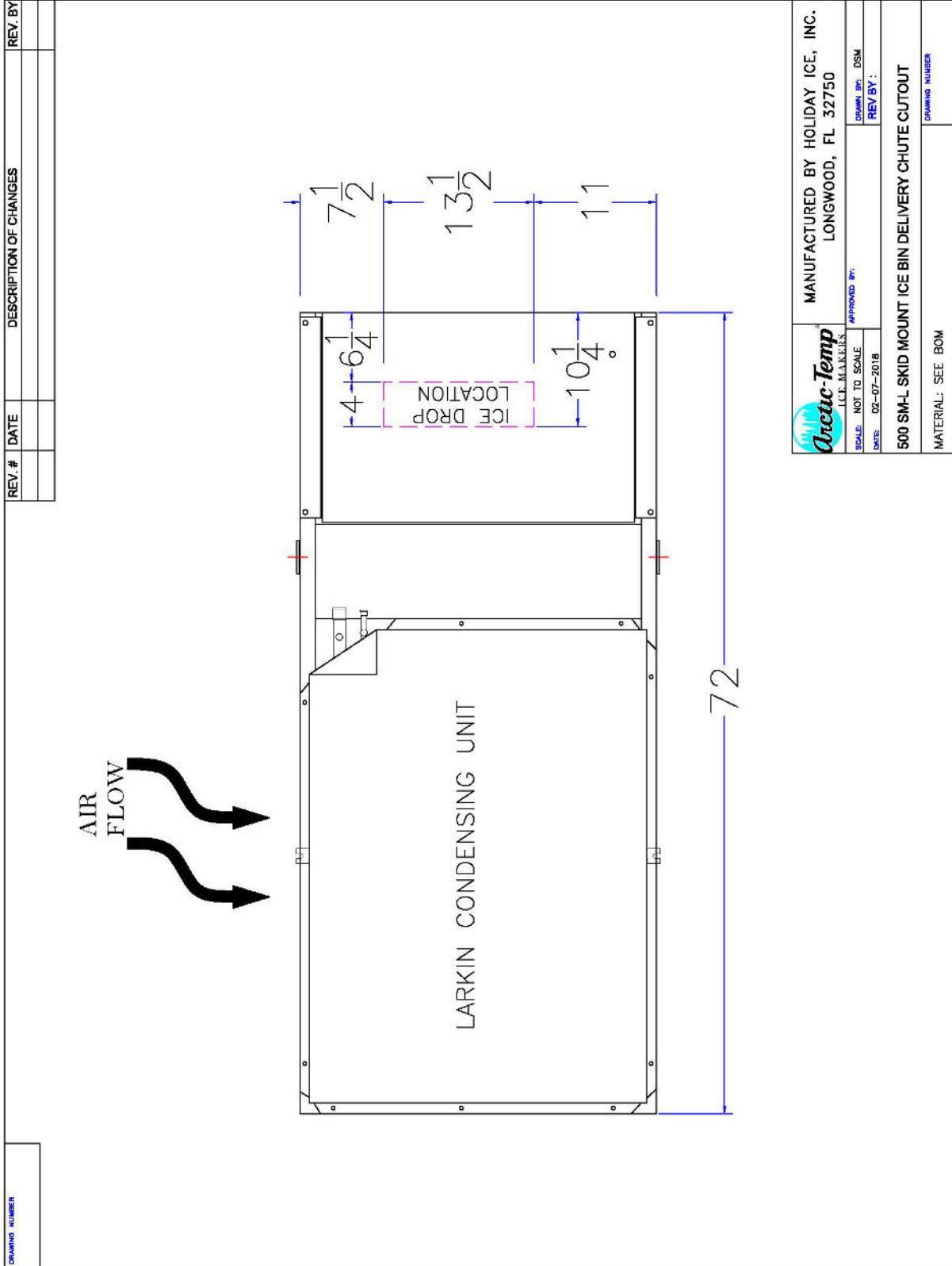
MANUFACTURED BY HOLIDAY ICE, INC.
LONGWOOD, FL 32750

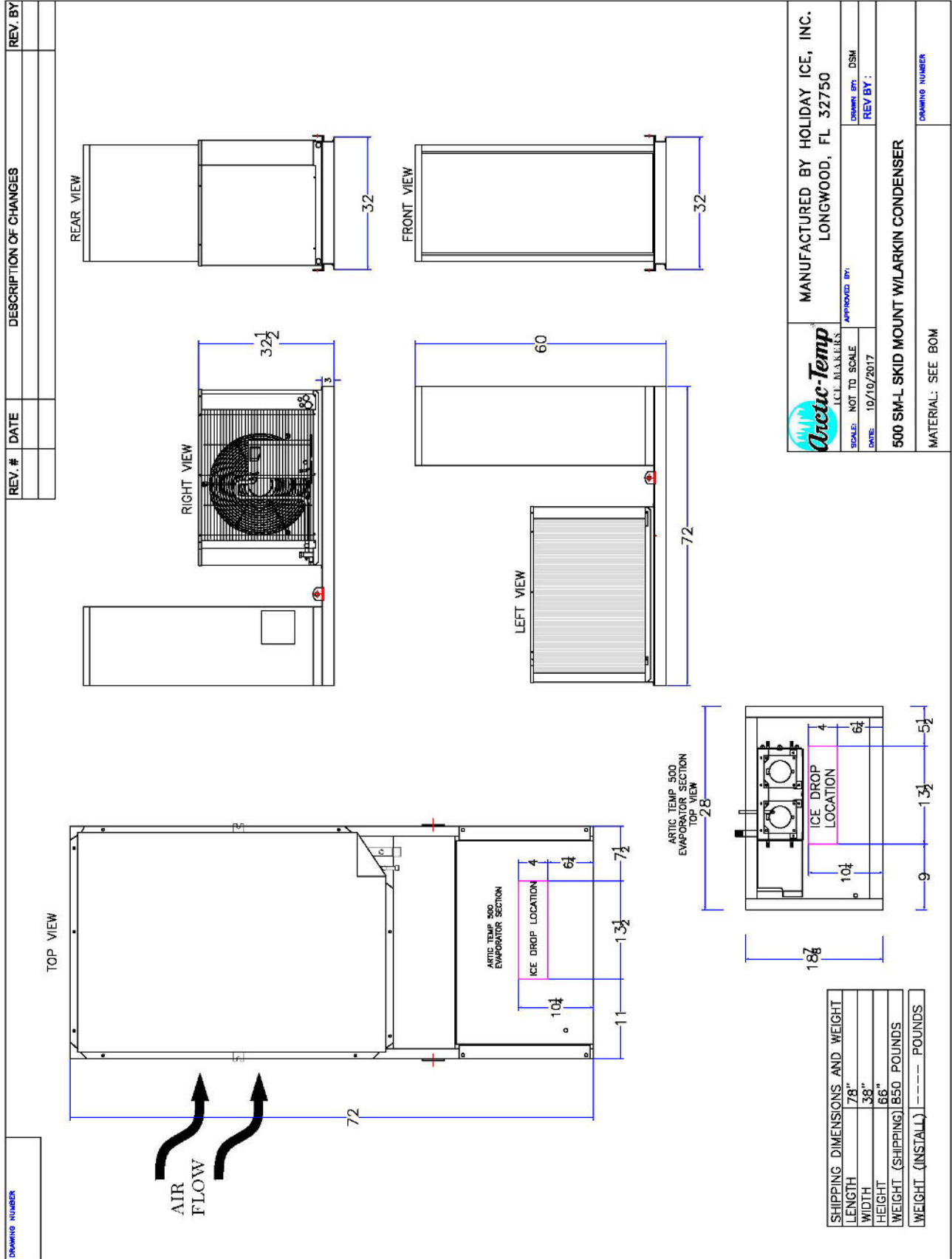
SCALE: N.T.S.	DATE: 10/10/23	DRAWN BY: LA	APPROVED BY:
MODEL 500 AR-LJSM-L			
HEATCRAFT CONDENSING UNIT			
DOCUMENT NO. SERVICE & BALL VALVE LOCATION	DRAWING NO. Coppeland-400AR-400SM.ai		

REV. #	DATE	DESCRIPTION OF CHANGES	REV. BY



	MANUFACTURED BY HOLIDAY ICE, INC. LONGWOOD, FL 32750	
	SCALE: NOT TO SCALE	APPROVED BY: DSM
	DATE: 02-07-2018	REV BY:
500 AR-L REMOTE MOUNT ICE BIN DELIVERY CHUTE CUTOUT		
MATERIAL: SEE BOM		
DRAWING NUMBER		





Service and Operation

Principle of Operation

The Arctic-Temp® line of ice making machines from Holiday Ice, Inc., combines proven technology and efficiency with a reputation for quality and reliability for over four decades of manufacturing.

In the Arctic-Temp® ice maker, ice is produced on vertically suspended, double-walled cylindrical evaporators. Chilled water is continually recirculated over both the inner and outer surfaces of the evaporator as refrigerant passes through the annular space between the two ice making surfaces. This process utilizes 100% of the evaporator surface and provides fast production with maximum efficiency of heat exchange. Ice making water is recirculated by pump from the stainless steel sump, where proper water level is maintained by a float valve. Water flows onto both the inner and outer evaporator surfaces by simple tubed water distributors. The freezing period is determined by a repeating cycle timer.

At completion of the freeze cycle, hot gas from the compressor is introduced into the annular space in the evaporator tubes. The introduction of hot gas "breaks the ice bond" from the evaporator surface, releasing the concentric cylinders of ice which fall by gravity into the ice crusher or auger assembly. Here, the curved ice is cracked into irregular shapes and sizes. The ice crusher or auger then delivers the ice into the bin or bunker. A mechanical bin control stops the machine when the bin is full.

The Arctic-Temp® ice maker consists of four interrelated subsystems as follows:

Refrigeration System The Arctic-Temp® refrigeration system offers the ultimate in simplicity. The basic refrigeration system includes a non-circuited Arctic-Temp® evaporator and a dependable Copeland® compressor. The Arctic-Temp® refrigeration system is readily maintained with standard service tools and procedures and differs from a standard refrigeration system only in its simplicity.

Refrigerant Condensing System The Arctic-Temp® ice maker employs the dependable Copeland® Discus® or Scroll compressor with a matched condensing unit. This condensing method produces adequate capacity. A fan cycling control maintains head pressure.

Process Water System Ice making water is recirculated by centrifugal pump from the stainless steel sump, which utilizes a float valve to maintain the proper water level. Water flows onto both the inner and outer evaporator surfaces by simple tubed water distributors that require no maintenance other than occasional cleaning.

Ice Handling System At completion of the freeze cycle, hot gas from the compressor is introduced into the evaporators. Gravity forces the ice to slip from the evaporator surfaces into the ice crusher assembly, where the curved ice is cracked into irregular shapes and sizes. The ice crusher or auger then delivers the ice into the bin or bunker. A mechanical bin control stops the machine when the bin is full.

The Arctic-Temp® ice maker presents no peculiar, complex, or out-of-the-ordinary hookups in any of its subsystems. Most replacement parts are readily available at local supply houses.

CONTROLS

Cycle Timer Arctic-Temp® ice makers utilize a repeating cycle timer with a single cam to control the freeze and harvest cycles. The cycle timer cam allows for a total time of six (6) or eight (8) minutes (model dependent), with a portion (the indented segment of the cam) allocated for harvest (removal of ice).

The cam on the cycle timer can be rotated manually in either direction without damaging the timer mechanism.

Normal timer operation and accompanying functions are described below:

Freeze cycle Freezing time is 92.5% of the total cycle time. This would be seven minutes twenty-four seconds of the eight-minute cycle, or five minutes and thirty-three seconds on the six minute cycle. During this cycle, the compressor and water pump are running, with the crusher motor not running and the hot gas valve(s) closed. At the end of the production cycle, the roller on the bottom microswitch enters the indent on the timer dial and starts the harvest cycle.

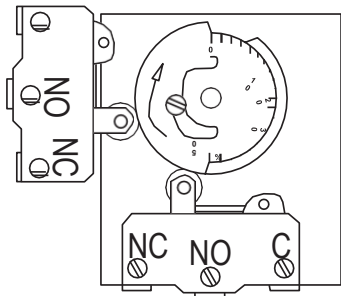
Harvest cycle Harvest time is 7.5% of the total cycle time (plus the time in the positive harvest mode; see E-4). During this cycle, the compressor is running, the water pump stops, the crusher motor starts, and the hot gas valve(s) open. The length of time in the Positive Harvest Mode will depend on the ambient temperature. Longer time in cold weather and shorter time in warm weather.

Most cycle timer problems are attributable to failed microswitches or microswitch roller guides that are not centered on the edge of the cam. Misalignment of roller guides is due to loose or defective mounting screws.

See timer drawings and related functions, p. E-4.

CYCLE TIMER FUNCTIONS

FREEZE CYCLE

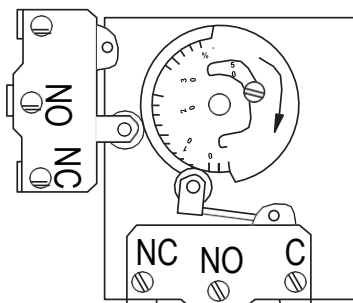
Bin Control Lockout
Micro SwitchRotating
CamPrimary
Micro Switch

Freezing time is approximately 90% of the total cycle and controlled by a repeating cycle timer with a single cam.

1. Compressor is running.
2. Recirculating water pump is running.
3. Hot gas solenoid(s) are/is closed.
4. Ice crusher motor is off.

When the timer has reached the end of the freeze cycle, the roller on the micro switch will enter the detent position of the cam the primary micro switch and initiate the harvest cycle.

HARVEST CYCLE

Bin Control Lockout
Micro SwitchRotating
CamPrimary
Micro Switch

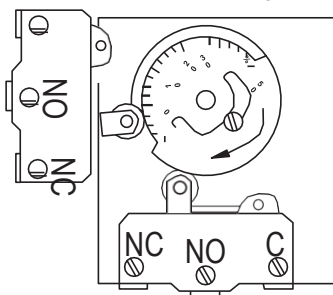
Harvest time is approximately 10% of the total time cycle.

1. Compressor is running.
2. Recirculating water pump is stopped.
3. Hot gas solenoid(s) are/is open.
4. Ice crusher motor is on.

At the start of this cycle, the positive harvest control (PHC) pressure switch and its associated relay/pilot light will operate and hold the timer motor out of the electric circuit until the suction pressure reaches the set point of the pressure switch (see C-2 for recommended set point) at which time the ice will start to drop and enter the crusher. All ice should be off the evaporators and through the crusher within 10-15 seconds. The harvest cycle will continue for another 20-30 seconds period which is called overrun. At completion of overrun, the freeze cycle is initiated.

Note: When red pilot light is on, timer is stopped.

BIN LOCKOUT

Bin Control Lockout
Micro SwitchRotating
CamBin Control Lockout
Micro-switchRotating
CamPrimary
Micro Switch

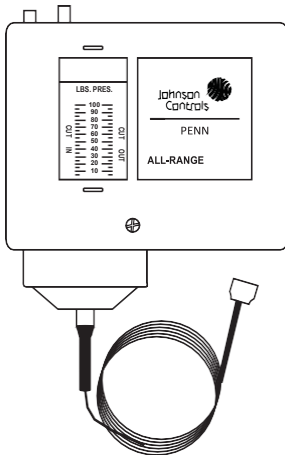
Bin thermostats, mechanical bin controls, and remote OFF/ ON switches may be activated at any time during the freeze and harvest cycles. Machine operation will continue upon opening any of these controls, and machine shutdown will be delayed until the roller on the bin control lockout micro switch is in the detent position of the cam.

Low ambient thermostats when activated, (optional on some machines) will shut the machine down with this lock-out.

Note: Most cycle timer problems are attributable to failed micro switches or roller guides that are not centered on the edge of the cam.

MACHINE CONTROLS

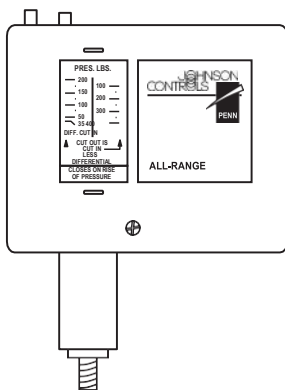
POSITIVE HARVEST CONTROL — PENN P70CA-1



The positive harvest uses a reverse acting low pressure switch, a normally closed relay, and a pilot light to indicate when the timer is stopped. The purpose of this control is to allow increased time in the harvest mode for more definite harvesting in lower ambient temperatures. Correct fan switch setting is imperative for this to operate properly. Incorrect fan switch settings or low refrigerant charge could result in prolonged operation in harvest, and possibly resulting in to supply the compressor with sufficient cooling.

As the suction pressure drops to 40 to 50 PSIG, the positive harvest switch closes, but nothing happens as it is not in the electrical circuit. When the machine enters the harvest mode, this switch is powered from the timer N.C. terminal and energizes the relay, opening the normally closed contacts, lighting the red pilot light, and stopping the timer. This allows additional time in harvest during colder ambient temperatures. When the suction pressure rises to the set point of the pressure switch, the switch opens, de-energizing the relay, closing the N.C. contacts, starting the timer motor again. The timer then completes the harvest cycle.

FAN CYCLING CONTROL — PENN P70AA-118



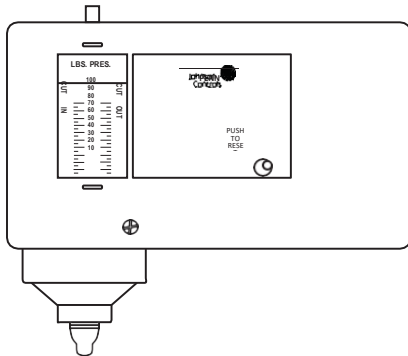
To assure enough heat to harvest the ice, head pressure is controlled by fan cycling pressure switch(es). The models 500, 750, and 5200 have only one fan. The models 1000 and 1500 have two fans and use two fan controls. It is imperative the fan(s) are cycling at the proper settings. Refer to C-2 for setting(s) and adjust the switch setting(s) by using manifold gauges. **DO NOT SET BY THE POINTERS ON THE CONTROLS.** Incorrect fan settings could also result in other than head pressure problems. It is a good practice to verify fan settings as the first step when checking out problems with the machine.

Mechanical Bin Control A mechanical flapper device is used to terminate ice production when the storage bin or bunker is full. It is recommended for use in refrigerated, freezer, and other applications that would adversely affect the use of a thermostat type control. This control will allow the ice maker to run until the flapper is held in the down position by accumulated ice. A secondary bin delay microswitch is used as a lockout feature. See drawing, p. E-4.

Dual Pressure Control Older machines used a dual pressure control safety cut-out. This control used a single switch which opened on too high a head pressure or too low suction pressure. The servicer could not tell which problem caused the machine to stop. On the newer machines, that problem has been solved by using two separate switches, one for high and another for low pressure conditions.

MACHINE CONTROLS

LOW PRESSURE CONTROL W/ TIME DELAY (Manual Reset) PENN P29NC-3



This control aids starting in low ambient conditions. The head pressure might not increase fast enough because of the cold condenser coil and receiver, to force enough refrigerant through the expansion valve(s) to raise the suction pressure above the cut-out set point. A standard low-pressure switch would shut the machine down even though no problem exists, possibly resulting in several “nuisance” trips and repeated re-setting. With this control, there is a 60 second delay between reaching the set point and machine shutdown.

Adjust the setting on this control requires a voltmeter and a manifold gauge.

Turn the cut-out well below the desired setting. Throttle the suction service valve until the suction pressure is at the desired setting (refer to C-2). Attache the meter leads to terminals 1 & 2 in the control. It should read line voltage. Slowly raise the cut-out adjustment until the meter drops to zero (0-) volts. This is the correct setting. Hold this pressure for 60 seconds and the machine should shut off. Open the suction service valve all the way to return to operation. Ambient temperature will affect the actual time-to-trip.

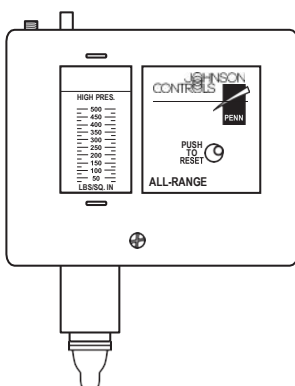
NOTE: Models 750/5200/1000 are equipped with a Motor Overload Protection Device (Klixon) that opens in the event compressor temperature or amperage reaches an extreme that could damage the compressor. The device automatically reset after the compressor has cooled.

On older machines using the SENTRONIC oil protection safety switch, should the Klixon stop the compressor, 120 seconds later the oil pressure switch will open because it senses no oil pressure. When the service person arrives and finds the oil pressure tripped, the “obvious” answer is an oil problem, and not a compressor overload trip. On newer units, the protector used is a CoreSense which senses amp draw to the compressor. If there is no amp draw, the oil switch will not trip.

THE MODEL 500 DOES NOT HAVE AN OIL PRESSURE SWITCH.

WARNING: If the machine is off on the **Oil Pressure Control**, or as a result of the **Motor Overload Protection Device**, the control cycle timer and other components will continue to function although the compressor is off. **The machine or any of its components, INCLUDING THE ICE CRUSHER ASSEMBLY, can start without warning and cause serious personal injury.**

HIGH PRESSURE CONTROL (Manual Reset) PENN P70DA-1



All currently manufactured machines no longer use the dual pressure switch, but two separate high and low pressure switches. Should the machine experience a high-pressure condition, the high pressure switch opens, and all functions of the machine will stop. Ther machine will not re-start until the reset button on the switch is pressed.

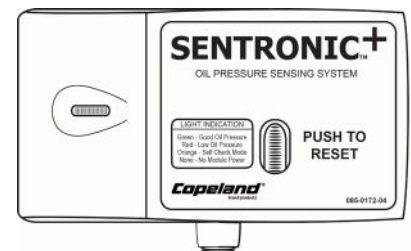
Oil Pressure Controls

Beginning in February 2011, Copeland began supplying compressors with a combination oil and amperage sensing device called CoreSense. Prior to this, the compressors came with only an oil pressure device called Sentronic. Both controls are referenced in this manual.

WARNING: ALL MACHINES EXCEPT THE MODEL 500 HAVE AN OIL PUMP. SHOULD THE OIL SAFETY SWITCH STOP THE COMPRESSOR, THE EVAPORATOR WILL CONTINUE TO GO THROUGH ITS SEQUENCE OF PRODUCTION AND HARVEST, RESULTING IN THE CRUSHER OR AUGER MOTOR STARTING WITHOUT WARNING. THIS COULD RESULT IN SEVERE INJURY.

Copeland Sentronic Oil Pressure Control – Manual Reset

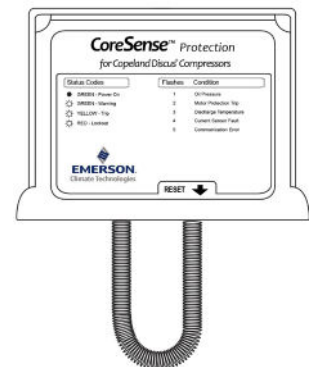
This electronic device consists of a manual reset control with a time delay, and a pressure differential sensing unit in the oil pump. If the net oil pressure (oil pump pressure less suction pressure) drops to below nine (9) pounds for 120 seconds, the Sentronic unit stops and locks out the compressor.



NOTE: Under this condition, the evaporator section continues to go through its cycle, resulting in the crusher motor starting without warning.

Copeland CoreSense Safety Switch – Manual Reset

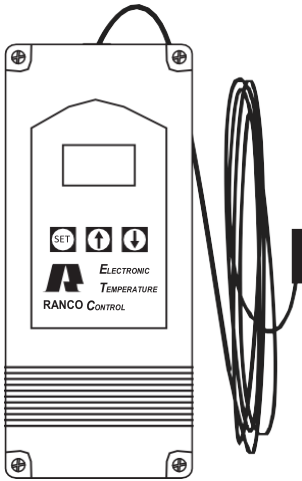
This control replaces the Sentronic oil safety switch, and the Kriwan motor overload on the model 1500 and larger machines. It senses a compressor current overload condition or a loss of oil pressure. Unlike the Sentronic unit, if the motor overload causes the compressor to stop, the oil pressure feature will not trip. The servicer would know an oil problem did not cause the shut-down.



NOTE: Under this condition, the evaporator section continues to go through its cycle, resulting in the crusher motor starting without warning.

Some things that can cause the Sentronic to “trip”:

1. Failed control module or pressure differential sensor.
2. Refrigerant overcharge.
3. Failed crankcase heater resulting in refrigerant migration.
4. Loss of oil from the crankcase due to excessive blow-by and failed crankcase check valve.

ELECTRONIC THERMOSTAT — RANCO ETC 111-000-000

Though our evaporator section will operate at any ambient temperature above freezing, some customers want the machine to shut down before reaching freezing ambient temperatures. We supply an optional thermostat to do this. This control can also be used as a high temperature cut-out in high ambient locations as in our south-western states. It operates with the bin control to shut the machine down. The AMBER pilot light will turn on as when the bin is full.

For low Ambient Cut-Out

The factory set point is 50 degrees Fahrenheit with a 5-degree differential. This will shut down the machine at 45 degrees, and re-start at 50 degrees. The thermostat is set in the H-1 program.

For High Ambient Cut-Out

Choosing the set point for a high ambient cut-out will depend on how much stress you are willing to put on your compressor. The set point is the temperature you wish to shut down the compressor. The differential setting will allow the compressor to re-start. The thermostat is set in the C-1 program.

To Set the Thermostat

- Step 1** Press "SET" key to select F or C (Fahrenheit or Celsius)
- Step 2** Press "SET" key to select "set point" (low ambient set point minus differential=machine stops, high ambient set point machine stops.)
- Step 3** Press "SET" key to select differential.
- Step 4** Press "SET" key to select H1 for low ambient or C1 for high ambient cut-out.

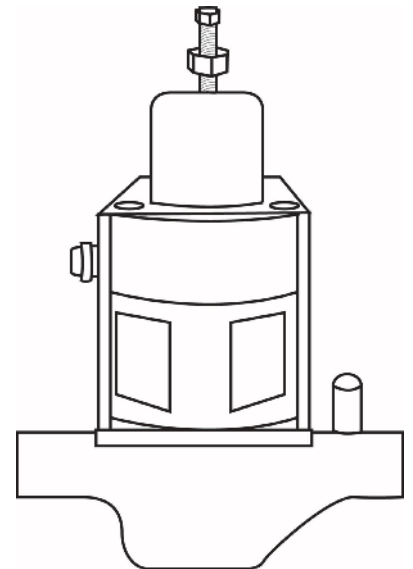
Low Ambient Controls

The low ambient control system consists of a pressure regulating valve in the discharge line, a transfer line and solenoid valve connected from the condenser coil inlet to the suction line at the accumulator inlet. When the machine enters the harvest mode the harvest valves open, the bypass solenoid valve opens and the pressure regulator valve closes. This allows all of the compressor discharge gas to be diverted to the harvest valve(s). The transfer line allows gas from the top of the condenser coil to be drawn into the suction line to add more refrigerant to the harvest circuit.

To adjust the valve, a gauge must be connected to the access port on the inlet of the valve.

On machines manufactured after 2010, there is a bypass tube around the pressure regulating valve (PRV) with a ball valve to be closed in winter, making the PRV operable. With the ball valve open for summer operation, there is no resistance to the flow of refrigerant. The PRV system should be bypassed in summer. In high ambient temperatures, it can fail to open quickly enough to avoid a high pressure switch trip.

On older machines, the valve must be set to "OPEN" for summer use. To set to "OPEN", turn the AUTO/OPEN screw out (counterclockwise).



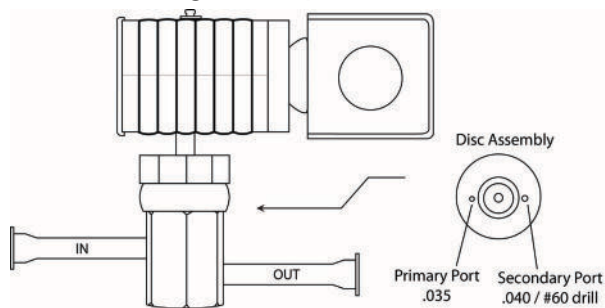
Adjusting The Pressure Setting

The valve (PRV) must be set to “AUTO” to make any adjustment. The AUTO/OPEN adjustment screw is under the acorn nut shown on the drawing. The screw is a “captive” screw, so it cannot come out of the valve. Turn the screw in (clockwise) to set it to “AUTO” before adjusting the pressure setting. See page C-2 for setting.

The 5/16” square head screw is for adjusting the pressure setting. Adjustments are to be made at the beginning of the harvest cycle. With a pressure gauge attached to the tap on the inlet of the valve, as soon as the pressure has equalized, turn the adjusting screw clockwise to raise the set point or counterclockwise to lower.

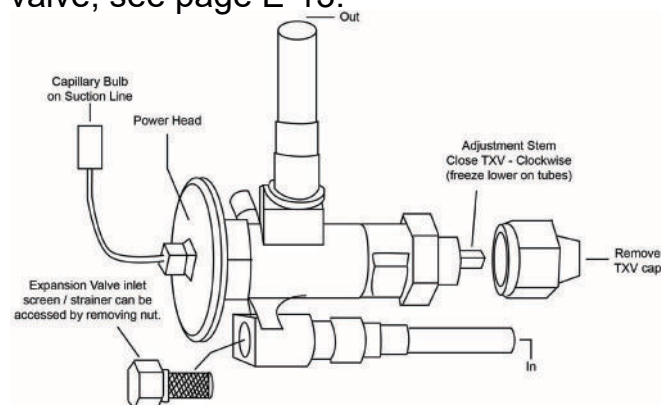
Hot Gas Solenoid Valves

Arctic-Temp® ice makers use hot gas solenoid valves to harvest the ice. One solenoid valve and one expansion valve for each two evaporators. We use a Sporlan E10S240-20. The standard E10S240 will not work on R-404A and some other refrigerants. The valve sometimes fails to close, resulting in no ice production and perhaps not enough cooling for the compressor. The -20 denotes two bleed ports to allow more refrigerant to move above the disk allowing more pressure to close the valve.



Thermostatic Expansion Valves

The expansion valve(s) are adjusted at the factory during machine testing. The valve has an inlet strainer to trap any debris in the system after the drier. To clean the strainer, the machine must be pumped down as with any procedure requiring opening the refrigerant system. Adjustments in the field are seldom necessary, but if it should be required as in replacing the valve, see page E-13.



EXPANSION VALVE

Expansion valves have been set prior to shipping. Field experience proves that expansion valve adjustment is rarely necessary. Before making any adjustment to the expansion valve(s), the technician should rule out other machine and system conditions that mimic a defective or misadjusted expansion valve.

Reduced ice production could be the result of problems in the water supply, circulating water pump, water distributors, or refrigerant level and these should be checked prior to attempting an adjustment of the expansion valve.

The expansion valve should not be suspected for frosting the body of the compressor where water is not being evenly distributed over the evaporators. A visual check should be performed to confirm that all water distributors—both inner and outer—are feeding and that ice is being produced on both the inside and outside walls of the evaporators.

Excessive head pressure may indicate that resulting superheat would require closing the expansion valve. The cause of the excessive head pressure should be determined and corrected.

The above-described conditions could cause the sight glass to have the appearance of refrigerant shortage. To add refrigerant under these conditions could cause compressor damage.

Before adjusting the expansion valve(s) or adding refrigerant, be absolutely certain that water problems do not exist. If it is necessary to adjust an expansion valve(s), never adjust it more than a quarter turn either way at any time. After a quarter turn, observe the machine to determine if the desired corrective action is evident.

A properly charged and adjusted machine will not slug at any time and should produce freeze scallops of ice at the top of the cylinder below the water nozzles. Excessive opening of the expansion valve(s) will produce compressor frosting, slugging, and likely result in compressor failure.

The expansion valve bulb should be firmly secured to a clean suction line that is well insulated.

RECIRCULATING WATER SYSTEMS

Most problems with ice makers can be traced directly to the condition of the water system.

The quality of the water and water treatment devices determine how often the system must be cleaned. To ensure proper operation, the system must be kept free of mineral buildup in the sump, water distributors and on the evaporator surfaces.

Prevention of mineral buildup and suspended particles in the system is accomplished by installing a water treatment system to treat the specific problem(s) that might exist with the local water supply. It is recommended that a reputable company specializing in water treatment perform an analysis of the water to determine if treatment of the water system is required.

It is advisable to install a large capacity strainer in the water supply line to protect the float valve from dirt or solids in the water which would require frequent cleaning. A strainer of size forty mesh screen is acceptable.

Cleaning Procedure

1. Turn the machine to OFF immediately after harvest.
2. Cover or remove ice from storage area to avoid contamination.
3. Turn the water supply off and drain sump tank.
4. Flush out any loose deposits from the sump.
5. Close drain and fill sump to depth shown in the chart. Tip: warm water will expedite the cleaning process.
6. You can use standard ice machine cleaner. Using "nickel safe" ice machine cleaner is not necessary on our machines.

Refer to the following graph for your machine model:

MODEL	WATER DEPTH	CLEANER
500	2"	3 oz
750 / 5200	2"	4 oz
1000	2"	6 oz
1500	3"	12 oz

7. Turn the pump on by placing the toggle switch in the "PUMP" (down) position.
8. Circulate the cleaning solution for fifteen (15) minutes (the acid will not work much beyond fifteen minutes). If all lime deposits are not removed, drain, flush all water from the sump and refill with water. Circulate the water for a minute or two, then drain and flush the sump

again. Re-fill and add ice machine cleaner again.

9. Turn the toggle switch to "OFF" position and drain and flush the sump. Remember: There is still an acid residue that must be disposed of accordingly.
10. Close the drain and refill the sump with clean water. Allow the pump to circulate fresh water to flush out any acid remaining. If there are still lime deposits on the ice making surfaces or water distribution tubes, repeat steps 5, 6, 7, 8, 9, and 10.
11. If all deposits have been removed, repeat step 10 at least twice.
12. Clean the inside of the ice storage area and remove any solution that might have entered during the cleaning process. Do NOT use steel wool to clean any stainless-steel parts.
13. Remove the cover (if used to protect the ice) from the ice bin.
14. The machine is now ready to resume production.

**** If the pump should become inoperative and require replacement, disconnect the incoming power at the disconnect prior to any repairs. Exact pump replacement is suggested.**

ICE CRUSHER ASSEMBLY SYSTEM

DANGER: Disconnect electrical power and lock out machine before attempting any repairs to the ice crusher assembly, bearings, or motor drive. This device may start without warning and special precautions are necessary to avoid personal injury. The control toggle switch does not isolate the crusher motor from the power source.

Ice Crusher Arctic-Temp® ice makers use a rotating ice crusher to fragment the ice during the harvest cycle. The ice crusher assembly is kept centered by alignment of the drive sheave on one end and a set collar on the opposite end.

Delivery Auger The model 1500 machines have a delivery auger for crushing and delivering the ice into the ice bin.

Bearings Externally mounted self-aligning bearings support the crusher assembly. This will allow for minimal lateral movement while keeping the ice crusher properly centered. The drive sheave and set collar are set with a lateral clearance of 3/16" on the 5/8" shaft, and 1/4" on the 1" shaft.

The wooden ball can be affected by moisture, which will result in swelling. If proper clearance is not allowed, the ball will expand against the set collar and sheave resulting in a locked crusher or a crusher with additional drag. As a result, the crusher motor may draw excessive amperage causing the internal motor overload to trip. If this occurs, the machine will freeze up, and eventually, suction pressure will decrease until the low-pressure safety control is tripped.

Crusher Motor and Belt The ice crusher motor and belt should be adjusted to ensure that the motor, sheave, and belt are in direct alignment with the sheave on the ice crusher assembly shaft. The belt should be maintained in good working order and replaced if worn or stretched.

The belt should be tight enough to avoid slipping when starting or crushing ice. **CAUTION: Do not overtighten the belt. Overtightening will cause the wooden ball insert to elongate, producing water leakage and bearing and shaft failure.**

In the event the ice crusher assembly requires removal, follow this procedure:

1. Disconnect power to the machine.
2. Locate the five (5) three-eighths inch (3/8") hex nuts securing the assembly on the sheave drive side.
3. Split the rubber insulation and remove the hex nuts.
4. Remove the set collar from the opposite end of the shaft.
5. Slide the assembly through the evaporator housing opening on the drive end.

See exploded view drawing, p. D-5.

COMPRESSOR

When starting and charging the Arctic-Temp®, the oil sight glass in the crankcase of the compressor should be watched carefully for the first hour of operation to determine that proper lubrication is maintained. The oil may become low in the crankcase on an initial startup if the electrical current has been interrupted to the machine, thereby deenergizing the compressor crankcase heater.

Before starting the machine again, the crankcase heater should be energized for a period of at least two (2) hours to evaporate refrigerant that may have condensed in the crankcase during the shutdown period. If the level is low after startup, it should begin to return after a short period of operation.

Frequently check the oil level to ensure that a sufficient amount of oil remains in the crankcase. Oil should be visible and splashing occurring while the machine is running. To obtain an accurate oil level, observe the sight glass when the machine is running. The oil level should cover one-half (1/2) to two-thirds (2/3) of the sight glass.

The machine was shipped with a correct oil charge. However, it may be necessary to add some oil on remote piping of considerable length or when more refrigerant is added. *Note: POE 32 or an equivalent is recommended.*

Oil Pressure Control (NOT ON THE MODEL 500) The compressor on models 750, 5200 1000, and 1500 are protected by a Copeland CoreSense oil pressure control. This electronic unit consists of a manual reset control with a time delay and uses a sending unit attached to the oil pump to monitor oil pressure electronically. No capillary tubes are used with this control.

If the net oil pressure (*net oil pressure is pump pressure minus the suction pressure*) falls below the differential setting of 9 PSIG, the compressor will continue to run for 120 seconds attempting to build the required oil pressure. If the differential pressure has not been achieved within the delay period, the switch contact will open and stop the compressor. After a short period of time, the switch can be reset manually, and the machine restarted. **CAUTION: When this switch causes the machine to stop, the cause should be identified and corrected before resuming operation. In order to avoid certain compressor failure, this switch should never be bypassed or jumpered.**

WARNING: If the machine is off by the oil pressure control, the control cycle timer and other components will continue to function although the compressor is off. The machine or any of its components can start without warning resulting in serious personal injury.

REFRIGERANT SYSTEM

Adding Refrigerant Unless the refrigerant charge has been lost, do not add refrigerant until after several harvest cycles have been completed. Occasionally you will see slight bubbling in the sight glass. This does not necessarily signify a refrigerant shortage. **Note: Do not charge by filling the sight glass for the full production cycle.** Bubbling in the sight glass will be affected by ambient air temperature and fan cycling.

The information presented in this manual regarding installing and servicing the Arctic-Temp® industrial ice machine is intended for use by individuals possessing adequate backgrounds of electrical, refrigeration, and mechanical experience. Any attempt to repair major equipment might result in personal injury and property damage. The manufacturer cannot be responsible for the interpretation of this information, nor assume any liability in connection with its use.

Special Precautions to be Observed When Charging Refrigeration Systems

Only a technically qualified person, experienced and knowledgeable in the handling and operation of refrigeration systems, should perform the operations described in this manual. **Follow all Federal and local regulations when handling refrigerants.**

Safety goggles should be worn during refrigerant handling and charging operations.

If a refrigeration system is being charged from refrigerant cylinders, disconnect each cylinder when empty or system is fully charged. Install a gauge in the charging line to indicate refrigerant cylinder pressure. Close the refrigerant charging valve and cylinder valve before disconnecting the cylinder. Loosen the refrigerant charging line slowly to make sure refrigerant pressure between the cylinder valve and charging valve is relieved.

WARNING: Always close the system charging valve before the harvest cycle is initiated. Never leave a refrigerant cylinder connected to the system except during the charging operation. Failure to observe either of these precautions might result in possible overfilling the refrigerant cylinder causing it to rupture due to pressure from expansion of liquid refrigerant.

Prior to Startup Each Arctic-Temp® ice maker is charged with the type and amount of refrigerant as indicated on the machine data plate and also listed in the Model Specifications sheet. The refrigerant charge has been isolated in the condensing unit.

Before shipment of the machine, the compressor service valves, hot gas ball valve, and receiver service valve have been closed. A placard on the condensing unit warns that these valves must be opened prior to startup. Before opening these valves, it is advisable to check all joints for leaks which may have occurred during shipment.

BLEED-OFF

The Arctic-Temp® ice maker is equipped with a bleed-off tube (the smaller of the two tubes at the rear of the sump). The function of a bleed-off is to discharge some of the water from which the ice is being made. This will maintain the solids content of the sump water at a lower concentration and, therefore, less minerals will precipitate out into the sump, distribution tubes, and evaporator. If the water and ice are of sufficiently good quality, the bleed-off need not be used. Where a water softener is used, the bleed off will not be necessary unless it is desired to make clearer, harder ice. Where frequent sump cleaning or acid cleaning is necessary, the use of the bleed-off will greatly extend the time interval between cleanings.

The volume of water to bleed off will depend upon the mineral content of the local water. More bleed-off can be produced by lowering the vertical end of the bleed-off tube inside the sump.

If the bleed-off is not desired, merely leave the plastic cap over the end of the three-eighths inch (3/8") stainless tube at the rear of the sump.

Troubleshooting

MACHINE WILL NOT RUN

The first test is to turn the toggle switch to “PUMP” position; if the pump runs, you have power to the machine, and control circuit breaker or fuses, and safety switches are closed. **CAUTION: If the pump runs, then evaporator section will go through its program; the crusher motor will start without warning and could result in severe injury.** Skip to number 3 below. If the pump does not run, the problem could be:

1. No power from the supply Check for voltage on the “L” side of the compressor contactor.
2. If line voltage is there, check for voltage on the “L” contacts of the contactors in the timer box. If voltage is not there, check for tripped circuit breaker or blown fuses in the control circuit. Next check the high and low pressure safety switches. If you read voltage across the terminals, the switch is open and must be re-set. If the voltage reads “0” volts across the terminals and voltage from either terminal to ground, the switch is closed and not the problem.
3. The micro switch on the upper left side of the timer is for the bin control. If this switch is in the indent of the timer dial, the machine could be off by the bin control. Push the micro switch arm out toward the switch body. If the machine starts, then the bin control has the machine off. **The following test must be done with the bin micro switch in the timer dial indent.** Check the voltage across the bin relay coil (24 volts). If voltage is there but the bin is not full, check the bin flapper to be sure it is in the “UP” position. It could be jammed in the down position indicating a full bin. If no voltage is there, check the transformer secondary for voltage output. If no voltage is there, replace the transformer. If voltage is there, disconnect the main power to the machine, disconnect one lead from the bin relay terminal #1 or #2 and check for continuity across terminals #1 and #2. If there is no reading, replace the bin relay.

Completing these tests, should isolate the problem to the condensing unit.

Failure of the compressor to run. All compressors have internal overload protection. If the compressor is off due to a tripped overload, the compressor will not run, but the evaporator section will go through its timer sequence. The ice crusher will start and could result in severe injury. If the compressor overload is tripped, the compressor must cool down before it will automatically re-set. For the models 750, 5200, 1000, or 1500, the CoreSense could be tripped. This would be the result of a low oil pressure problem or motor overload trip. On older machines using the Sentronic oil

switch, if the compressor overload trips, the Sentronic will trip leading the mechanic to think it was an oil problem when it was an electrical fault instead. Refer to page E-7 for information on this control.

LOW ICE PRODUCTION

Low refrigerant charge. While this is a possibility, many other things could be the cause. Adding refrigerant before checking the other possibilities could result in damage to the machine.

Leaking hot gas solenoid valve(s) Lack of frost or warm to the touch on the outlet tube could indicate a leaking valve. A higher suction pressure just before harvest than the referenced pressure listed on page C-2, could indicate a leaking valve.

Insufficient water flow on the evaporators. This could also result in the low pressure switch shutting the machine down.

Check for:

- Low water level (water supply pressure, float valve adjustment)
- Blocked pump inlet (sediment in the sump requiring cleaning)
- Leaking sump drain seal
- Pump overheating and shutting down

Excessive head pressure. *This would result in less refrigeration effect for ice making, and a higher amp draw.*

Check for:

- Dirty or crushed coil fins
- Overcharged or non-condensable in the system
- Defective fan motor or fan control switch
- Condensing unit location allows coil discharge air to recirculate through the coil

Bin control shutting the machine down: See page F-2

Defective compressor: Valve plate requiring replacement

Expansion valve(s) out of adjustment: This is possible, but seldom the problem. See page E-9 to verify if adjustment is required.

EVAPORATOR FREEZE-UP

This term refers to the icemaker failing to harvest the ice and builds up sometimes becoming a solid block on the evaporator tubes. There are several conditions that can result in this occurring:

A power failure lasting long enough to allow the ice accumulated on the evaporator tubes to loosen and slide down on the ice crusher or auger. When the power is restored, the machine starts again, freezing more ice on the evaporators. When the machine enters the harvest cycle, it is possible for the ice to jam the crusher or auger, and the motor might not have enough torque to rotate the crusher. This possibility is rarely considered because the technician is looking for a machine problem.

Too much air moving through the condenser coil can cool the refrigerant temperature below what is required to harvest the ice. This could be **wind** blowing through the coil or the **fan switch** could be out of adjustment. **VERIFYING THE SETTING OF THE FAN SWITCH SHOULD BE THE FIRST CHECK TO BE MADE WHEN A PROBLEM EXISTS. A FAN CYCLING AT IMPROPER SETTING CAN RESULT IN OTHER INDICATIONS THAT WOULD BE CORRECTED BY A PROPERLY SET SWITCH.**

Low ambient temperature can keep the head pressure below fan cycling pressures. Refer to the LOW AMBIENT CONTROL SYSTEM on page E-8

Positive harvest control out of adjustment (see E-5) can result in the machine exiting harvest before the ice has cleared the crusher or auger. This could block it from rotating at the next harvest, resulting in a freeze-up.

Defective: Timer, micro switch, harvest contactor, crusher motor or belt, solenoid valve or coil, bin transformer, relay, or balance switch.

Worn crusher/auger drive belt. We do not recommend adjusting the belt tension. If the belt is loose, replace the belt. Over-tightening the belt could result in abnormal wear to the bearing and possibly scoring the shaft, requiring replacement.

CLEARING THE ICE FREEZE-UP Place the toggle switch in the "PUMP" (down) position and let the water circulate over the evaporators. Melting the ice can be expedited by attaching a drain tube from the sump drain to a convenient location and using a garden hose to melt the ice if one is available. Be sure to melt the ice in the center of the evaporators. Failing to do so, will result in another freeze-up.

CAUTION – NEVER USE ANY TOOL (HAMMER, SCREWDRIVER ETC) TO REMOVE THE ICE FROM THE EVAPORATORS. DAMAGE COULD RESULT, REQUIRING REPLACING THE EVAPORATOR(S).

ADDITIONAL TROUBLESHOOTING

Low Suction Pressure: Insufficient water flow over the evaporators. Check for plugged water distribution nozzles, blocked water pump inlet, low water level in sump.

Compressor Runs, But Fan(s) Do Not :

Defective fan switch, defective motor or blocked fan blade. Loose wire connections. Defective capacitor. Blown fuses or tripped circuit breaker. Defective contactor.

Water Pump Runs, Compressor Does Not:

Tripped overload or CoreSense. Defective capacitor (single phase machines). Defective contactor. Defective compressor.

Compressor Runs, Water Pump Does Not:

Defective pump or contactor. Timer stuck in HARVEST.

Insufficient Water Across Tubes:

Clogged pump inlet or distribution tubes, machine needs cleaning. Low water level in the water sump.

Additional Product Information