



Installation & Operation Manual



ICE ABOARD, WHERE & WHEN YOU WANT IT

Polar Cap Ice Machine

Produces up to 540lbs of ice per day.

Dimensions: 18.5" x 11" x 15"

Weight: 85lbs

Power: 5.8 Amps 120 VAC / 60 Hz

3.0 Amps 230 VAC / 60Hz

2.6 Amps 220 VAC / 50Hz

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Thank you for purchasing Frigibar Polar Cap Ice Machine. Frigibar equipment has a well -deserved reputation for excellent performance, long term reliability and outstanding post sale support. To ensure that this equipment delivers the same degree of service review this guide carefully before you begin your installation and operation. Should you have the need for technical support, please call our technical service department at 954- 523-3300 or email to info@Frigibar.com. Please have your model number, serial number and a complete detailed explanation of the problem when contacting us. We hope you find that our equipment meets or exceeds your expectations.

Getting Started

Unpacking:

After uncrating and removing all packing materials, Inspect the equipment for concealed shipping damages. All Freight is to be inspected upon delivery. If visible signs of damage exist, please refuse delivery or sign your delivery receipt “damaged”. Contact Frigibar customer service within 48 hours at 954 523 3300 or info@Frigibar.com . Wherever possible please include detailed photos of the damage with the original packaging so that we may start the freight claim process.

Equipment identification:

Please note your equipment identification number upon receipt for future records.

Serial number: _____

Date of purchase: / /
 Month Day Year



Important cautions

Moving parts.Do not operate with front cover removed.

Hot parts.Do not operate with cover removed.

To reduce risk of shock, disconnect power before servicing.

Most ice machine cleaners contain citric or phosphoric acid, which can cause skin irritation.Read caution label on product and follow instructions carefully.

The equipment operates with compressed refrigerant at high pressures. Proper care must be taken during installation, operation and servicing to prevent injury or loss of life.

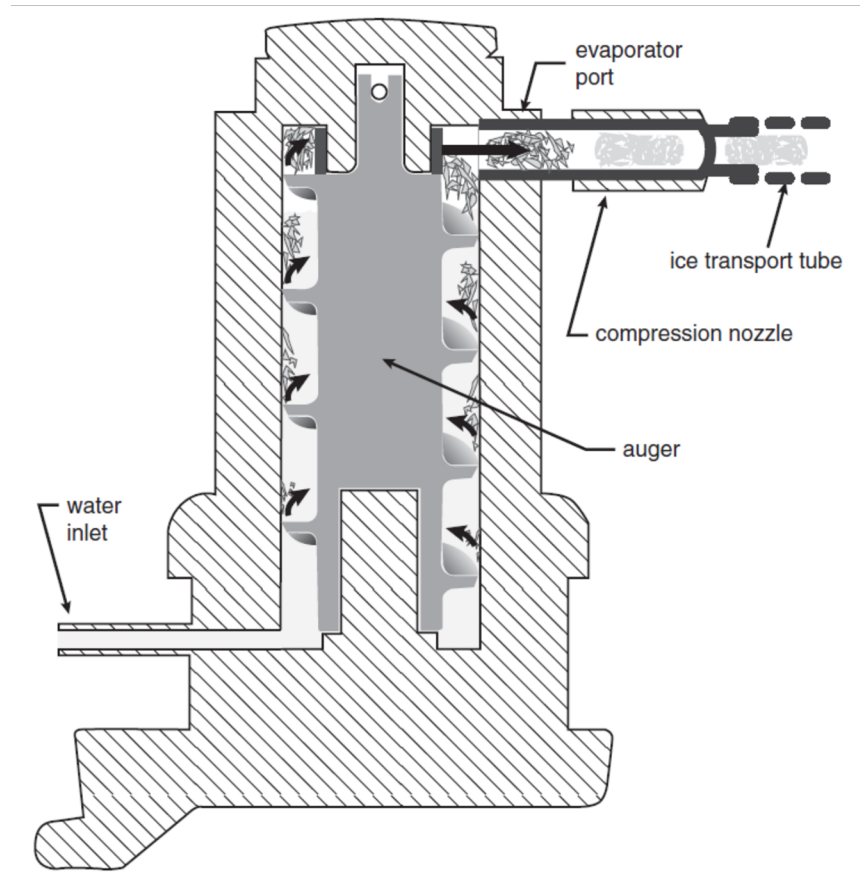
Ice is food.Follow recommended cleaning instructions to maintain cleanliness of delivered ice.

Do not use solvents, abrasive cleaners, metal scrapers or sharp objects to clean any part of the dispenser.

Your Ice Machine system uses the environmentally safe refrigerant R 404A. Federal law forbids the intentional release of any refrigerant gas into the environment. Make certain that any field service is performed by a

ICE MAKING AND REFRIGERATION BASICS

ICE MAKING PROCESS: fresh water is applied to the interior wall of the evaporator shell. Using a refrigeration process, heat is removed from the fresh water in order to freeze it. As the water freezes onto the wall of the evaporator shell, the auger scrapes it off and into a discharge port. The ice shavings are then compressed and pushed into the ice transport tube which runs to the ice-collection bin.



THE REFRIGERATION PROCESS: The basic principle of an ice machine system is that a liquid refrigerant absorbs heat as it turns into a gaseous state (evaporates) and releases heat as it turns back into a liquid state (condenses). The system consists of five main components: • **Evaporator** - Absorbs heat from the fresh water in the evaporator shell causing the fresh water to freeze. • **Auger** - Scrapes the frozen fresh water from the interior sides of the evaporator shell and extrudes it into the discharge hose. • **Condenser** - Releases heat into the system's circulating seawater and turns the refrigerant gas back into a liquid. • **Compressor** - Drives the refrigerant through the loop. • **Metering Device** - Meters the flow of refrigerant to the evaporator. The ice maker's refrigerant compound has a very low boiling point. It flows in a closed loop between an evaporator and a condenser, alternately absorbing and releasing heat. This process removes the heat from the fresh water in the evaporator/ auger assembly and causes the fresh water to freeze on the inside of the evaporator wall. The heat absorbed by the refrigerant is transferred to the seawater. A water pump circulates seawater through the inner tube in the condenser coil which cools the refrigerant in the outer tube and condenses it from a gas into a liquid. The heat from the refrigerant is exchanged to the seawater and discharged overboard. The liquid refrigerant is then pumped through the evaporator coil and the cycle repeats.

THE EFFECT OF TEMPERATURE ON ICE PRODUCTION

WATER TEMPERATURES Seawater and freshwater temperatures affect the ice machine's efficiency and capacity. The system is most efficient when the seawater and freshwater temperatures are 55-80°F (13-27°C). The ideal temperature for both is 70°F (21.1°C). See Figure 3. High Temperatures - As water temperatures approach 90°F (32°C) and above, the water's ability to absorb heat diminishes, so the capacity of the system decreases. Also, when seawater temperature increases above 90°F (32°C), the system could sustain a high pressure shutdown to protect the compressor. Low Temperatures - As water temperatures approach 45°F (7.2°C) and below, the water's ability to provide heat exchange diminishes, so the capacity of the system decreases. Also, as the water temperature decreases, the system could sustain a low-pressure shutdown to protect the compressor. **AIR TEMPERATURE** The Effect of Ambient Air Temperature The ambient air temperature affects the ice machine's efficiency and capacity, but not as significantly as the water temperatures. The system is most efficient when the ambient air temperature is 55-80°F (13-27°C). At temperatures above and below this range, ice production will decrease.

CAUTION Extreme care should be taken in operating any unit below seawater temperatures of 45°F (7.2°C). The seawater could freeze in the condenser tubing, possibly causing it to burst, which is not covered by the warranty.

AIR TEMPERATURE The Effect of Ambient Air Temperature The ambient air temperature affects the ice machine's efficiency and capacity, but not as significantly as the water temperatures. The system is most efficient when the ambient air temperature is 55-80°F (13-27°C). At temperatures above and below this range, ice production will decrease

Specifications

Electrical

Each ice machine requires a separate circuit.

Equipment ground required.

Standard electrical – 115 V, 60 Hz, 1 phase / 230 V, 60 Hz, 1 phase / 220 V, 50 Hz, 1 phase

Connect to a dedicated 15A circuit.

Maximum ice machine amperage – 11A each.

Electrical system



ATTENTION!

To prevent circuit breaker overload, wait 15 minutes before restarting this unit. This allows the compressor to equalize and the evaporator to thaw.

Normal control board operation

The PC board indicator lights provide all the information necessary to determine the machine's status. Green indicator lights generally represent "go" or normal operation; Yellow indicators represent normal off conditions; Red indicators generally represent alarm conditions, some of which will lock the machine off. A flashing green light labeled POWER indicates power to the machine. All other normal operation status indicators are covered as follows:

Ice machine disposition	Operating conditions
Legend: ● ON ○ OFF ● ON or OFF ● FLASHING	
1. Ice machine is making ice. CLEANER FULL DRAIN CLOG HI PRESS HI AMPS SERVICE MAINT/CLEAN LOW WATER TIME DELAY SLEEP CYCLE MAKING ICE LOW BIN POWER ON	1. Normal running.
2. Ice machine is not making ice. CLEANER FULL DRAIN CLOG HI PRESS HI AMPS SERVICE MAINT/CLEAN LOW WATER TIME DELAY SLEEP CYCLE MAKING ICE LOW BIN POWER ON	2. Normal time delay. When the bin fills with ice, the LOW BIN light goes out momentarily and the refrigeration and auger drive systems immediately shut down. (Note: The fan motor will continue to run for 10 minutes to cool condenser) The TIME DELAY light comes on, initiating the time delay period. When the time delay expires, the machine will restart provided that the LOW BIN light is on.

Plumbing

3/8" FPT water inlet

3/8" MPT drain

1/2" FPT condenser inlet

1/2" FPT condenser outlet

Notes:

Slope to drain of 1/4" per foot (6 mm per 30.4 cm run) with a 1/2" min. is recommended.

Water shut off recommended within 10 feet (3 m), drain to be hard piped and insulated.

Separate drains for ice machine and condenser. To prevent back flow, do not connect drains.

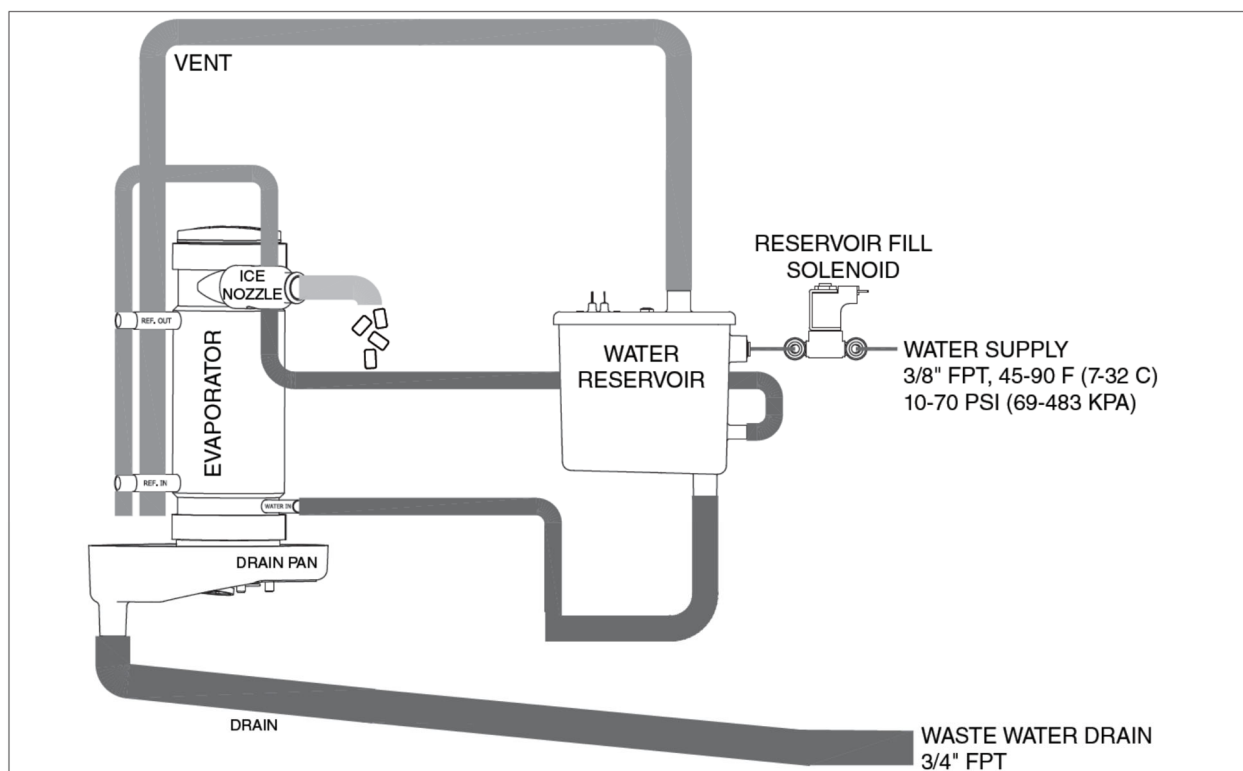
WATER SYSTEM

The water level in the evaporator is controlled by the solenoid and level detecting sensors. Water sensing rods extend down into the reservoir at the end of the evaporator assembly. The system works via electrical conductivity as follows.

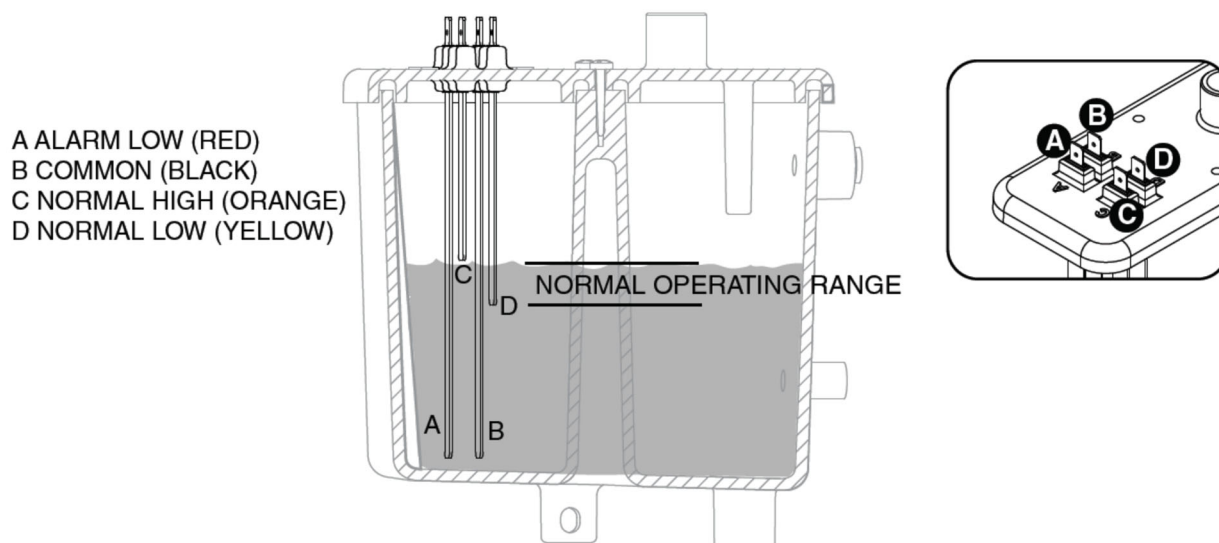
One of the longest probes is a common. When water is between any of the other probes and the common, the PC board will sense the activation. During normal operation, the water level rises and falls between the Normal High and the Normal Low sensors. As water is consumed to make ice, the level will fall until the Normal Low sensor is exposed, triggering the water feed solenoid on. Water will fill until the Normal High sensor is activated.

NOTE: The potable water dissolved solids content must be greater than 10 ppm for the water control system to function properly. If using a reverse osmosis water filtration system, ensure TDS level is greater than 10 ppm.

WATER SYSTEM DIAGRAM



WATER LEVEL DIAGRAM



Water usage water-cooled condenser

0.25 gpm @ 50 F (10 C)

0.5 gpm @ 70 F (21 C)

1.25 gpm @ 90 F (32 C)

Ambient

Air temperature* 100 F/38 C max. 50 F/10 C min. (best performance below 80 F/27 C)

Water temperature+ 90 F/32 C max. 45 F/10 C min. (best performance below 70 F/21 C)

Water pressure 70 psi max. (482 kPa) 10 psi min. (68 kPa)

Condenser watertemperature90 F/32.2 C max. 45 F/7.2 C min

Condenser waterpressure125 psi (862 kPa) max. 10 psi (68 kPa) min.

* Ambient air temperature is measured at the air-cooled condenser coil inlet.

+ Ambient water temperature is measured in the ice machine reservoir.

Refrigeration pressure data

Water regulating valve is factory set at 300 (+ - 10) PSIG head pressure.

Reading within 10% of table values should be considered normal.

All service on refrigeration systems must be performed in accordance with all federal, state and local laws. It is the responsibility of the technician to ensure that these requirements are met.

Recharging the ice machine to other than factory specifications will void the warranty and cause damage to the equipment.

R404A ice machine charge specification:

POLAR CAP	Water Cooled	9 oz.	R404A
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Compressor data

Locked rotor amps 58.8A

Compressor current Water-Cooled

Water Temperature at float	50 F/10 C	60 F/15.6 C	70 F/21.1 C	80 F/26.7 C	90 F/32.2 C
Amperage	5.6 A	5.6 A	5.7 A	5.8 A	5.8 A

Water cooled Ice Machine Refrigeration Pressure

Discharge Pressure/Suction Pressure

Water cooled Ice Machine Refrigeration

Pressure

Condenser Inlet water temperature F/C				
F/C	50/10	70/21	90/32	
50/10	280/27	285/29	290/31	psi
70/21	280/27	285/29	290/21	psi
90/32	280/27	285/29	290/31	psi

Installation Procedures

This section covers the installation procedures for your ice-making system. Read the manual completely before attempting to install any equipment.

CHOOSING THE CORRECT EQUIPMENT VOLTAGE

Know the frequency and voltage provided where your ice-making system will be used Do not operate a 60Hz unit on 50Hz power, as this will cause damage and void the warranty. The voltage in a given location may be higher or lower by as much as 10% and the system will still operate correctly. For example, in a 60 Hz environment you may see 110 VAC to 120 VAC.

INSTALLING THE UNIT SELECTING THE SITE

Never install the unit in the bow of the boat. Frigibar POLAR CAP ice-machine units are designed to be installed in any convenient location on the transom, in the aft, or in a machinery space that does not require ignition protection that is as far aft of midship as possible. The unit can be installed in living areas if necessary. Some considerations: This equipment is not ignition protected per CFR 183.410 and may not be installed in areas that may be exposed to flammable gas. The unit will produce condensation, so the drip pan is necessary. The unit is water cooled and does not need direct ventilation, but do not install in a sealed space. The space around the unit may be insulated to reduce noise if necessary.

SITE LOCATION CHECK LIST

Location is aft of midship. Never install the unit in the bow of the boat.

Location is not exposed to flammable gas.

Location provides adequate space for access to refrigerant, seawater, and electrical connections.

Location provides accessibility for service and maintenance.

Location is away from direct spray, from engine air intakes, and from water washdown.

MOUNTING THE UNIT

Do not remove any covers, caps, or fittings that may expose any wiring until you are ready for those steps of the installation.

Base mount: horizontal surface, orient the unit so the seawater, and electrical connections are accessible and use the mounting plate to secure it.

Bulkhead mount: vertical surface, orient the unit so the seawater, and electrical connections are accessible and use the mounting plate to secure it.

If pump wires need to be extended by butt connections, make sure they are tightly crimped, and heat shrunk. AC power source must be installed and grounded/bonded in accordance with ABYC standards. Connect control wires to terminal strip with ring terminals.

INSTALLING CONDENSATE DRAINAGE

The condensate drain pan is 2.0" (51mm) high with one drain location. During conditions of high humidity, condensate may be produced at a rate of approximately one quart per day. It is important to route condensate drains downward to a sump pump. It is not recommended to route condensate drains to the bilge.

After the condensate drain installation is complete, test the installation by pouring one quart (liter) of water into the pan and checking for good flow.

INSTALLING THE ICE DELIVERY HOSE

PLANNING THE ROUTE

The maximum length of the ice delivery hose is 25 feet under ideal conditions.

Note: Frigibar additional kit sold separately includes 25' Delivery hose and proximity sensor with wire.

The best hose routing provides a level but slightly up route travel from the ice machine to the ice storage box with very few bends.

INSTALLING THE FEEDWATER SYSTEM

Feedwater for the Polar Cap Ice Machine should be fresh water supplied by the boats potable water system. The water reservoir has a float switch to ensure the unit does not operate without a water supply. Supplies feedwater must have a pressure of at least 15 PSI. The water supply must be able to supply at least 4 GPH when the ice machine is operating.

WARNING: Use of saltwater as feedwater will damage auger components and evaporator barrel causing system failure and void of all warranty.

INSTALLING SEAWATER COLING SYSTEM

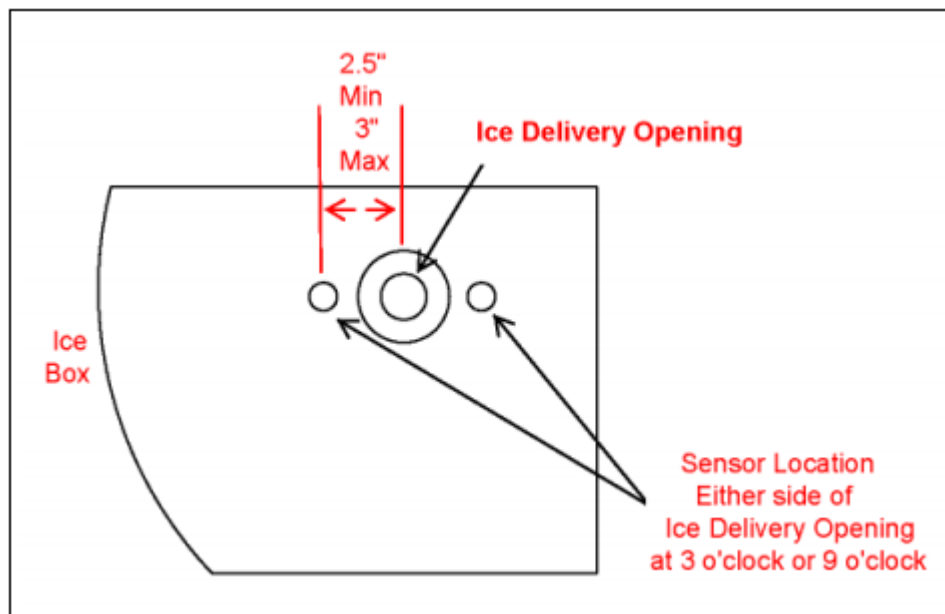
SELF-DRAINING SYSTEM: Seawater systems that are plumbed incorrectly can cease ice production as well as damage the pump. It is imperative that the seawater piping be routed continually uphill from the thru hull to the condenser, and smoothly up or down to the overboard discharge without any dips or loop also only one high point in the system. This type of routing is called self-draining because all water will drain out of the piping when the boat is taken out of the water. If air gets into the system, it can be trapped in the pump. A self-draining system allows air in the piping to rise naturally through the pump and be expelled.

INSTALLING THE ICE LEVEL SENSOR

To prevent overflow, this sensor stops ice production when the ice in the storage box reaches the level of the sensor. The drawing below will help you to determine placement for the ice-level sensor at the storage box location.

1. The sensor must be located 2.5" minimum to 3" maximum to the left or right side of the ice-delivery hole. Drill a 23/32" hole for sensor.
2. Use the 2 lock nuts provided to secure sensor into the hole.
3. Use marine-grade sealant around the hole if desired.
4. Route the cable to the ice maker's electrical box and plug the end into the ice-bin sensor socket.

Location of Ice-Level Sensor (front view)



MAINTENANCE

CLEANING SCHEDULE: Frigibar POLAR CAP ICE MACHINE machine and dispensers are designed for us with potable water sources. Periodic cleaning of the Ice machine system is required to ensure peak performance and delivery of clean sanitary ice. The recommended cleaning procedures that follow should be performed at least as frequently as recommended and more often if environmental conditions dictate. ** Clean Ice Machine prior to start up

POLAR CAP	FREQUENCY
Drain Line	Weekly
Drain Pan/ Drip Pan	Weekly
Condenser	Yearly
Ice Machine	Semi Annually
Transport Tube	Semi Annually

Maintenance:

Evaporator Cleaning: Every 6 months the evaporator should be cleaned by an authorized service agency.

Fresh Water Filter and Strainer: Change the filter at least twice per year, or every 1500 gallons whichever comes first. The correct filter helps prevent clogging of the needle valve and scale buildup within the evaporator chamber. Occasionally check the Y strainer and clean away any debris.

Auger Motor and Gearbox: The Auger and Gearbox are permanently lubricated and sealed and need no maintenance unless leakage or contamination has occurred.

Compressor: The compressor is a sealed system and requires no service.

Refrigerant Gas: The refrigerant gas included in the system is adequate for the life of the system and should not need routine or seasonal charging. If the need exists for charging, have a refrigeration specialist look for a refrigerant leak that needs repair.

Water Reservoir: If the water reservoir is contaminated, refer to the evaporator cleaning. Have an authorized service agency investigate, the water reservoir is the window to your evaporator's condition.

Feedwater Filter And Strainer: Change the filter at least twice per year, or every 1500 gallons whichever comes first. The correct filter helps prevent clogging of the needle valve and scale buildup within the evaporator chamber. Occasionally check the Y strainer and clean away any debris.

Winterizing the System: Close the seacock and remove the inlet hose from the condensing unit. Allow all water to drain from the system. Loosen screws on the pump head to allow water to drain from the pump. Cut off feedwater supply and drain the unit. Remove water from the water reservoir inside the unit. Use a shop wet vac to remove the water from the evaporator through the ice discharge spout tube or remove the water tank assembly from the spout and drain it.

TROUBLESHOOTING GUIDE

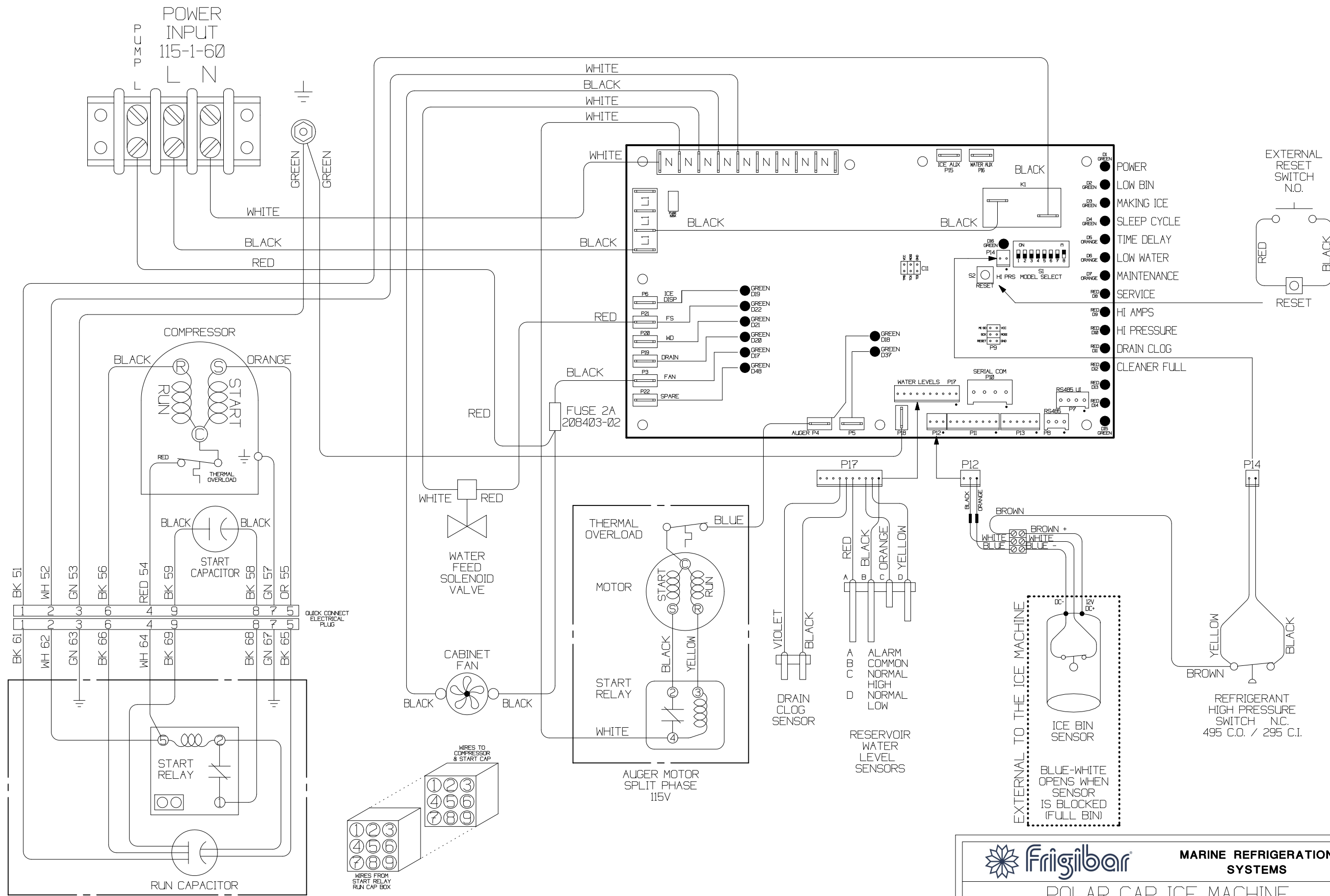
PROBLEM	POSSIBLE RESONS &SOLUTIONS
FEED WATER FAULT (HZO)	1. Check water pressure in boat's potable water system. 2. Check for a supply valve that has been turned off. 3. Check for a clogged feedwater filter 4. Check for clogged Y strainer located on the feedwater line of the unit. 5. Check for clogged needle valve in the water reservoir.
ICE DELIVERY VOLUME LESS OR SLOWER THEN EXPECTED	1. 1.High seawater temperature 2. High feedwater temperature 3. Low seawater flow, Check pump and strainer 4. Drive motor weak. Replace motor 5. Auger corroded or stained due to cater conditions. Clean and /or replace assembly 6. Inlet water filter or Y strainer partially clogged. Clean or replace filter. Remove clog. 7. Loss of refrigerant charge. Consult trained technician.
WATER LEAKS	1. Defective water seal. Replace seals. 2. Water level in reservoir to high. Adjust float.
DISPLAY CONSISTENTLY SHOWS FULL	1. Make sure ice sensor is installed in the ice storage box. 2. Check ice sensor for proper operation.
SQUEAKING OR GROANING NOISE COMING FROM EVAPORATOR/AUGER ASSEMBLY.	1. Normal during Ice production 2. No adjustment is necessary.
EXCESSIVE BUZZING, GRINDING NOICE FROM EVAPORATOR/AUGER ASSEMBLY. CONSTANT SOUND.	1. Mineral or scale deposit on auger and evaporator walls. Clean evaporator as described in Evaporator cleaning. 2. Low water supply. Check for filter or float valve failure. 3. Gear-reducer assembly loose on mounts, Tighten the mounts. 4. Gear-motor end-play or worn bearing, Replace worn part.
OIL IN AUGER ASSEMBLY DRAIN PAN.	1. Leaking water seals in the evaporator/auger assembly Replace seals.
UNIT DOES NOT OPERATE AT ALL.	1. Power switch is in the off position. Press power switch to turn unit on. 2. Check for tripped breaker or clown fuses. 3. Significantly low voltage to unit. 4. Misconnected or loose plugs or wiring.
HIGH PRESSURE FAULT (HPF)	1. Check seawater system for clogs, air trap, faulty pump, dirty strainer or condenser in need of descaling. 2. Faulty pump relay trigger at relay station if pump is used for more than one unit. Replace trigger.
LOW PRESSURE FAULT (LPF)	1. Low refrigerant charge. Have certified technician check the pressure.
ICE-CLOG	1. Check for obstruction at the ice discharge in the ice Storage box. 2. Check for frozen ice delivery hose 3. Check routing for dips or kinks in the ice delivery hose. 4. Check for auger motor failure.

TECHNICAL ASSISTANCE:

Frigibar, LLC Phone: [\(954\) 523 3300](tel:9545233300) info@frigibar.com

WARRANTY:

PRODUCT	SALE TYPE	WARRANTY COVERAGE
POLAR CAP ICE MACHINE	All Sales Type	1-Year warranty, parts and labor Not to exceed three (3) years from date of manufacture.



REV	DATE	BY	REVISION DESCRIPTION
B	220811	DN	ADDED 208502-10 FUSE HOLDER & 208403-02 FUSE TO PUMP CIRCUIT
C	220819	DN	CHANGED FUSE/FUSEHOLDER TO COMMON LINE AHEAD OF THE PUMP & FAN



MARINE REFRIGERATION
SYSTEMS

POLAR CAP ICE MACHINE
INTERNAL WIRING 115-1-60

DRAWING NUMBER	4016-51A	DRAWN BY	DN	DATE	6-17-21
SCALE	NONE	APPROVED BY		REVISION DATE	8-19-22
				REV	C

