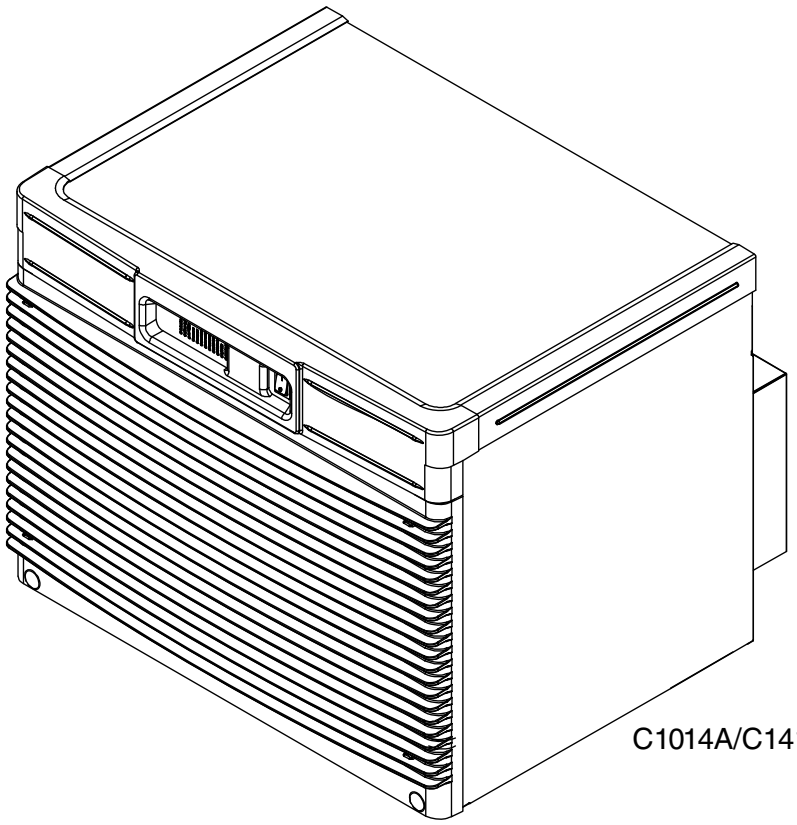
C1014A, C1414A/W
Horizon Elite™ Ice Machines (Self-contained), R290

Operation and Service Manual



C1014A/C1414A/W

Welcome to Follett

Follett equipment enjoys a well-deserved reputation for excellent performance, long-term reliability and outstanding after-the-sale support. To ensure that this equipment delivers the same degree of service, we ask that you review the installation manual (provided as a separate document) before beginning to install the unit. Our instructions are designed to help you achieve a trouble-free installation. Should you have any questions or require technical help at any time, please call our technical service group at (877) 612-5086 or +1 (610) 252-7301.

Before you begin

After uncrating and removing all packing material, inspect the equipment for concealed shipping damage. If damage is found, notify the shipper immediately and contact Follett LLC so that we can help in the filing of a claim, if necessary.

Check your paperwork to determine which model you have. Follett model numbers are designed to provide information about the type and capacity of Follett equipment.

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WARNING! Risk of fire or explosion. Flammable refrigerant used. Follow handling instruction carefully. To be repaired only by trained service Personnel.

WARNING! Do not puncture Refrigerant Tubing. Do not use this product with flammable gases or flammable solvents.

WARNING! Do not store flammable gases, flammable liquids or flammable solids in these units. Do not use FLAME to check for gas leak.

WARNING! Do not under any circumstances try to modify or repair valves, regulator, connectors, controls or any other appliance. Doing so creates the risk of a gas leak.

WARNING! Keep ventilaton openings clear of obstruction.

WARNING! Do not damage the refrigerant circuit.

WARNING! Connect to potable water supply only.

WARNING!

Installation

- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, personal injury, or death.
- The ice machine contains R290 (propane) refrigerant. R290 (propane) is flammable in concentrations of air between approximately 2.1% and 9.5% by volume. R290 (propane) may burn if exposed to a heat source above 470 °C.
- Because R290 is highly flammable, a combustible gas leak detector is required when servicing R290 systems.
- This equipment contains high-voltage electricity and refrigerant charge. Installation and Service repairs are to be performed by properly trained technicians aware of the dangers of dealing with high voltage electricity and refrigerant under pressure. The technician must also be certified in proper refrigerant handling and servicing procedures.
- All lockout and tag out procedures must be followed when working on this equipment.
- A qualified person shall provide a readily accessible disconnect device incorporated into the fixed wiring.
- This appliance should be permanently connected by a qualified person in accordance with application codes.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Do not tilt unit further than 30° off vertical during uncrating or installation.
- This appliance is designed for commercial use.
- This equipment is intended for indoor use only. Do not install or operate this equipment in outdoor areas.
- Warranty does not cover exterior or outside installations.
- To avoid a hazard due to instability of the appliance, it must be fixed in accordance with the instructions.
- Maintain all minimum clearances. DO NOT obstruct vents or openings.
- This appliance is not suitable for installation in an area where a water jet could be used.
- Connect to potable water supply only.
- Follett recommends a Follett water filter system be installed in the ice machine inlet water line (standard capacity, high capacity, carbonless high capacity).
- We reserve the right to make product improvements at any time. Specifications and design are subject to change without notice.

Usage

- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, personal injury, or death.
- User maintenance should not be done by children.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Routine adjustments and maintenance procedures outlined in this manual are not covered by the warranty.

- Maintain all minimum clearances. DO NOT obstruct vents or openings.
- This appliance must not be cleaned by a water jet.
- Connect to potable water supply only.
- Ice is food. Follow recommended cleaning instructions to maintain cleanliness of delivered ice.
- Ice is slippery. Maintain counters and floors around dispenser in a clean and ice-free condition.
- We reserve the right to make product improvements at any time. Specifications and design are subject to change without notice.

Service

- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, personal injury, or death.
- Review Installation section.
- This equipment contains high-voltage electricity and refrigerant charge. Installation and Service repairs are to be performed by properly trained technicians aware of the dangers of dealing with high voltage electricity and refrigerant under pressure. The technician must also be certified in proper refrigerant handling and servicing procedures.
- To reduce risk of shock, disconnect power before servicing.
- When servicing this equipment, be sure to lock the circuit breaker, and display an in-service notice.
- Repair on R290 systems must always be done in a well-ventilated area.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Only use parts recommended or provided by the manufacturer. Use of unapproved parts can be dangerous due to design requirements to safely use R290 (propane).
- Routine adjustments and maintenance procedures outlined in this manual are not covered by the warranty.
- Maintain all minimum clearances. DO NOT obstruct vents or openings.
- This appliance must not be cleaned by a water jet.
- Connect to potable water supply only.
- We reserve the right to make product improvements at any time. Specifications and design are subject to change without notice.

Decommissioning and Dismantling

- Read this manual thoroughly before operating, installing or performing maintenance on the equipment. Failure to follow instructions in this manual can cause property damage, personal injury, or death.
- Decommissioning and Dismantling are to be performed by properly trained technicians aware of the dangers of dealing with high voltage electricity and refrigerant under pressure. The technician must also be certified in proper refrigerant handling procedures for R290 (flammable) refrigerant.
- Review Installation section.
- Ensure area is being well-ventilated before Decommissioning and Dismantling of equipment using R290 (flammable) refrigerant.
- When servicing this equipment, be sure to lock the circuit breaker, and display an in-service notice.
- To reduce risk of shock, disconnect power before servicing.
- Utilize and maintain good safety practices and follow all applicable local, state, and federal regulations for proper decommissioning and disposal of the equipment.
- Ensure all personal protective equipment is used during the entire process.
- Ensure all necessary tools and equipment are available, including recovery equipment and cylinders.
- All containers used for recovery must have proper labelling to ensure they can be used for R290 (flammable) refrigerant.
- Before starting recovery, place refrigerants on scales. Do not overfill containers more than 80% of volume, and do not exceed working pressure of the container.
- Before using a recovery machine, ensure that it is in satisfactory working order and that the electrical components are properly sealed to prevent any type of ignition.
- Recovered refrigerant shall not be added or used in another refrigerating system or mixed into another container.
- If the compressor or compressor oils are removed, ensure it has been removed to an acceptable level so that flammable refrigerant does not remain in the lubricant.

Disposal

- Follow all applicable local, state, and federal regulations for proper disposal of the equipment.
- All recovered refrigerant must be returned to an appropriate refrigerant supplier for proper disposal.
- DO NOT dispose of your appliance with household waste.

Specifications

Electrical

Each ice machine requires its own separate circuit with electrical disconnect within 10 ft (6m). Equipment ground required.

Standard electrical:

- C1014: 208-230/60/1 (6 ft (2m) NEMA 6-15 cord and plug provided)
- C1414: 208-230/60/1 (6 ft (2m) NEMA 6-20 cord and plug provided)
- Amperage: C1014A: 10A, C1414: 14A, C1414W: 12.5A

Plumbing

⚠ WARNING

This equipment to be installed with adequate backflow protection to comply with applicable federal, state, and local codes.

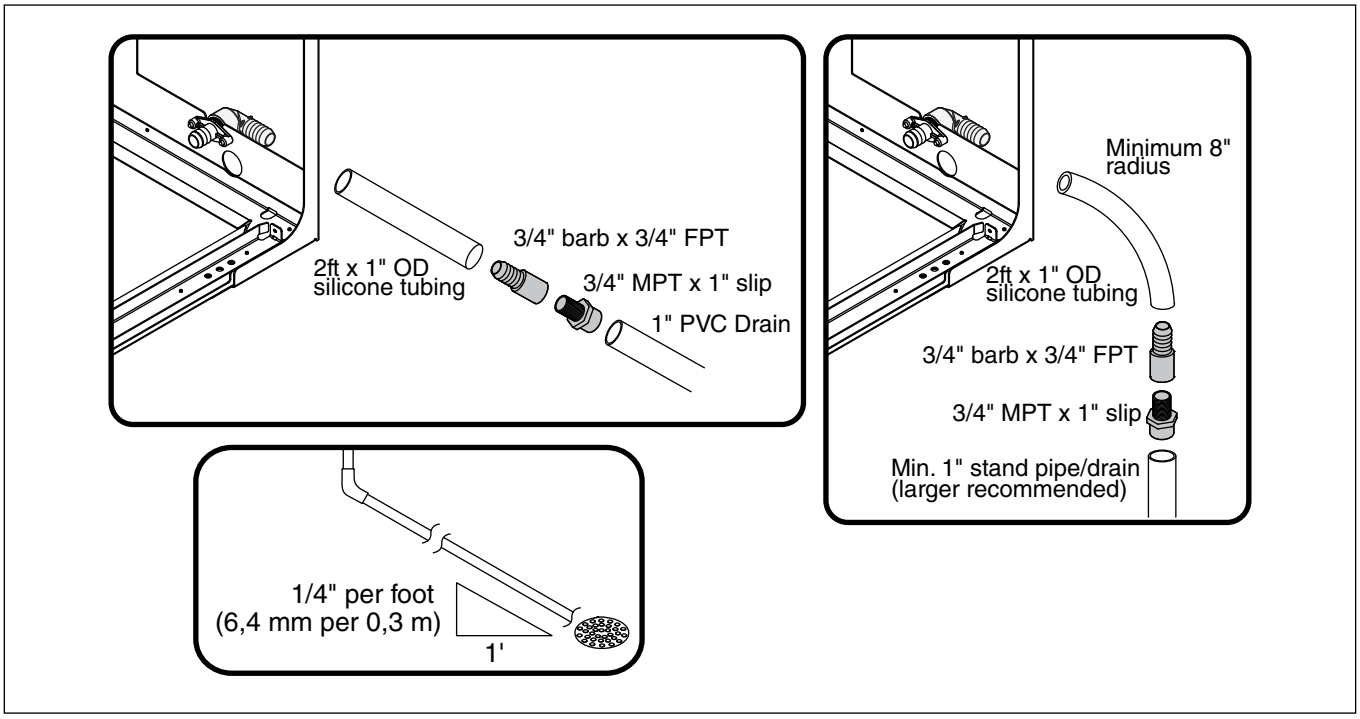
- 3/8" OD push-in water inlet - 3/8" OD tubing required
- 3/4" MPT drain
- 1/2" FPT condenser inlet (water-cooled condenser only)
- 1/2" FPT condenser drain (water-cooled condenser only)

Notes:

- Water shut-off recommended within 10 feet (3m).
- Water supply must have particle filtration. Follett recommends the filter system that has integral scale inhibitors. (Follett P/N CARBONSTDCAPSYSTEM).
- Follett does not recommend the use of water softeners or bowl scale inhibitors.

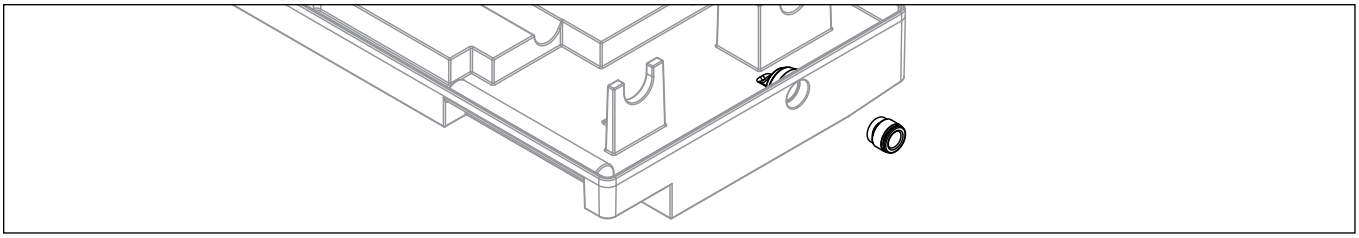
Flush drain plumbing

- 3/4" MPT flush drain connection at the rear of the machine.
- Drain must slope 1/4" inch per foot (6 mm per 30.4 cm).
- Drain line should not be shared with any other piece of equipment.
- Drain line cannot be reduced to a size smaller than 1 inch.
- Drain should be piped without a vent.



Chassis drain plumbing

- Route 3/8" drain tubing through knockout in back of docking station and insert fully into John Guest fitting connection at the rear of the machine chassis. Route other end of 3/8" drain tubing to drain.
- Drain must slope 1/4" inch per foot (6 mm per 30,4 cm).



Ambient

Air temperature	100 F/38 C max.	50 F/10 C min.
Water temperature	90 F/32 C max.	45 F/7 C min.
Water pressure – potable	70 psi max. (483 kPa)	10 psi min. (89 kPa)

Heat rejection

	1014	1414
Air-cooled	12,000 BTU/hr	15,500 BTU/hr
Water-cooled	—	15,500 BTU/hr

Weight

	C1014A	C1414A/W
Approximate ship weight	205 lb (93 kg)	235 lb (107 kg)
Approximate net weight	195 lb (88 kg)	225 lb (102 kg)

Ice production

1014 Air-cooled ice machine capacity/24 hrs.

Ambient Air Temperature F/C								
Evap Potable Water Temperature F/C	F	50	60	70	80	90	100	
	C	10	16	21	27	32	38	
	50	1071	1023	975	929	882	843	lbs
	10	486	464	443	422	400	383	kg
	60	1011	969	926	879	833	801	lbs
	16	459	440	421	399	378	364	kg
	70	952	915	878	830	783	759	lbs
	21	432	415	398	377	355	344	kg
	80	892	860	829	784	740	716	lbs
	27	405	391	376	356	336	325	kg
	90	832	806	780	738	696	674	lbs
	32	378	366	354	335	316	306	kg

C1414 Air-cooled ice machine capacity/24 hrs.

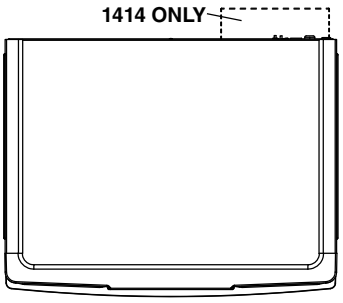
Ambient Air Temperature F/C								
Evap Potable Water Temperature F/C	F	50	60	70	80	90	100	
	C	10	16	21	27	32	38	
	50	1472	1426	1379	1319	1258	1180	lbs
	10	668	647	626	599	571	536	kg
	60	1394	1349	1303	1249	1195	1122	lbs
	16	633	612	592	567	543	510	kg
	70	1316	1272	1228	1180	1132	1065	lbs
	21	597	577	557	536	514	483	kg
	80	1237	1195	1152	1110	1069	1007	lbs
	27	562	542	523	504	485	457	kg
	90	1159	1118	1076	1041	1006	949	lbs
	32	526	507	489	473	457	431	kg

C1414 Water-cooled ice machine capacity/ 24 hrs.

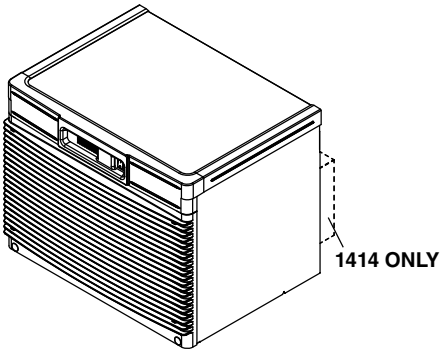
Condenser Water Temperature F/C								
Evap Potable Water Temperature F/C	F	50	60	70	80	90	100	
	C	10	16	21	27	32	38	
	50	1253	1264	1274	1205	1136	1038	lbs
	10	569	574	578	547	516	471	kg
	60	1201	1205	1209	1142	1075	984	lbs
	16	545	547	549	519	488	447	kg
	70	1149	1146	1144	1079	1015	930	lbs
	21	521	520	519	490	461	422	kg
	80	1096	1088	1079	1016	954	876	lbs
	27	498	494	490	461	433	398	kg
	90	1044	1029	1014	954	893	822	lbs
	32	474	467	460	433	405	373	kg

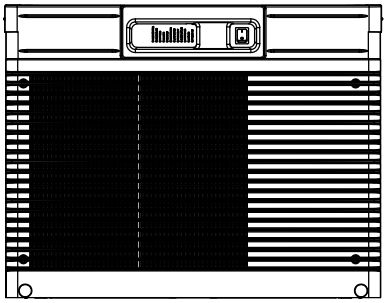
Dimensions and clearances

- Entire front of ice machine must be clear of obstructions/connections to allow removal.
- 1" (26 mm) clearance above ice machine for service.
- 1" (26 mm) minimum clearance on sides
- 3" (78 mm) minimum clearance at rear.
- The intake and exhaust air grilles must provide at least 250 sq in (1615 sq cm) of open area.
- Air-cooled ice machines – 18" (458 mm) minimum clearance between discharge and air intake-grilles.

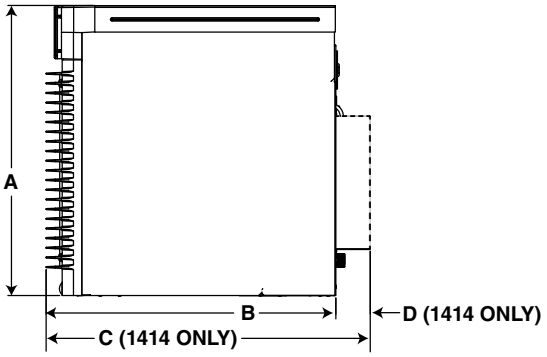


ICE MAKER TOP VIEW

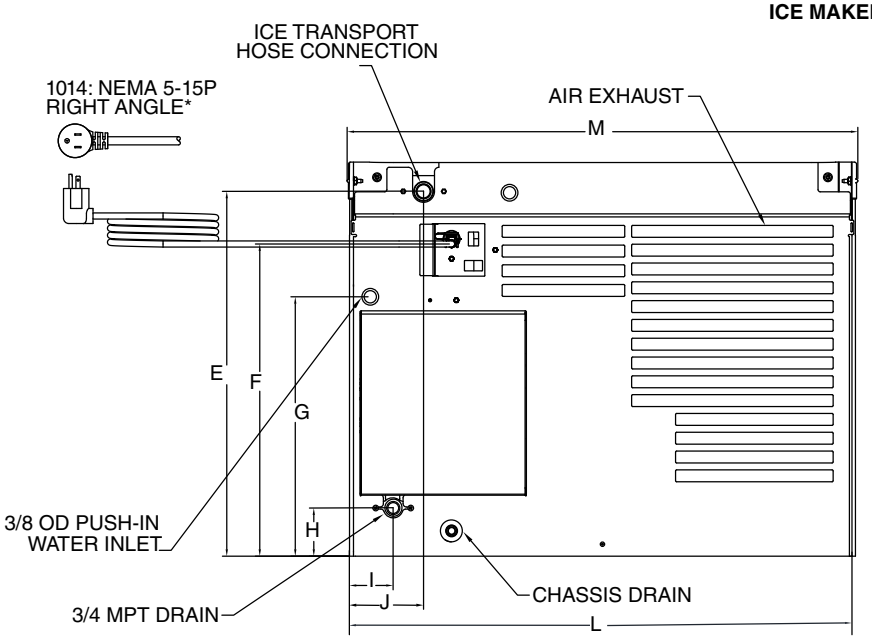




ICE MAKER FRONT VIEW



ICE MAKER SIDE VIEW



ICE MAKER BACK VIEW

A	22.51" (57.2 cm)
B	22.48" (57.1 cm)
C	25.15" (56.3 cm)
D	2.66" (6.8 cm)
E	20.84" (52.9 cm)
F	17.49" (44.4 cm)
G	15.00" (38.1 cm)
H	2.73" (6.9 cm)
I	2.30" (5.8 cm)
J	3.34" (8.5 cm)
K	10.44" (26.5 cm)
L	28.50" (72.4 cm)
M	29.15" (74.0 cm)

Operation

Cleaning/sanitizing and preventive maintenance (all models)

Note: Do not use bleach to sanitize or clean the icemaker.

Preventive maintenance

Periodic cleaning of Follett's icemaker 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.

Cleaning of the condenser can usually be performed by facility personnel. Cleaning of the icemaker system, in most cases, should be performed by your facility's maintenance staff or a Follett authorized service agent. Regardless of who performs the cleaning, it is the operator's responsibility to see that this cleaning is performed according to the schedule below. Service problems resulting from lack of preventive maintenance will not be covered under the Follett warranty.

Weekly exterior care

The exterior may be cleaned with a stainless cleaner such as 3M Stainless Steel Cleaner & Polish or equivalent.

Monthly condenser cleaning (air-cooled icemaker only)

1. Use a vacuum cleaner or stiff brush to carefully clean condenser coils of air-cooled icemakers to ensure optimal performance.
2. When reinstalling counter panels in front of remote icemakers, be sure that ventilation louvers line up with condenser air duct.

Semi-annual evaporator cleaning (every 6 months)

⚠ WARNING

- Wear rubber gloves and safety goggles (and/or face shield) when handling ice machine cleaner or sanitizer.

⚠ CAUTION

- Use only Follett approved SafeCLEAN Plus™ cleaning solution.
- DO NOT USE BLEACH.
- It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling.
- Read and understand all labels printed on packaging before use.

Note: Complete procedure for cleaning an sanitizing MUST be followed. Ice must be collected for 15 minutes before putting ice machine back into service.

1. Note position of TDS switch. Set to HIGH for duration of cleaning. Press the CLEAN button. The machine will fill and drain three times (**approximately 5 minutes**). The auger will run for a short time and then stop. Wait for the LOW WATER light to come on.

Fig. 1

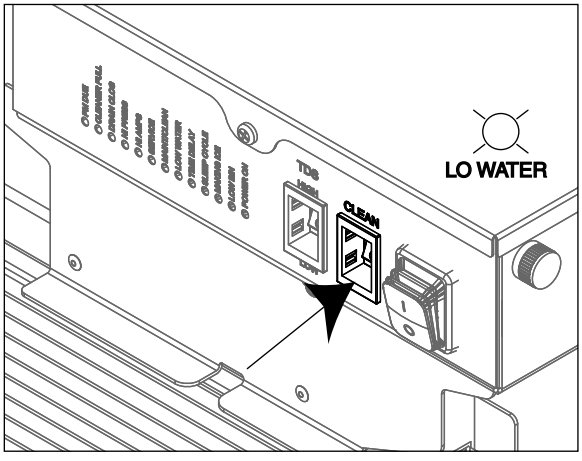
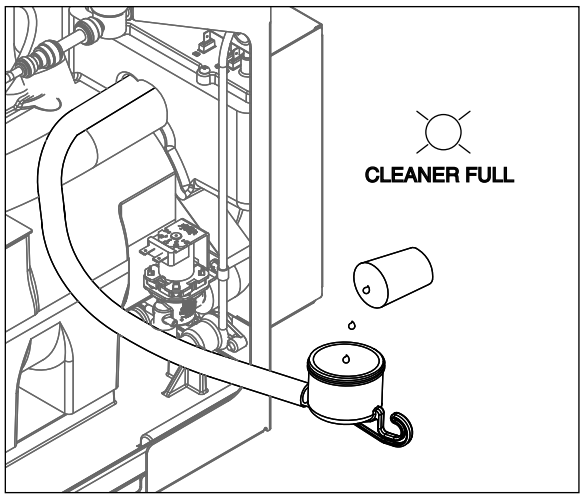


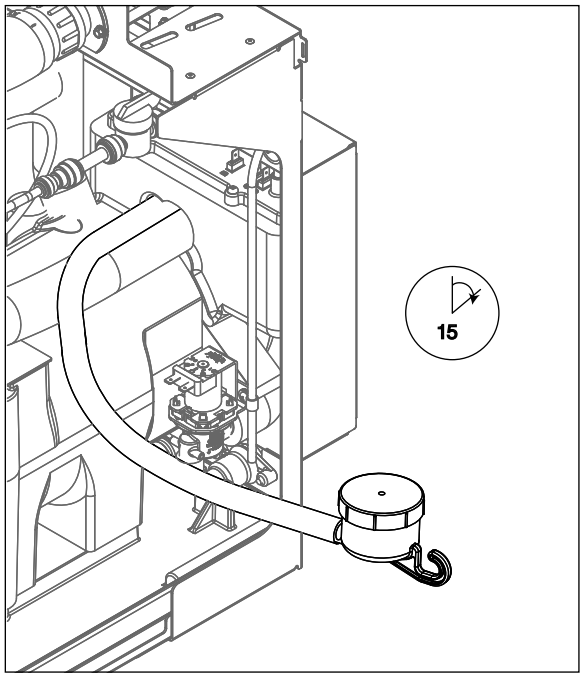
Fig. 2



2. Follow the directions on the SafeCLEAN Plus packaging to mix 1 gal. (3.8 L) of Follett SafeCLEAN Plus solution. Use 120 F (49 C) water.
3. Using a 1 quart (1 L) container, slowly fill cleaning cup until CLEANER FULL light comes on and cleaner just begins to flow from the vent tube.
4. Place plastic plug and four SaniSponge™ cleaning sponges in remaining sanitizing and cleaning solution and retain for Step 8.

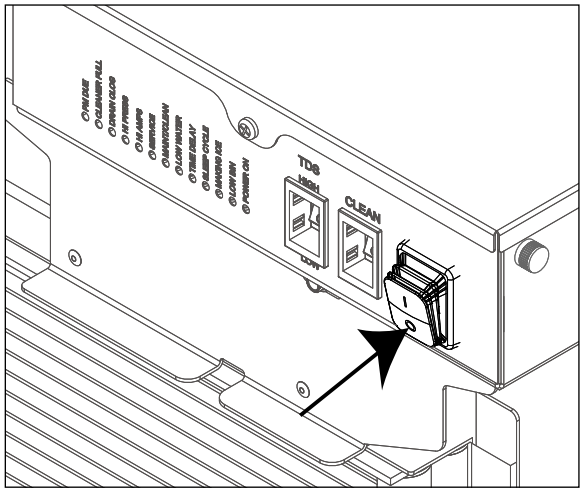
Note: Do not use bleach to sanitize or clean the icemaker.

Fig. 3



5. Replace cover on cleaner cup. Machine will clean, then flush 3 times in approximately 15 minutes. Wait until machine restarts.

Fig. 4



6. To clean/sanitize ice transport tube – Press power switch OFF

7. Disconnect coupling as shown.

Fig. 5

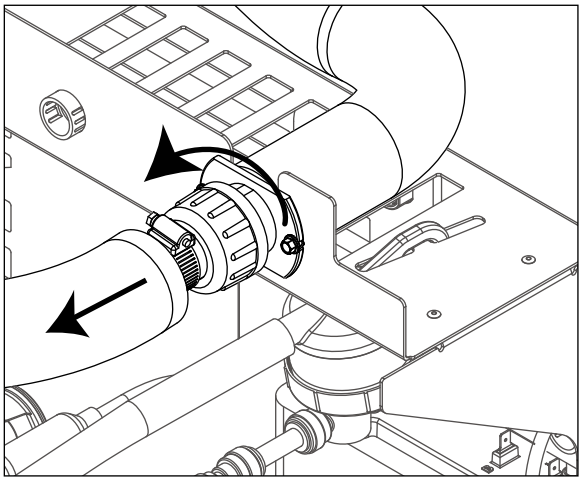


Fig. 6

8. Using disposable foodservice grade gloves, insert plastic plug (**Fig. 6.1**) followed by four SaniSponges (**Fig. 6.2**) saturated in cleaning solution (from Step 4).

9. Push plug and four SaniSponge cleaning sponges down ice transport tube with supplied pusher tube.

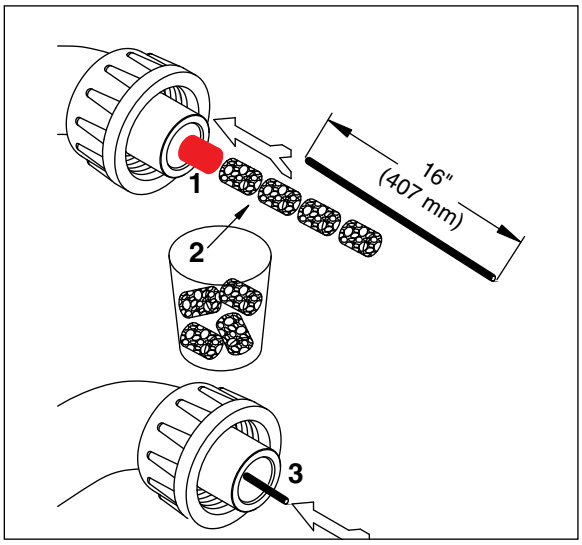
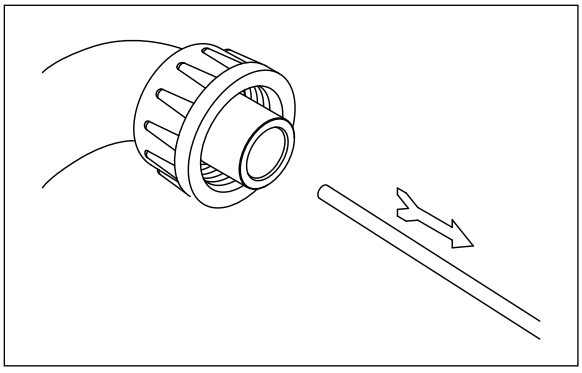


Fig. 7

10. Remove and discard 16 inch (407 mm) pusher tube.



11. Fill internal ice transport tube with remaining cleaning solution.

Fig. 8

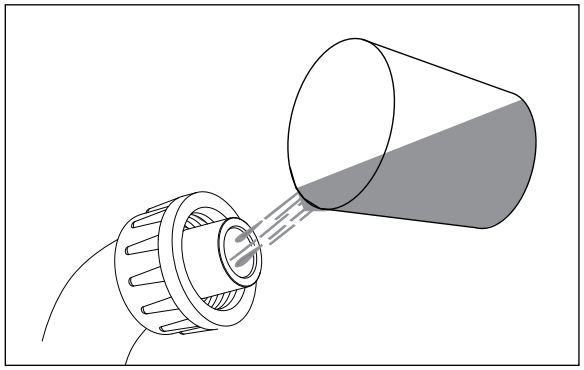


Fig. 9

12. Reconnect coupling. Press power switch ON. Ice pushes SaniSponge cleaning sponges through ice transport tube.

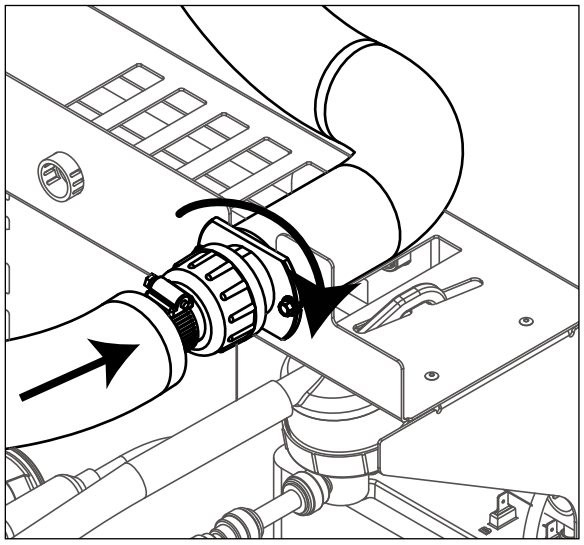
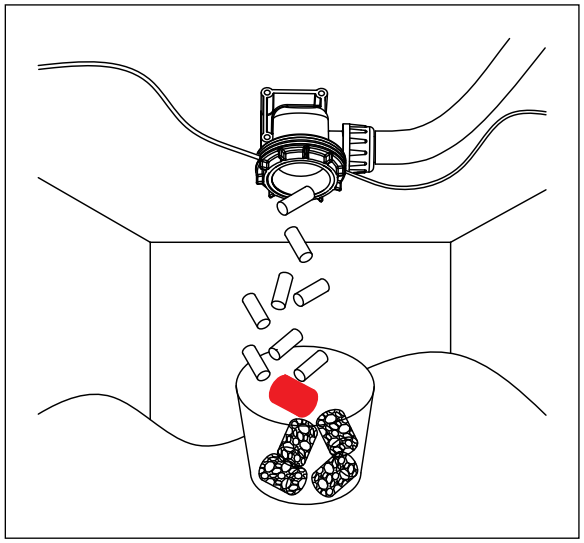


Fig. 10

13. Place a sanitary (2 gal. or larger) container in bin or dispenser to collect the plug, SaniSponge cleaning sponges and ice for 15 minutes* *after the Sani-Sponges come out*.

* If cleaning a 700 series ice maker with an ice transport tube run that exceeds 20 feet, the ice must be collected for 30 minutes to ensure proper sanitization of the ice transport tube.

14. Discard ice, Sani-Sponges and plug. Return TDS switch to the original position.



Service

Ice machine operation (all models)

Follett's ice machine consists of five distinct functional systems covered in detail as follows:

- Water system
- Electrical control system
- Mechanical assembly
- Refrigeration system
- Bin full

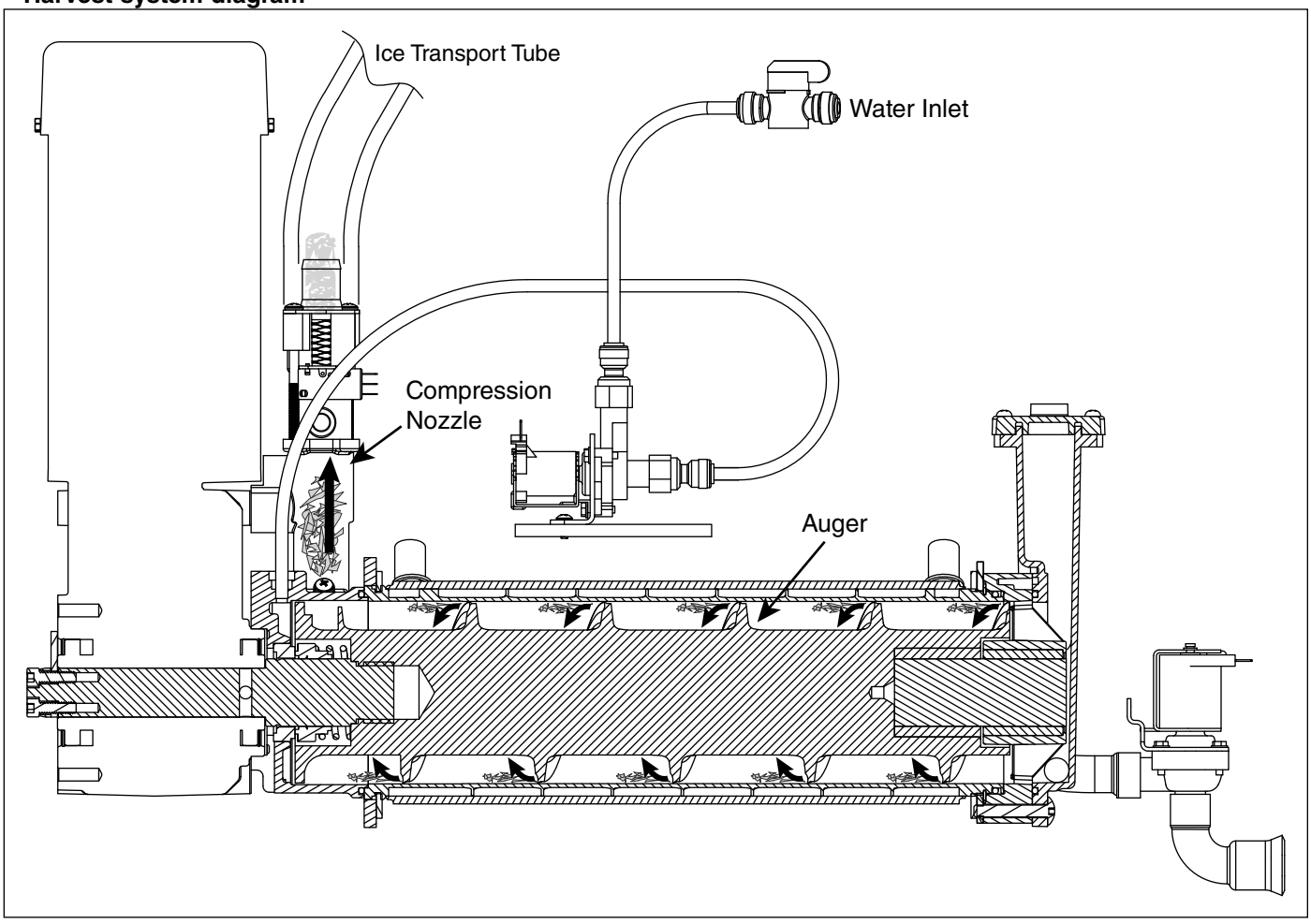
The Horizon ice machine overview

The Follett Horizon ice machine uses a horizontal, cylindrical evaporator to freeze water on its inner surface. The refrigeration cycle is continuous; there is no batch cycle. The evaporator is flooded with water and the level is controlled by sensors in a reservoir. A rotating auger (17 RPM) continuously scrapes ice from the inner wall of the evaporator. The auger moves harvested ice through the evaporator into an ice extrusion canal. The ice is forced through a restrictive nozzle that squeezes out the water and creates the Chewblet. The continuous extrusion process pushes the Chewblets through a transport tube into a dispenser or bin.

A solid state PC board controls and monitors the functionality of the ice machine. In addition to sequencing electrical components, the board monitors various operational parameters. A full complement of indicator lights allows visual status of the machine's operation. Additionally, the PC board controls the self-flushing feature of the ice machine. The evaporator water is periodically drained and replenished to remove minerals and sediment.

A unique "bin full" detection system is incorporated in the Horizon ice machine. A switch located at the ice discharge port of the machine detects the position of the transport tube. When the bin fills up with ice, the transport tube moves out of the normal running position, and the switch turns the ice maker off. A domed housing at the end of the transport tube contains the ice extrusion loads during shut down.

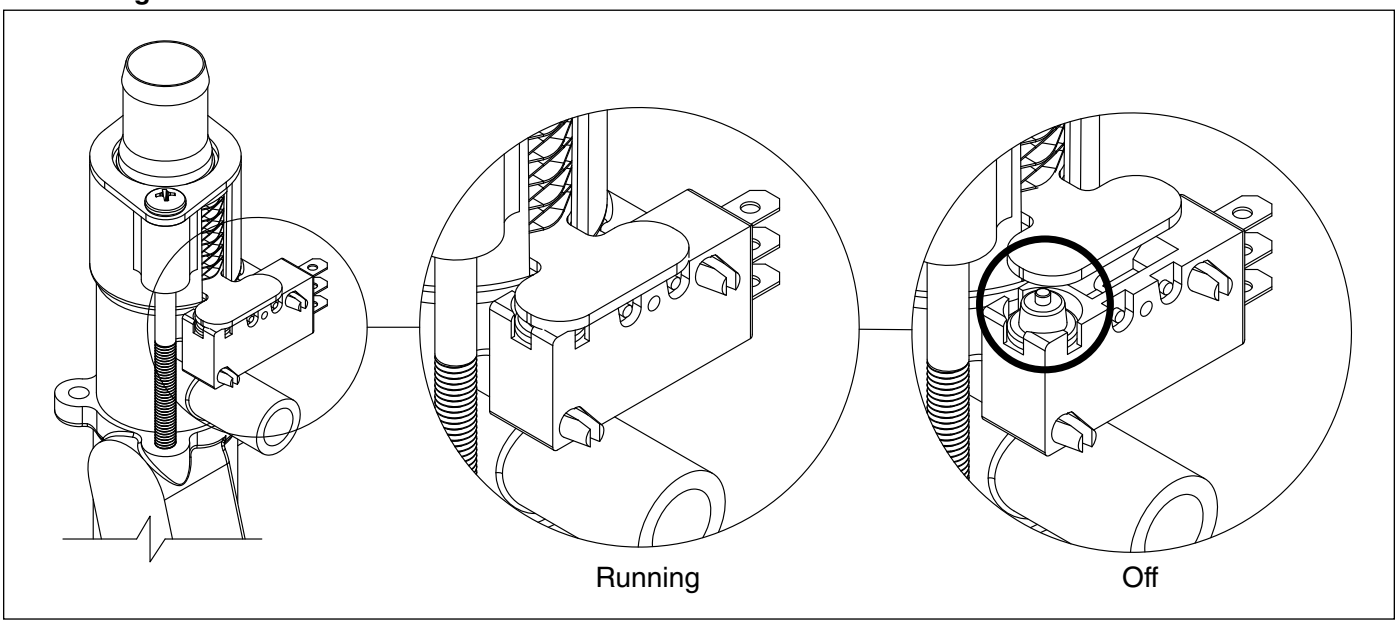
Harvest system diagram



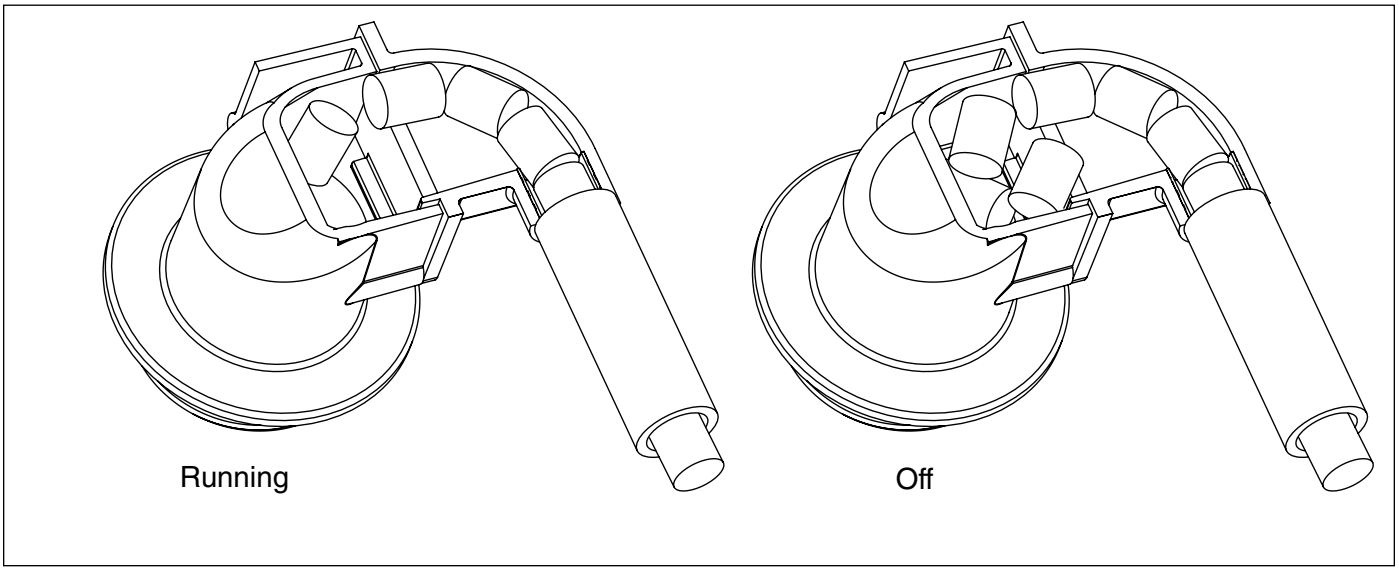
“Bin full” detection system

The Follett Horizon ice machine incorporates a unique “bin full” detection system that consists of the shuttle and actuator. The shuttle incorporates a flag and switch. Referencing the figure below, the normal running position of the flag is down, and the switch is closed. When the bin fills to the top and ice can no longer move through the tube, the machine will force the shuttle flag up, opening the switch and shutting the machine off. The shuttle actuator, located above the ice bin allows the ice to curl up within it when the bin is full. In this way, there are no loads generated that would tend to lift off the lid of the bin.

Shuttle flag and sensor



Shuttle actuator



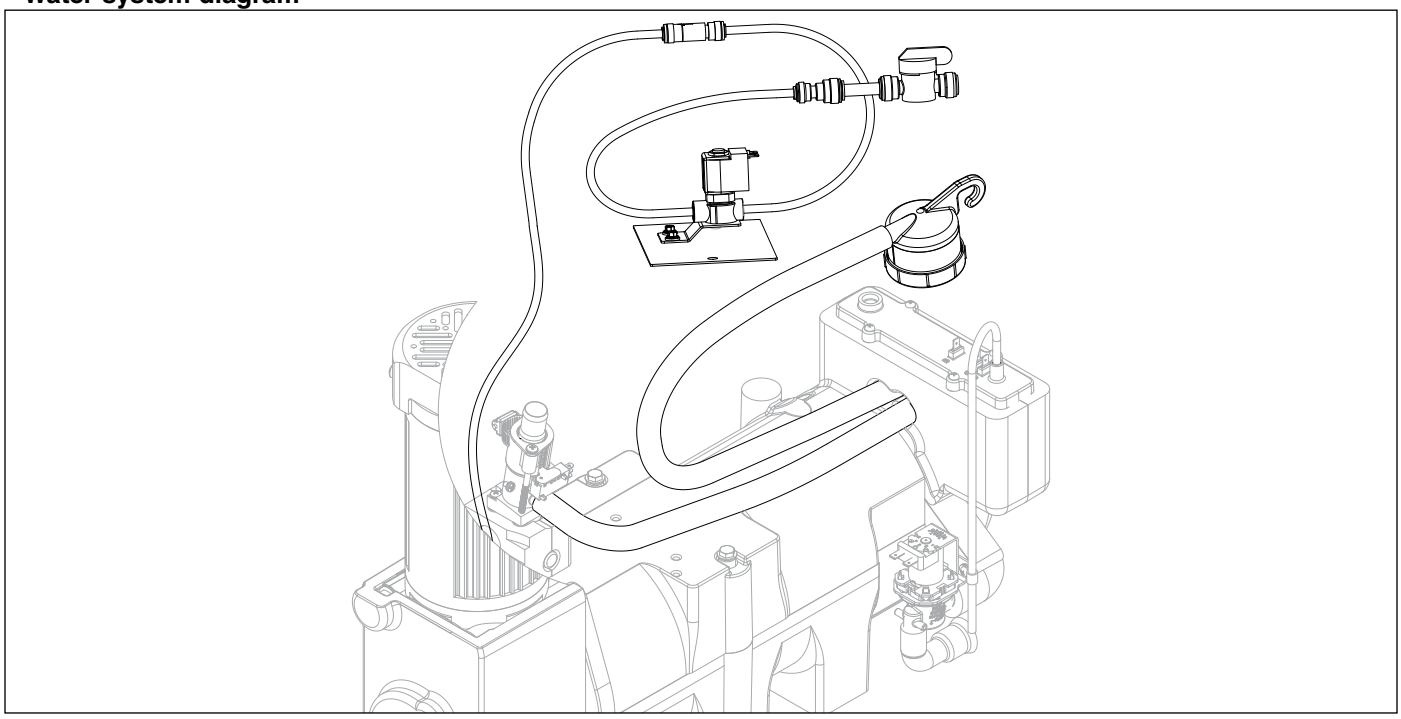
Water system

The water level in the evaporator is controlled by a feed solenoid and level detecting sensors. Referencing the diagram below, water sensing probes extend down into the reservoir at the end of the evaporator assembly. The system works via electrical conductivity as follows:

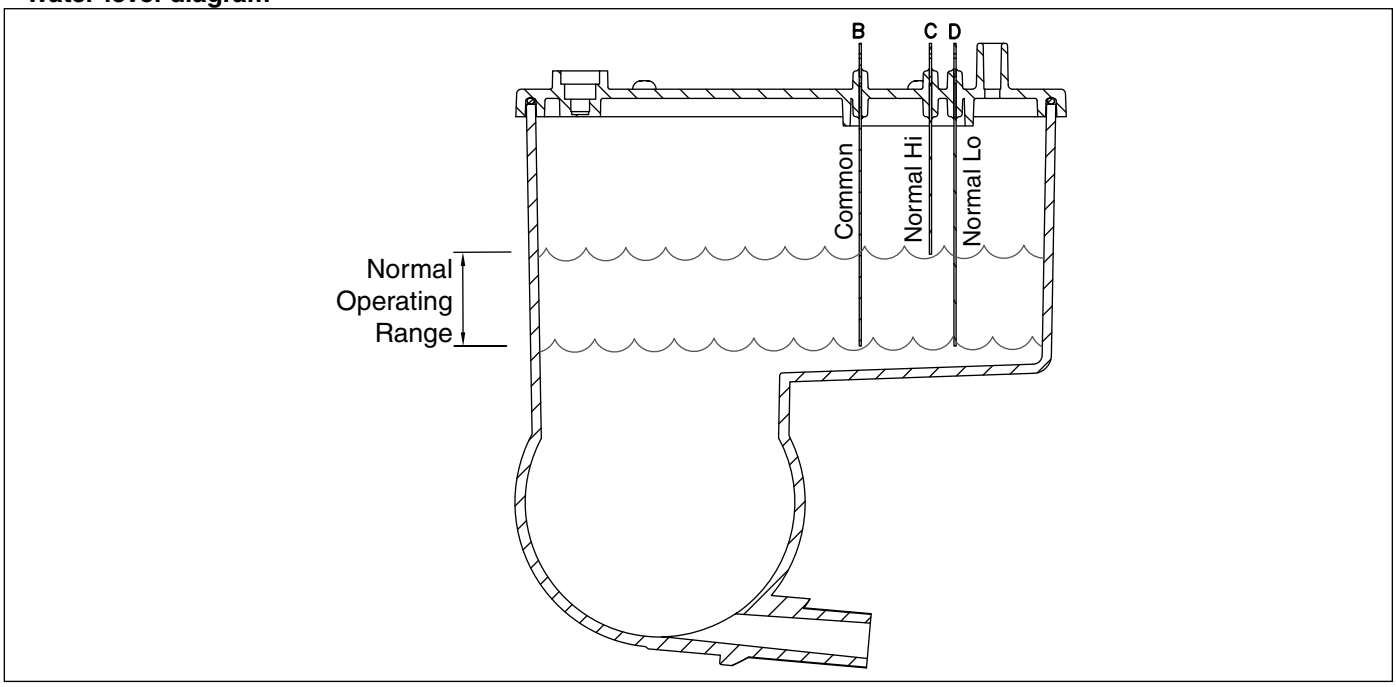
The probe labeled B is the common. When water is between any of the other probes and the common, the PC board will sense the activation. During normal operation, the water level rises and falls between the Normal High and Normal Low probes. As water is consumed to make ice, the level will fall until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

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

Water system diagram



Water level diagram



Electrical system

ATTENTION!

To prevent circuit breaker/Hi-amp overload, wait 5 minutes before restarting this unit.This allows the compressor to equalize and the evaporator to thaw.

Normal control board operation

The PC board indicator LEDs 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.

Operating sequence

- With correct voltage applied to L1 and L2, the PC board begins flashing the green POWER LED in a sequence indicating the programming of the board.
- After power is applied, the PC board checks for conductivity through the bin signal circuit via pins 2 and 3 of the P12 terminal.

– If bin signal is not present, the PC board will remain in an idle state with the POWER LED flashing the programming sequence until power is disrupted or bin signal is present.

– If bin signal is present, the LOW BIN LED will illuminate.

- After bin signal is confirmed, the PC board will check for conductivity between the common and low probes in the water reservoir via pins 1 and 3 of the “WATER LEVELS P17” terminal.

– If conductivity is sensed, the PC board will move on to MAKING ICE status.

– If no conductivity is sensed, the PC board will energize the water feed solenoid via the P21/FS terminal, simultaneously illuminating the D22 LED, until conductivity is sensed at which point the PC board will move on to MAKING ICE status.

Once conductivity is sensed between pins 1 and 2 of the “WATER LEVELS P17” terminal the PC board will de-energize the water feed solenoid the D22 LED will go out.

- Once the water check is passed the PC board will enter MAKING ICE status.

– The auger gearmotor will be energized via the P4 terminal, along with the D18 LED illuminating.

– The condenser fan motor will be energized via the P3/FAN terminal, along with the D17 LED illuminating.

– The compressor contactor coil will be energized via the K1 relay, along with the D16 LED illuminating.

- The PC board will remain in MAKING ICE status until one of the following conditions is met:

– Conductivity through the bin signal circuit is lost, indicating a full bin, upon which the PC board will enter a temporary TIME DELAY status.

– The PC board detects an error condition, upon which the PC board will enter a temporary 1-hour TIME DELAY status and illuminate an error LED.

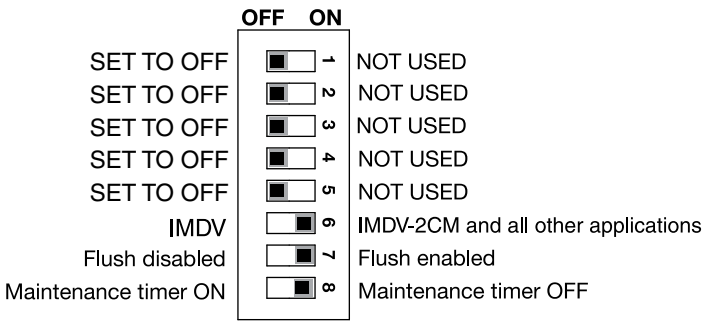
– The maintenance/clean rocker switch is pressed, providing conductivity across pins 3 and 4 of the P11 terminal, which will initiate a brief flush and fill sequence.

- After the TIME DELAY expires, or power is cycled, the PC board will restart the sequence.

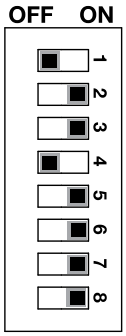
All other normal operation status indicators are covered as follows:

Ice machine disposition	Operating conditions
Legend: ● ON ○ OFF ◐ ON or OFF ⊗ FLASHING	
1. Ice machine is making ice. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ○ HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ○ TIME DELAY ○ NOT USED ○ MAKING ICE ● LOW BIN ● POWER ON ⊗	1. **Normal running.**
2. Ice machine is not making ice. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ○ HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ○ TIME DELAY ● NOT USED ○ 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.

DIP Switch Settings



Bin Top Sleep Cycle DIP Switch Setting



Evaporator flushing sequence

During operation, the purge valve opens periodically to drain water and reduce TDS concentration while making ice. Two flush intervals are available: Low TDS and High TDS (selected by the rocker switch behind the front cover). As ice is produced, dissolved minerals concentrate in the evaporator water. Without periodic purging, mineral concentration can increase and promote scale formation and reduced performance. Typically, High TDS might be considered levels above 200 PPM, but local experience and varying water chemistry may compel a High TDS setting for best performance in even lower TDS levels.

- Low TDS: flush interval 60 minutes.
- High TDS: flush interval 10 minutes.

Flush sequence (3 cycles)

1. Purge opens until the water level drops below the low probe.
2. Fill opens until the water reaches the high probe.
3. Repeat for a total of three purge/fill cycles.

Off-cycle flush

At the end of the full bin time delay or upon entering a time delay accompanying an error, the control board checks cumulative ice-making time since the last off-cycle flush. If cumulative run time exceeds 10 minutes, it opens the purge valve for 60 seconds, refills, and resumes making ice. If less than 30 minutes, it starts without draining.

Relay output indication

Each relay on the board has an indicator LED associated with its output. For example, when the water feed solenoid relay is energized, the adjacent LED illuminates green.

Error faults

The Horizon Elite PC board monitors various operating parameters including refrigeration head pressure, auger gearmotor amperage, reservoir water level, and for the presence of excessive water in the chassis. If an error condition occurs there are two possible types of errors:

- Soft errors shut the machine down and start a 1-hour time delay. Soft errors clear automatically after the time delay expires or may be manually cleared by cycling power.
- Run errors indicate a condition that may require attention but do not prevent the machine from normal operation. Run errors only clear after a power cycle of the unit.

Soft errors

HI AMPS: The board monitors auger motor current through the P4 terminal. If current draw exceeds the maximum limit or drops below 0.2A, normal ice making operation ends and the machine shuts down on a TIME DELAY / HI AMPS soft error. After the 1-hour time delay expires, the indicators clear and the machine restarts.

During normal operation while the PC board monitors conductivity between the three water reservoir sensors/ probes (common, high, and low) a disruption in water supply or lack of water usage may result in either a solid or flashing LOW WATER soft error.

Solid LOW WATER: If water flow to the machine is disrupted during normal operation, the sequence is as follows: when the reservoir water level drops below the normal low probe, the PC board energizes the water feed solenoid. If water is not detected at the normal low sensor/probe within 30 seconds, the machine shuts down on a TIME DELAY / solid LOW WATER soft error. After the 1-hour time delay expires and if water flow returns allowing the reservoir to refill to the normal low probe, the indicators clear and the machine restarts.

Flashing LOW WATER: If water consumption ceases or significantly slows during normal operation, the sequence is as follows: When the reservoir water level fails to drop below the normal low probe within 3 minutes of the previous water fill, the machine shuts down on a TIME DELAY / flashing LOW WATER soft error. After the 1-hour time delay expires the indicators clear, the machine restarts and attempts to make ice. Important note: Upon initial startup, the timing threshold is 7 minutes.

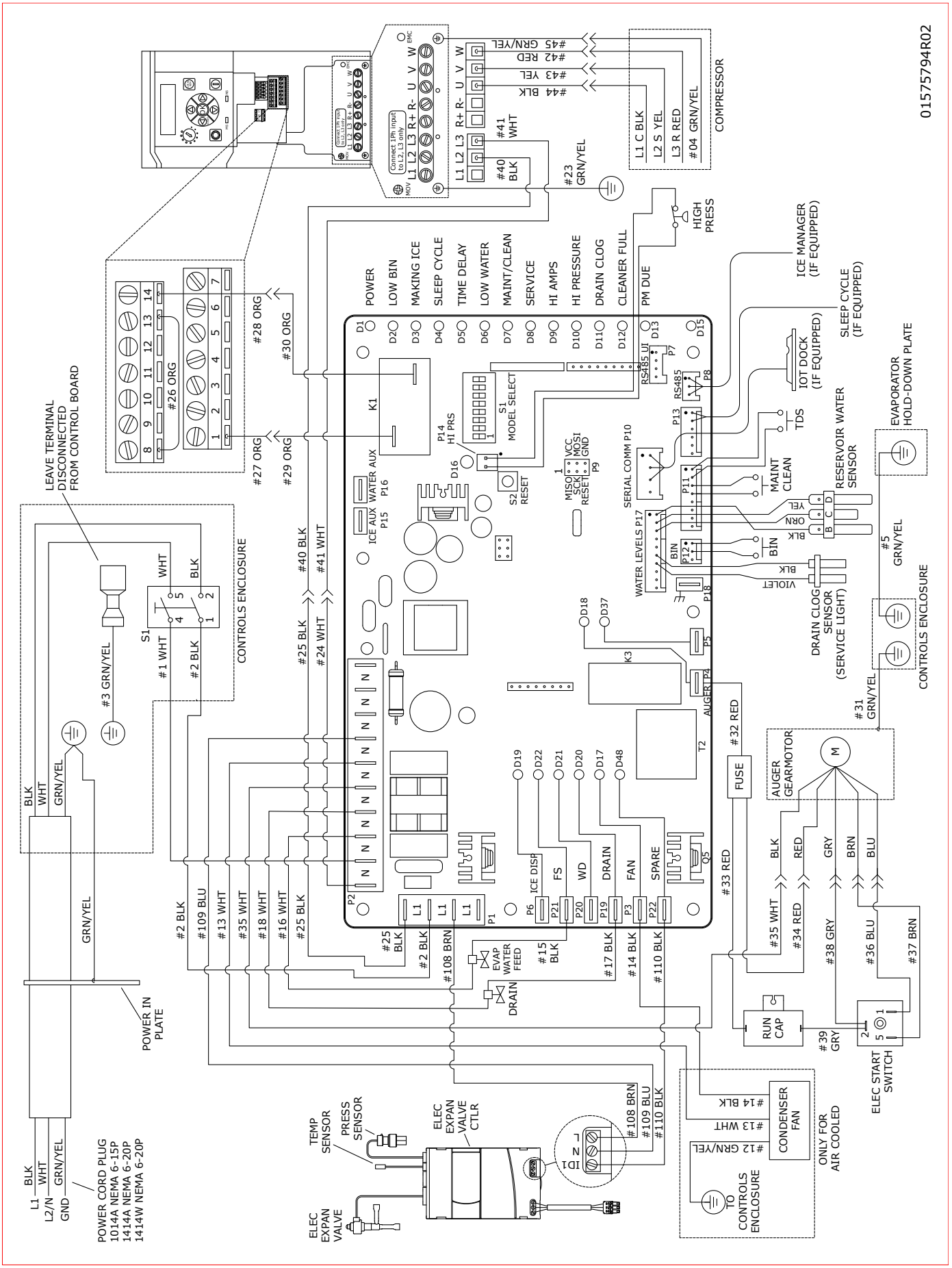
HI PRESSURE: A normally closed hi-pressure cutout is present in the refrigeration system. If head pressure rises above 425 psi, the hi-pressure cutout opens, the PC board senses the loss of conductivity through the circuit and the machine shuts down on a TIME DELAY / HI PRESSURE soft error. After the 1-hour time delay expires, if head pressure has dropped below the hi-pressure cutout's reset point of 295 psi, the machine restarts, and the indicators clear.

SERVICE: There are drain/overflow sensors located in the chassis positioned just below the top edge of the chassis. If the water level within the chassis rises enough to alert the PC board of conductivity between the sensors the machine shuts down on a TIME DELAY / SERVICE soft error. After the 1-hour time delay expires, if conductivity between the sensors is lost, the machine restarts and the indicators clear.

Run Errors:

DRAIN CLOG: When the machine shuts down on a full bin TIME DELAY or upon entering an error state and accompanying 1-hour TIME DELAY and there has been at least 10 minutes of cumulative compressor run time, the machine purges before starting. During this purge, if the PC board does not sense conductivity lost between the common and low sensors/probes in the water reservoir within 20 seconds of energizing the purge solenoid, the DRAIN CLOG LED illuminates as a run error. After the time delay expires, the machine will continue to run but the DRAIN CLOG LED will remain illuminated until a power cycle has been performed. This is an indication of a poorly draining machine and must be addressed.

Wiring diagram



Compressor data

	HCC/HMC (60 Hz)	
	1014 @ 3100 RPM 0 F SST 110 F SCT	**1414 @ 4300 RPM 0 F SST 110 F SCT**
Compressor current draw at 208-230 VAC, 90 F/32.2 C	7.5A	10.5A
Locked rotor amps@ 208-230 V - Copeland	40.3A	56A
	Limited by VFD	
Compressor motor winding reistance (208-230 V)	V-U: 0.203Ω U-W: 0.203Ω W-V: 0.203Ω	V-U: 0.203Ω U-W: 0.203Ω W-V: 0.203Ω

Gearmotor data

Gearmotor current 2.0A @ 208-230 V
Gearmotor torque-out (high amp) trip point: 2.6A @ 208-230 V
Locked rotor amps 8.2A@ 208-230 V

Resistance of windings
208-230 vac gearmotor (Brother):
Red to black: 11.8Ω
Brown to gray: 11.1Ω (auxilliary)

Fan motor data

Fan motor current 1.1A @ 208-230 V

Mechanical System

Evaporator disassembly

1. Press CLEAN button to purge evaporator. Turn power OFF when LO WATER lights.
2. Unscrew and disconnect transport tube from louvered docking assembly.

Fig. 11

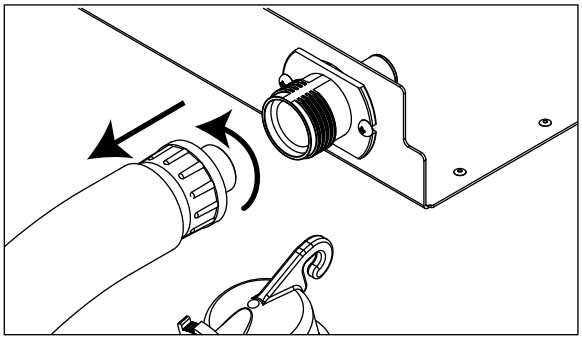


Fig. 12

3. Remove gearbox insulation..

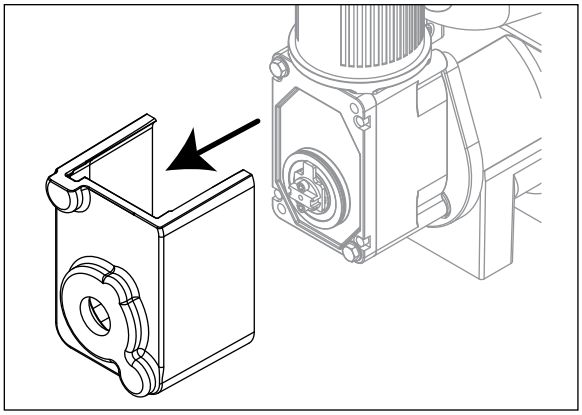


Fig. 13

4. Disconnect gear motor wires.

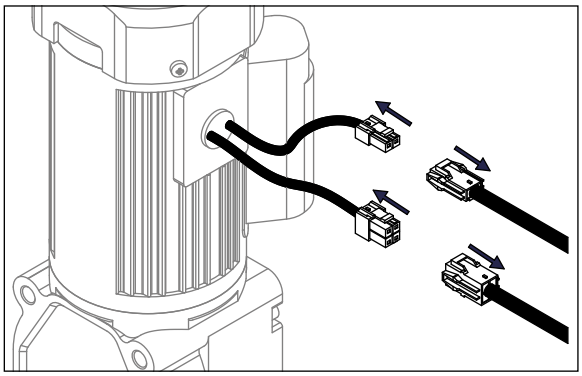


Fig. 14

5. Remove screws (with 3/16" allen wrench) and auger retaining fork:

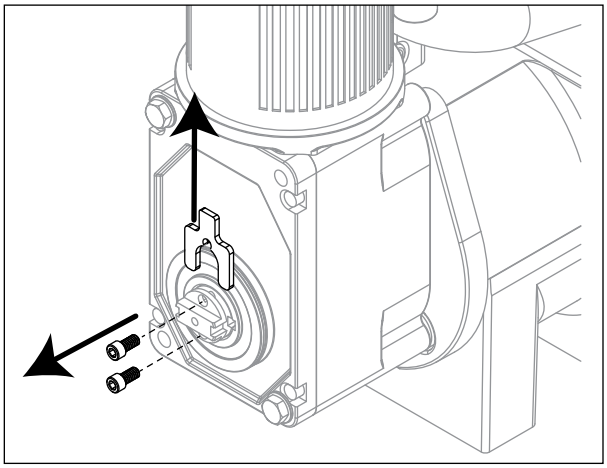


Fig. 15

6. Remove gear motor bolts (9/16" wrench).
7. Remove gear motor and wipe auger shaft clean.

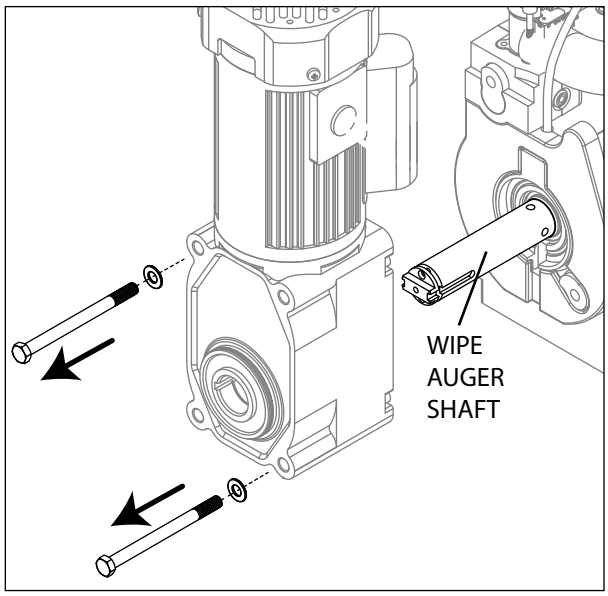


Fig. 16

8. Remove main housing insulation and shuttle insulation:

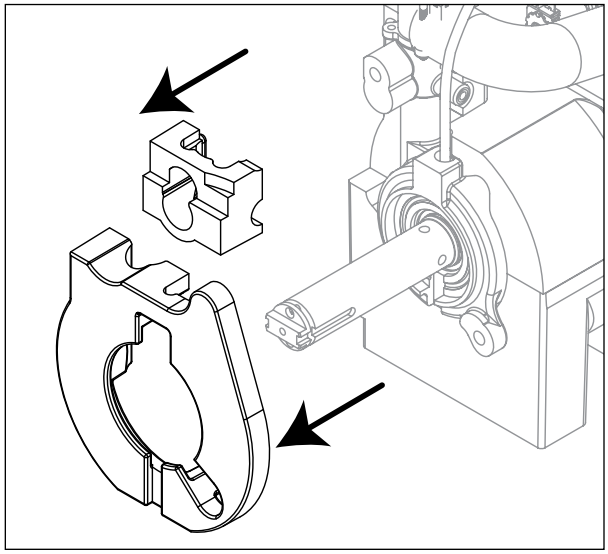


Fig. 17

9. Remove front feed water tube from push-in fitting, shuttle drain tube, and shuttle switch.

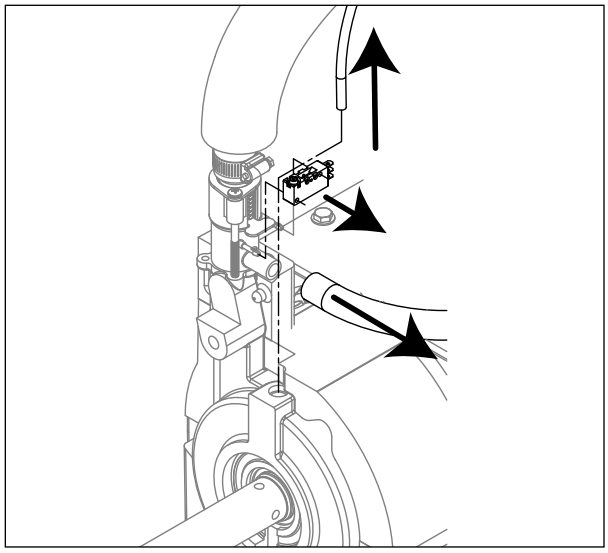


Fig. 18

10. Remove 3 screws (with 3/16" allen wrench) then remove auger and main housing together.

Note: Auger is sharp - wear protective gloves.

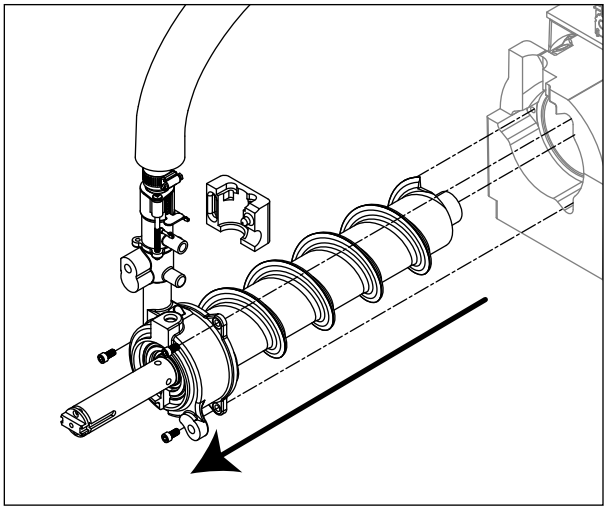


Fig. 19

11. Rotate auger to align opening in auger flange with stream divider.

Note: To prevent damage to internal components, pull outward on the auger shaft to rotate.

12. Pull out auger.:

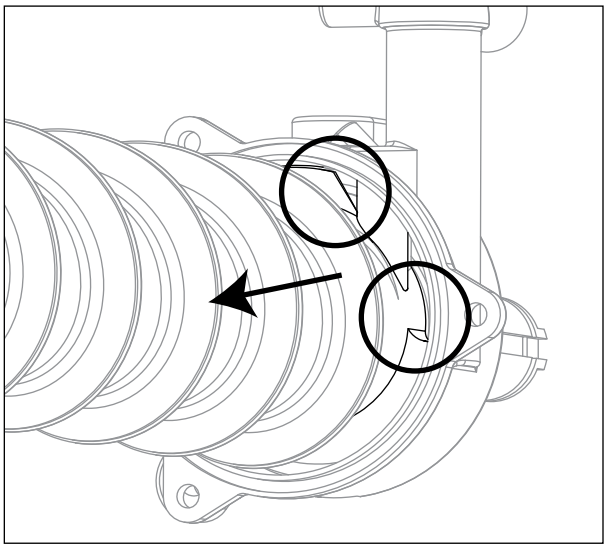
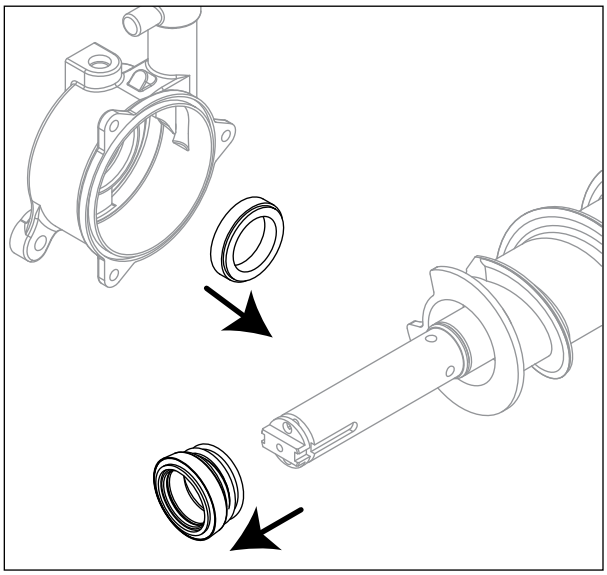


Fig. 20

13. Remove and discard the ceramic mating ring and shaft seal.



Evaporator reassembly

14. Install ceramic mating ring and shaft seal.

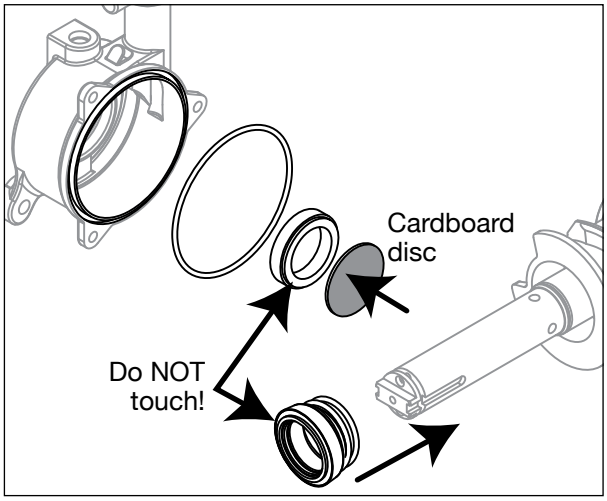
Caution: Do not touch the sealed surface of either part. Oil from bare skin will cause premature seal failure.

15. Use liquid hand soap on the rubber part of the ceramic seal when installing in main housing. Use supplied cardboard disc to press into recess.

16. Apply liquid hand soap to raised area of auger shaft and interior rubber portion of shaft seal before installing seal.

17. Clean O ring groove. Lubricate O ring with petrol-gel and reinstall.

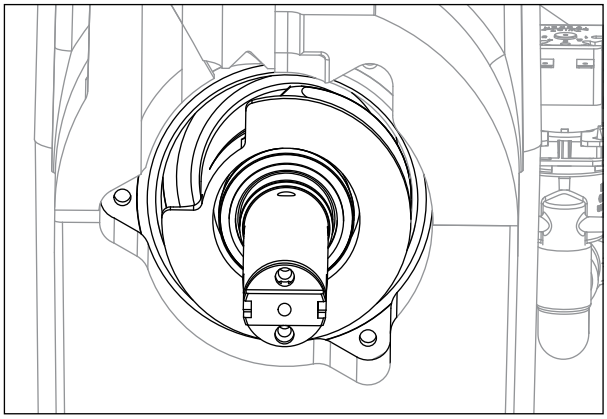
Fig. 21



18. Carefully install auger.

19. Rotate auger to position shown to clear main housing stream divider.

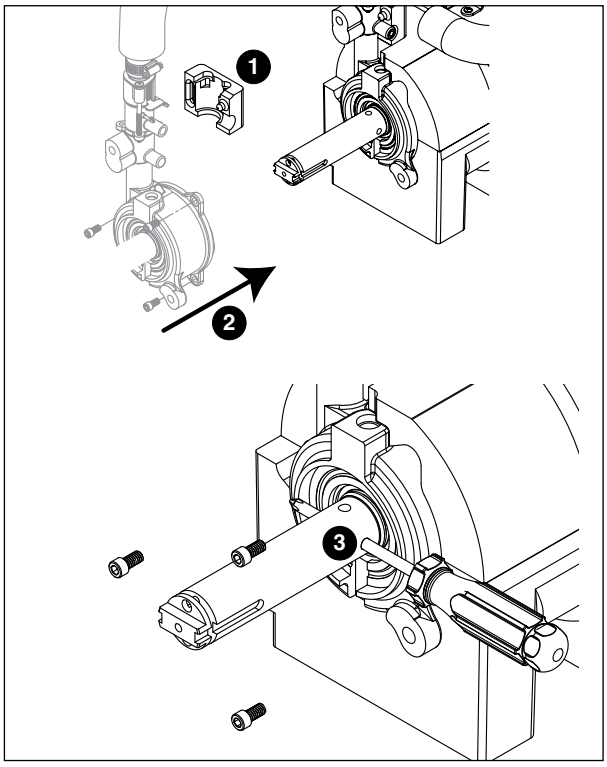
Fig. 22



20. Install rear shuttle insulation **(Fig. 22.1)** and slide main housing **(Fig. 22.2)** onto auger.

21. When installing new water seal, use screwdriver to compress the spring **(Fig. 22.3)**, which allows for easier installation of the three screws.

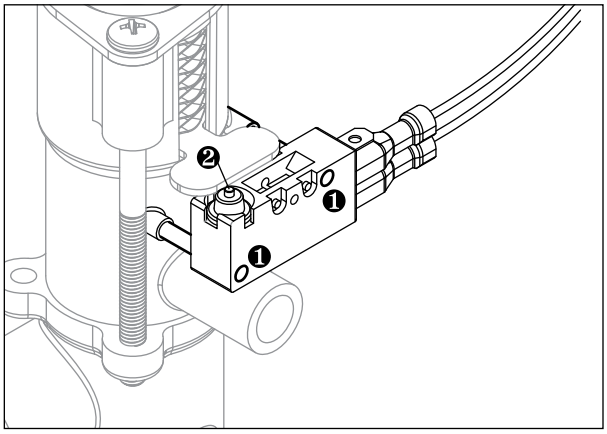
Fig. 23



22. Install shuttle switch.

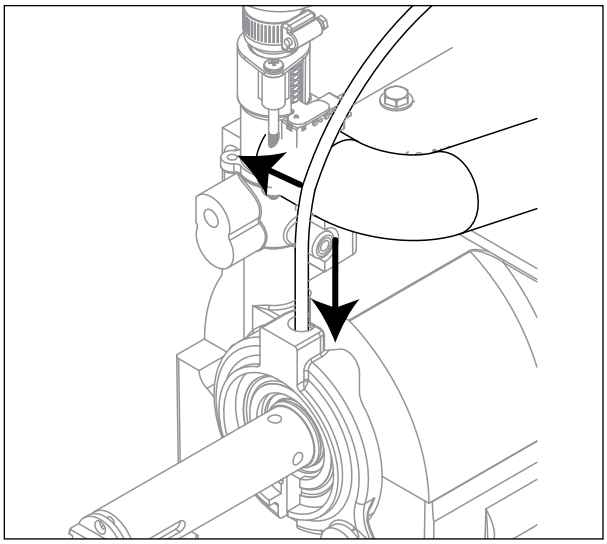
- Align holes with pins **(Fig. 23.1)** and depress switch button **(Fig. 23.2)** to clear shuttle tab.

Fig. 24



23. Install shuttle drain tube and front feed water tube **(Fig. 24)**.

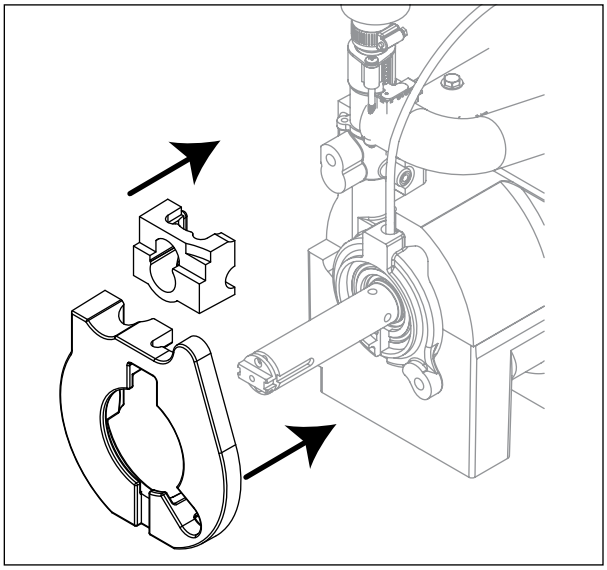
Fig. 25



24. Install main housing insulation and shuttle insulation:

25. Apply a coat of food safe grease to the auger shaft - *DO NOT USE petrol gel!*

Fig. 26



26. Slide gear motor onto auger and install gear motor bolts (9/16" wrench).

Fig. 27

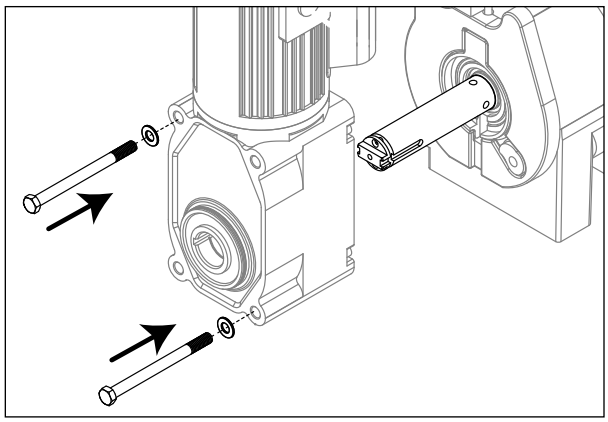


Fig. 28

27. Connect gear motor wires.

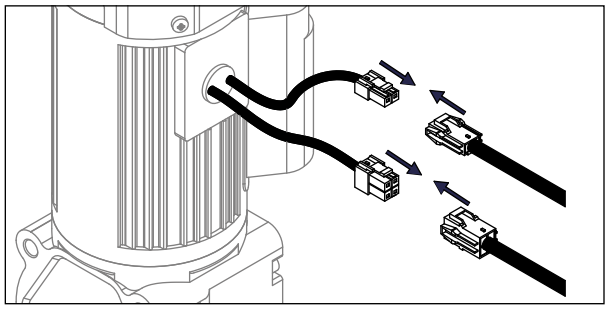


Fig. 29

28. Pry auger forward and rotate auger using 1/2" wrench to align keyways.

29. Install key fully.

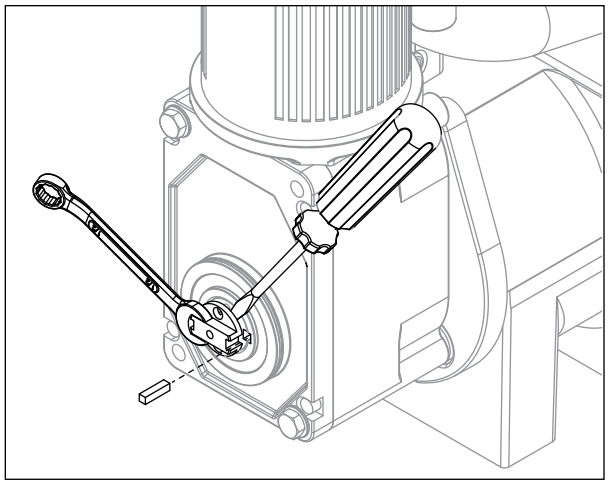
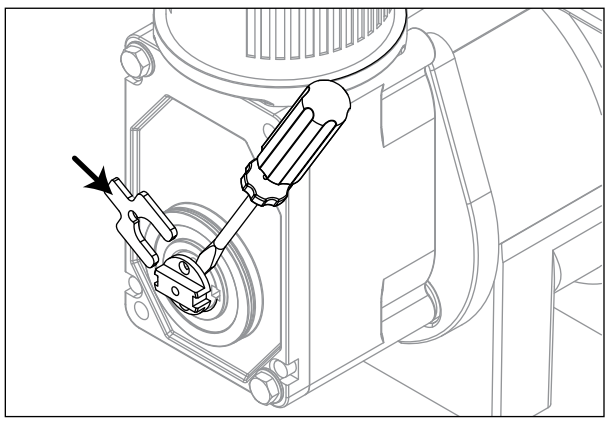


Fig. 30

30. Pry shaft forward to install retainer fork.



31. Rotate retainer fork to align screw holes.

32. Install screws to secure retainer fork.

Fig. 31

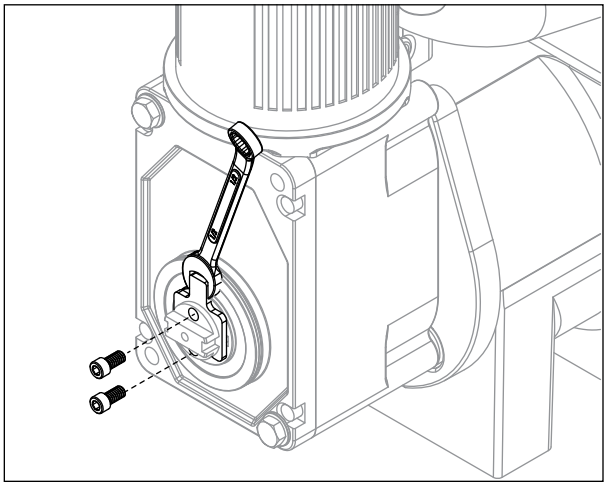


Fig. 32

33. Install gearbox insulation.

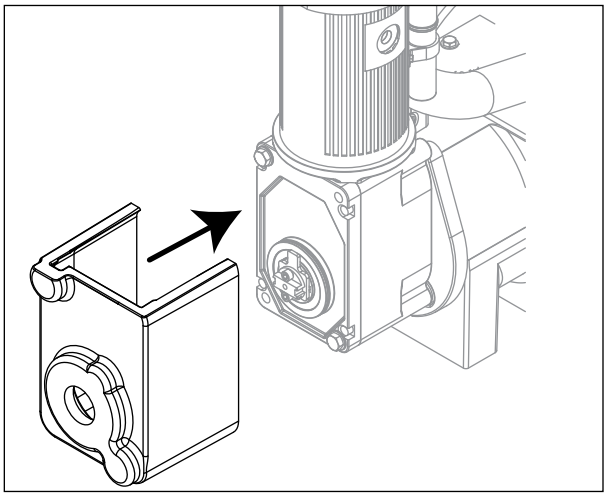
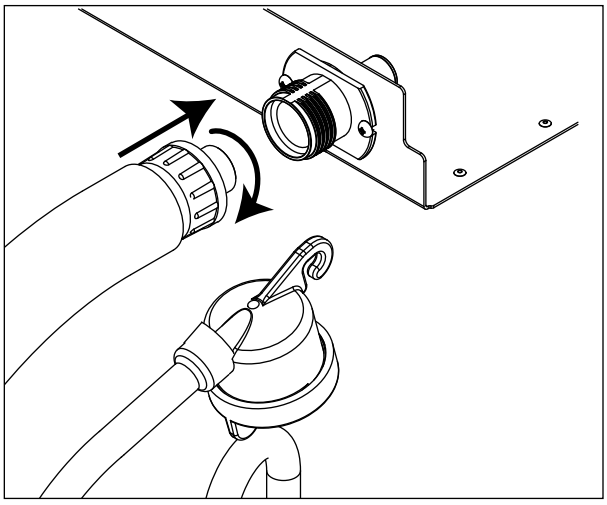


Fig. 33

34. Connect transport tube to louvered docking assembly.



Reservoir/rear bushing disassembly

1. Press CLEAN button to purge evaporator. Turn power OFF when LO WATER lights.

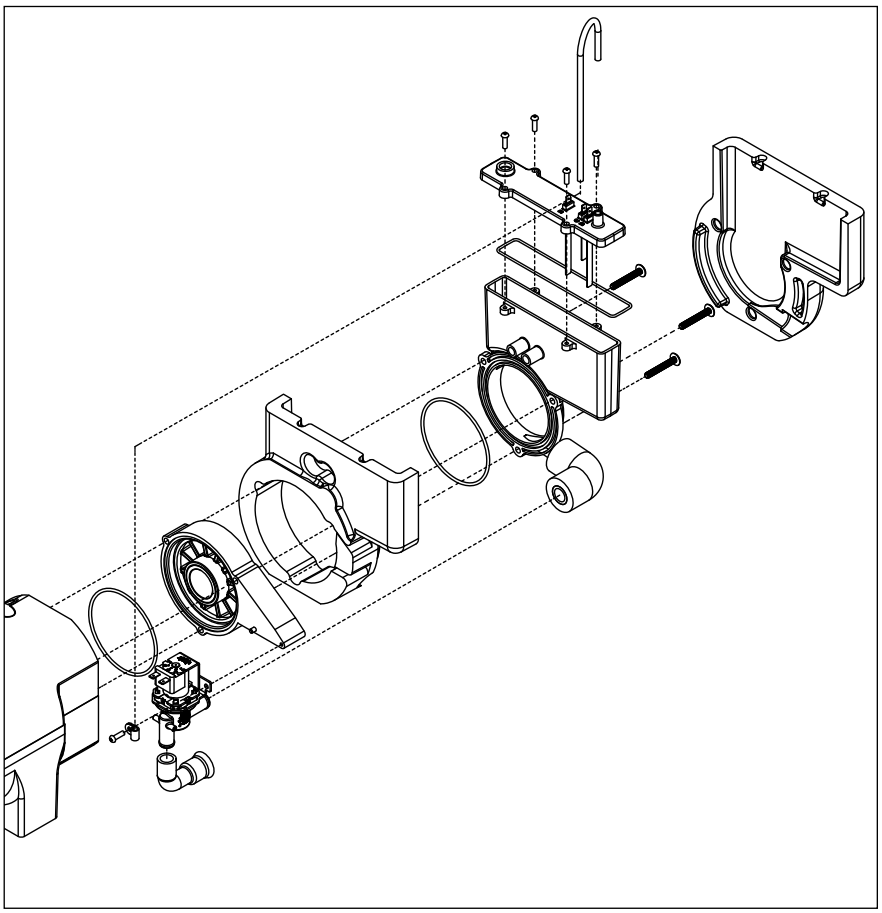
Note: In many applications, removing the gearmotor, main housing, and auger will allow for the ice machine to be pulled out further for better access to rear components.

2. Slide ice machine forward to gain access.

3. Use Fig. 33 as disassembly guide.

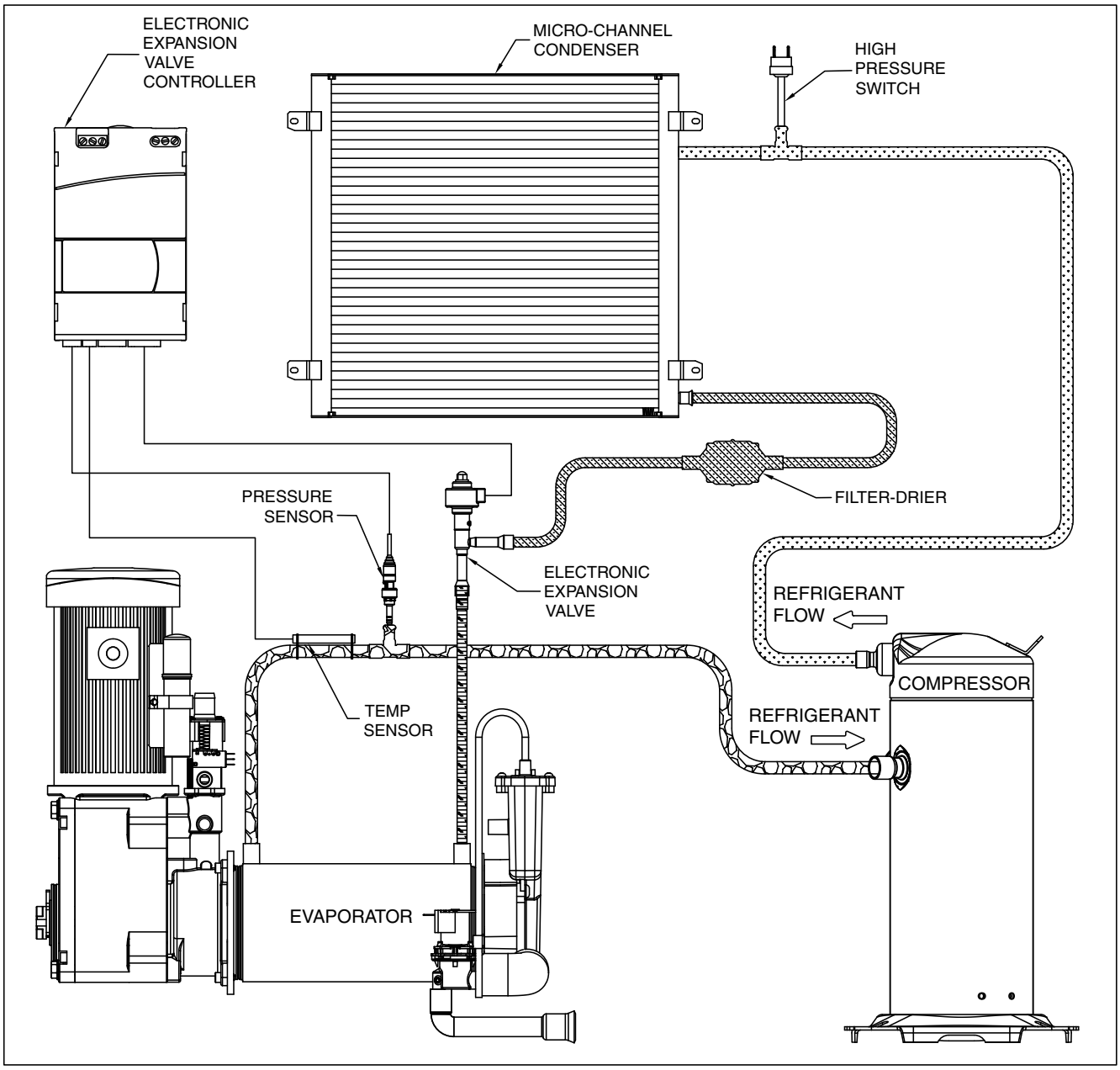
Note: Use petrol-gel when installing/reinstalling o-rings.

Fig. 34

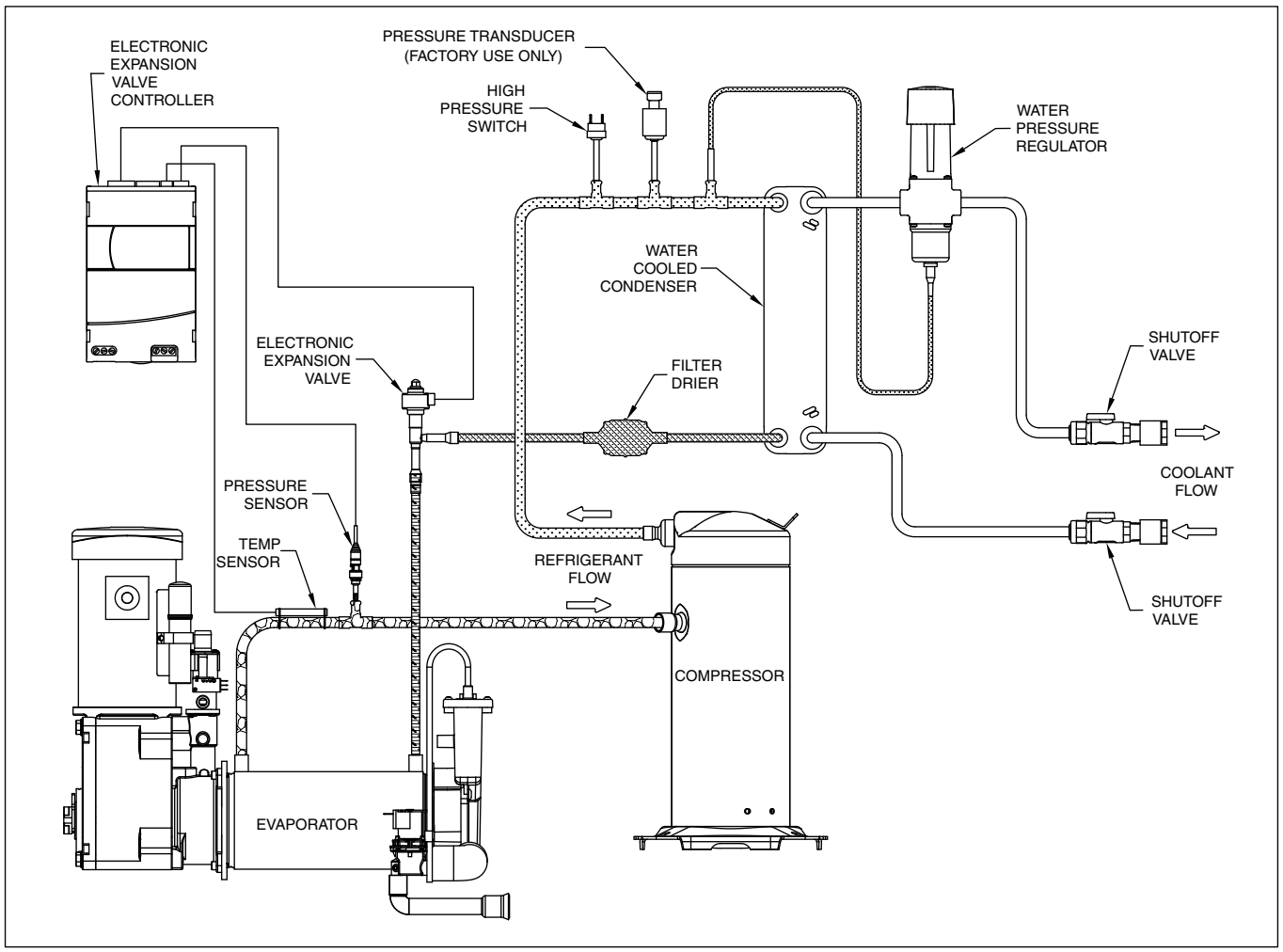


Refrigeration system

Refrigeration system diagram (air-cooled units)



Refrigeration system diagram (water-cooled units)



Refrigeration charge

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 ice machine to other than factory specifications will void the warranty.

R290 ice machine charge specifications

Model	Charge	Refrigerant type
C1014A (air-cooled)	5.3 oz (150 g)	R290
C1414A (air-cooled)	5.3 oz (150 g)	R290
C1414W (water-cooled)	4.9 oz (140 g)	R290

Refrigerant replacement requirements

1. Non-contaminated refrigerant removed from any Follett refrigeration system can be recycled and returned to the same system after completing repairs. Recycled refrigerant must be stored in a clean, approved storage container. If additional refrigerant is required, virgin or reclaimed refrigerant that meets ARI standard 700-88 must be used.
2. In the event of system contamination (for example, a compressor burn out, refrigerant leak, presence of non-condensibles or moisture), the system must be repaired, evacuated and recharged using virgin or reclaimed refrigerant that meets ARI standard 700-88.
3. Follett Corporation does not approve of recovered refrigerants. Improper refrigeration servicing procedures will void the factory warranty.

Evacuation

Evacuate the system to a level of 500 microns. When the 500 micron level is reached, close all valves. Allow the system to sit for approximately 20 minutes. During this period the system pressure should not rise. If the system pressure rises and stabilizes there is moisture in the system and further evacuation is needed. If the pressure continues to rise check the system for leaks.

Ambients	Minimum	Maximum
Air temperature[1]	50 F/10 C	100 F/37.8 C
Water temperature[2]	45 F/7 C	90 F/32.2 C

[1]Ambient air temperature is measured at the air-cooled condenser coil inlet.
[2]Ambient water temperature is measured at the water feed valve inlet.

Ice capacity test

Ice machine production capacity can only be determined by weighing ice produced in a specific time period.

1. Replace all panels on ice machine.
2. Run ice machine for at least 15 minutes.
3. Weigh and record weight of container used to catch ice.
4. Catch ice for 15 or 20 minutes.
5. Weigh harvested ice and record total weight.
6. Subtract weight of container from total weight.
7. Convert fractions of pounds to decimal equivalents (ex. 6 lbs 8oz = 6.5 lbs).
8. Calculate production using following formula:

$$\frac{1440 \text{ min.} \times \text{wt. of ice produced}}{\text{Total test time in minutes}} = \text{Production capacity/24 hr.}$$

9. Calculated amount per 24 hours should be checked against rated capacity for same ambient and water temperatures in Ice Production Tables.

Troubleshooting

Please see “Service” section for a description of each function.

Ice machine disposition	Possible causes	Corrective action
Legend: ● ON ○ OFF ◐ ON or OFF ⊠ FLASHING		
1. Ice machine is in running condition but not making ice. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ○ HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ○ TIME DELAY ○ NOT USED ● MAKING ICE ● LOW BIN ⊠ POWER ON	1. Defective compressor. 2. VFD fault. 3. Defective main contactor. 4. No output from PC board.	1. Replace compressor. 2. See VFD diagnostic chart. 3. Replace main contactor. 4. Replace PC board.
2. Machine in TIME DELAY without full bin. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ○ HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ◐ TIME DELAY ○ NOT USED ○ MAKING ICE ◐ LOW BIN ⊠ POWER ON	1. Ice jamming due to improperly installed transport tube causing a false shuttle. 2. Shuttle stuck in up position. 3. Damaged or improperly installed thermostat (open). 4. Transport tube backed-out of coupling.	1. Correct transport tube routing. 2. Repair or replace shuttle mechanism. 3. Replace or reposition thermostat. 4. Correct coupling installation.
3. Ice machine is not making ice. HI AMPS. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ● HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ● TIME DELAY ○ NOT USED ○ MAKING ICE ◐ LOW BIN ⊠ POWER ON	1. Poor water quality causing ice to jam auger. 2. Damaged shuttle mechanism. 3. Intermittent drive output from PC board. Evaporator will freeze causing a HI AMPS error. 4. Gearmotor is unplugged.	1. Clean ice machine. Increase flushing frequency. Position TDS switch to High TDS setting. 2. Replace or repair shuttle mechanism. 3. Replace PC board. 4. Plug in gearmotor.
4. Ice machine is not making ice. HI PRESSURE. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ● HI PRESS ○ HI AMPS ○ SERVICE ○ MAINT/CLEAN ○ LOW WATER ● TIME DELAY ○ NOT USED ○ MAKING ICE ◐ LOW BIN ⊠ POWER ON	1. High ambient temperatures >100 F (38 C). 2. Poor ventilation or air recirculation. 3. Clogged condenser (air-cooled). 4. No water flow through condenser (water-cooled only). 5. Fan not working properly. No air flow. • Blocked fan blades • No fan output from PC board • Faulty fan motor	1. Air condition area to below 100 F (38 C). 2. Reposition ice machine or properly ventilate. Prevent ice machine exhaust from recirculating. 3. Clean condenser/grille (air-cooled). 4. Restore water flow to condenser. Ensure supplied condenser water flow direction is correct. 5. Correct air flow. • Remove any blockage from fan blades • Replace PC board • Replace fan motor
5. Ice machine is not making ice. SERVICE. PM DUE ○ CLEANER FULL ○ DRAIN CLOG ○ HI PRESS ○ HI AMPS ● SERVICE ○ MAINT/CLEAN ○ LOW WATER ● TIME DELAY ○ NOT USED ○ MAKING ICE ◐ LOW BIN ⊠ POWER ON	1. Internal water leak touching chassis sensor. 2. Condensation.	1. Identify and repair leak. Clean/dry chassis and sensors and restart machine. 2. Ensure ice machine chassis condensate drain is plumbed and free flowing.

Ice machine disposition	Possible causes	Corrective action
Legend: ● ON ○ OFF ◐ ON or OFF ⊠ FLASHING		
6. Drain clog. 	1. Improper flow in drain system. 2. Failed purge solenoid. 3. No output from PCB to purge solenoid.	1. Correct/clean drain system. 2. Replace purge solenoid. 3. Replace PC board.
7. Ice machine is making ice. Excessive water in bin or coming into bin from transport tube. 	1. Failed water sensors. Processor assumes there is no water when there is water. 2. Blocked reservoir vent. 3. Defective water feed solenoid valve. Stuck in open position. 4. Pressure over 70 psi. 5. Auger jammed with ice. 6. RO water under 10 ppm.	1. Clean or replace water probe assembly. Check wiring connections. 2. Clean or replace vent tubes. 3. Replace water feed solenoid valve. 4. Correct water pressure. 5. Clean ice machine/auger. 6. Correct RO supplied water to >10 ppm.
8. Ice machine is not making ice. Solid Low Water. 	1. Water supply is insufficient. 2. Low water pressure. 3. Defective water feed solenoid valve. Stuck in closed position. 4. No water feed output from PC board. 5. Plugged screen on inlet side of fill solenoid. 6. Plugged check valve.	1. Restore water supply and check water filters. If evaporator was completely empty the reset button may have to be pressed to restart the ice machine. 2. Ice machine will eventually start when water reaches normal low level. • Ensure water pressure to ice machine is >10 psi. 3. Replace water feed solenoid valve. 4. Replace PC board. 5. Remove and clean screen. 6. Replace check valve.
9. Blinking Low Water, power, time delay. 	Machine did not see water consumption while trying to make ice. 1. Lack of refrigeration/low refrigerant charge/leak. 2. Debris shorting reservoir probes. 3. VFD error.	1. Verify refrigerant pressures, compressor running, sight glass clear. 2. Clean probes and reservoir of debris. 3. See VFD diagnostic chart.
10. Solid PM Due. 	1. Ice machine has been in service for 6 month interval without being cleaned.	1. Clean Ice machine.

ATTENTION!

To prevent circuit breaker overload, wait 5 minutes before restarting this unit. This allows the compressor to equalize and the evaporator to thaw.

VFD Diagnostics

The VFD screen will display VFD errors listed below. Please contact Follett tech support to report any errors. Do NOT press buttons or make changes to operating parameters of VFD without consulting Follett technical Support. Modifying operating parameters may void the factory warranty.

Fault Code	Fault Name/ Description	Possible Cause
1	Over Current	AC drive has detected too high a current (>4*IH) in the motor cable: ▪ Sudden heavy load increase; ▪ Short circuit in motor cables; ▪ Unsuitable motor.
2	Over Voltage	The DC-link voltage has exceeded the limits defined: ▪ Too short a deceleration time; ▪ Brake chopper is disabled; ▪ High overvoltage spikes in supply; ▪ Start/stop sequence too fast.
3	Earth Fault	Current measurement has detected that the sum of motor phase current is not zero: ▪ Insulation failure in cables or motor
9	Under Voltage	DC link voltage is under the voltage limits defined: ▪ Most probable cause: Too low a supply voltage; ▪ AC drive internal fault; ▪ Defect input fuse; ▪ External charge switch not closed. Note: This fault is activated only if the drive is in the Run state.
10	Input Phase Superv	Input line phase is missing
11	Output Phase Superv	Current measurement has detected that there is no current in one motor phase.
13	Drive Under Temp	Too low temperature measured in power. Unit's heat sink or board. Heat sink temperature is under -10°C
14	Drive Over Temp	Too high temperature measured in power. Unit's heat sink or board. Heat sink temperature is over 90°C
16	Motor Over Load	Motor is too hot, based on either the drive's estimate or on temperature feedback.
17	Motor Under Load	Condition defined by parameter underload protection, underload Fnom torque, underload FO torque, valid longer than the time defined by underload time limit.
21	S-flash fault	Serial flash error; serial flash memory failed.
22	Speed deviation	Estimated speed is greater than 115% of maximum frequency. Or current loop is oscillating.
67	Current Limit Controller	The output current has reached the current limit value.
68	Over Voltage Control	The DC link voltage hasreached its voltage limit value
90	Drive Under Temp (Cold weatther drive under temp)	Cold weather mode is not enabled, and unit temperature is less than -10°C. ▪ Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is less than -30°C. ▪ Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is -20 to -30°C. The temp <-20° C when cold weather start time out.
103	Drive Over Temp	Drive degree greater than (DCI_wDriveOverTempThreshold value - 10 degree) and less than DCI_ wDriveOverTempThreshold value, report drive over temperature warning.
126	Torque Limit Supv (Torque limit)	The motor torque exceeds the range of torque supervision limit.
128	Power Limit Supv (Power limit)	The motor power exceeds the range of power supervision limit.
129	Temp Limit Supv (Temp limit)	The unit temperature exceeds the range of temperature supervision limit.
131	Motor Current Supv (Motor current limit)	The motor current exceeds the range of current supervision limit.

Compressor Removal

Compressor removal—like all service procedures for flammable refrigerant systems—should be done in a well-ventilated area. Relocate the equipment being serviced to the outdoors if necessary.

Failure to remove the compressor properly can result in serious injury or death from electrocution, fire, or the sudden release of refrigerant and lubricant. Before removing a compressor from a system, follow these precautions:

1. Disconnect all electric power supplies to the system, making sure that all power legs are open. (Note: Be aware that some systems may have more than one power supply.)
2. Attach gauges to both the high and low sides of the system.
3. When compressor removal is necessary, be sure to recover the refrigerant from the system before removing the compressor to avoid the release of refrigerant and lubricant. (Note: The EPA allows the HC refrigerants R-170, R-290, R-441A, and R-600a to be vented to the atmosphere. All other refrigerants must not be vented.) Always recover from both the high and low sides of the system in order to make sure that refrigerant is not trapped by a restriction in the system. Attempting to remove the compressor before recovering all refrigerant from the system can cause a sudden release of refrigerant and lubricant. Among other things, this can cause a variety of injuries, including burns and frostbite. It also can cause a fire if a torch is used to disconnect the tubing, and expose the service technician to toxic gases. Remember: To avoid serious injury or death, be sure to remove and/or recover all refrigerant before attempting to remove the compressor. Consult with the compressor manufacturer regarding requirements for the approved methods of recovering refrigerants.
4. The compressor should be heated with a heat gun to warm the oil and drive additional refrigerant out of the oil. Never use a torch for this purpose.
5. Use a tubing cutter rather than a torch to remove the compressor. Using a torch may cause a fire hazard, especially if the flammable refrigerant has not been properly removed and/or recovered. If you must use a torch to remove the compressor, do so while running dry nitrogen through the system.

Compressor Installation

When installing the compressor, it is imperative that you do not make connections using soft solder. Assume that a soft solder connection will eventually fail and may cause a sudden release of refrigerant. The only acceptable filler metals for connecting tubing are brazing rod and silver solder.

Improperly sealing the process tube may lead to leaks or a sudden release of flammable refrigerant. The current approved method for the technician in the field is sealing the process tube. Pinch the tubing with the recommended equipment and then seal it by using brazing rod or silver brazing rod.

System Flushing, Purging, and Pressure-Testing for Leaks

Failure to properly flush, purge, or pressure-test a system for leaks can result in serious injury or death from explosion, fire, or contact with acid-saturated refrigerant or lubricant mists. Observe the following precautions when flushing and/or purging a system or pressure-testing a system for leaks:

When pressure-testing for leaks, use only regulated dry nitrogen and an approved leak detector and/or detection method.

- Never use air, oxygen, or acetylene for purging or pressure testing any refrigeration or air conditioning system for leaks. Oxygen can explode on contact with oil. Acetylene can decompose and explode when exposed to pressures greater than approximately 15 psig. Combining an oxidizing gas, such as oxygen or air, with an HC refrigerant under pressure can result in a fire or explosion.
- Use a pressure-regulating valve and pressure gauges. Commercial cylinders of nitrogen contain pressures in excess of 2,000 psig at 70°F. At pressures much lower than 2,000 psig, a compressor can explode and cause serious injury or death. To avoid over pressurizing the system, always use a pressure regulating valve on the nitrogen cylinder discharge outlet. The pressure regulator must be able to reduce the pressure to 1 or 2 psig and maintain this pressure. The regulating valve must be equipped with two pressure gauges—one gauge to measure the cylinder pressure, and one gauge to measure the discharge or downstream pressure.
- Use a pressure relief valve. In addition to a pressure-regulating valve and gauges, always install a pressure relief valve. This can also be a frangible disk-type pressure relief device. This device should have a discharge port of at least 1⁄2-in. MPT size. The relief valve or frangible disk device must be set to release at 175 psig. The release setting may be higher for some systems. Check with the equipment manufacturer if this value is unknown.

- Do not pressurize a system beyond the nameplate test value when field-testing for leaks. Disconnect the nitrogen cylinder, and evacuate the system to a level of at least 500 microns before connecting a refrigerant cylinder to the system.
- Before opening the refrigeration system, remember that the POE oil is very hygroscopic and absorbs moisture very quickly.
- You should not leave the system open to the atmosphere for more than 15 minutes. Any vacuum that exists before any repair should be broken with nitrogen to avoid moisture being pulled into the system.
- When accessing the system do not remove process tube ends. Use Temporary bolt on access valves for diagnosing and repair.
- When repair is complete valves need to be removed.
- For your manifold gauges, use as short as hose as possible.
- We recommend a maximum length of 12".
- The introduction to the refrigeration system of anything other than a flushing agent, nitrogen, refrigerant, or oil is prohibited.
- If you are changing a component keep the system closed up with plugs or caps to reduce moisture contamination.
- Recover the refrigerant from the system. Note R-290 can be vented to the atmosphere in a well ventilated area with no source of ignition.
- Remove the faulty refrigeration component and filter drier by cutting them out with a tubing cutter.
- Take a look at the filter drier and the components that have been removed for signs of oil breakdown, foreign objects like desiccant from drier, metal pieces from valves, etc.
- Be sure and test the oil from the refrigeration system for contamination using the proper test kit for the type of oil.
- When replacing a compressor make sure to also remove all the old oil from the system.
- If the oil shows signs of contamination. Flush the system.
- Always replace the drier with the exact OEM size.
- When brazing on R-290 system always purge nitrogen through the system.
- Place a nitrogen charge in the system to check for any leaks.
- Release the nitrogen down to 2 PSI.
- Change vacuum pump oil regularly to ensure the deepest vacuum.
- Start pulling a vacuum as soon as possible to help remove moisture.
- Using a micron gauge pull down to 500 microns.
- See if the system will hold this micron with the gauges closed and the pump switched off to test for leaks of moisture.
- Once the system is evacuated, weigh in the listed refrigerant charge located on the serial tag inside the cabinet. R-290 can be added as a liquid or vapor.

– Refrigerant should be charged through the high side.

- Test run unit and check for proper operation.
- Remove access valves.
- ANY NITROGEN ADDED TO THE SYSTEM SHOULD NOT EXCEED 200 PSI (13.8 BAR).

FAQ Section

1. Do you need specialized training to service R-290?

- No. The Environmental Protection Agency (EPA) has ruled specialized training is not required to service R-290, but it is recommended. (North America)

2. What tools are needed to service HC appliances? Are any specialized tools required?

- Standard refrigeration tools are required (pinch-off tool, nitrogen, vacuum pump, micron gauge, torches, soap bubbles, manifold set, tube cutter, etc.) Only two (2) specialized tools are required for servicing HC appliances:
- Combustible gas meter or HC leak detector.
- Safety placard advising of no smoking or open flames.

3. Is there a maximum charge amount for applicants with R-290?

- Yes, The maximum charge is 5.3 oz (150 g) per refrigerant system.

4. How do I tell if the system I am working on is built with R-290? Are there special markings?

- Yes, there are special indicators the appliance is built with R-290.
  - Serial label indicates refrigerant type
  - Multiple labels stating the appliance is built with HC refrigerant
  - Red sleeves on the process tubes (North America)

5. Will I need different gauges for an R-290 system?

- No, you can use a R-134a manifold set. Due to the small system charge amounts, recommend using the shortest hoses possible.

6. Do I have to recover R-290 refrigerant?

- No, you do not have to recover HC refrigerant. It can be vented to the atmosphere.

7. How do I leak check an R-290 system?

- You mostly leak check an R-290 system the same way you would an R-134a/404A system. You can still use a
- bubble solution or an ultrasonic leak detector as well.
  - Exception #1: You cannot use a halide leak detector on an R-290 system
  - Exception #2: Your electronic leak detector must be designed specifically for combustible gas

8. Where can I get R-290 refrigerant?

- You can source the refrigerant from an HVAC supply house or a company that sells gasses and welding supplies.
  - **NOTE: Be sure to purchase refrigerant grade R-290.**

9. What is the difference between R-290 and standard propane from a hardware store?

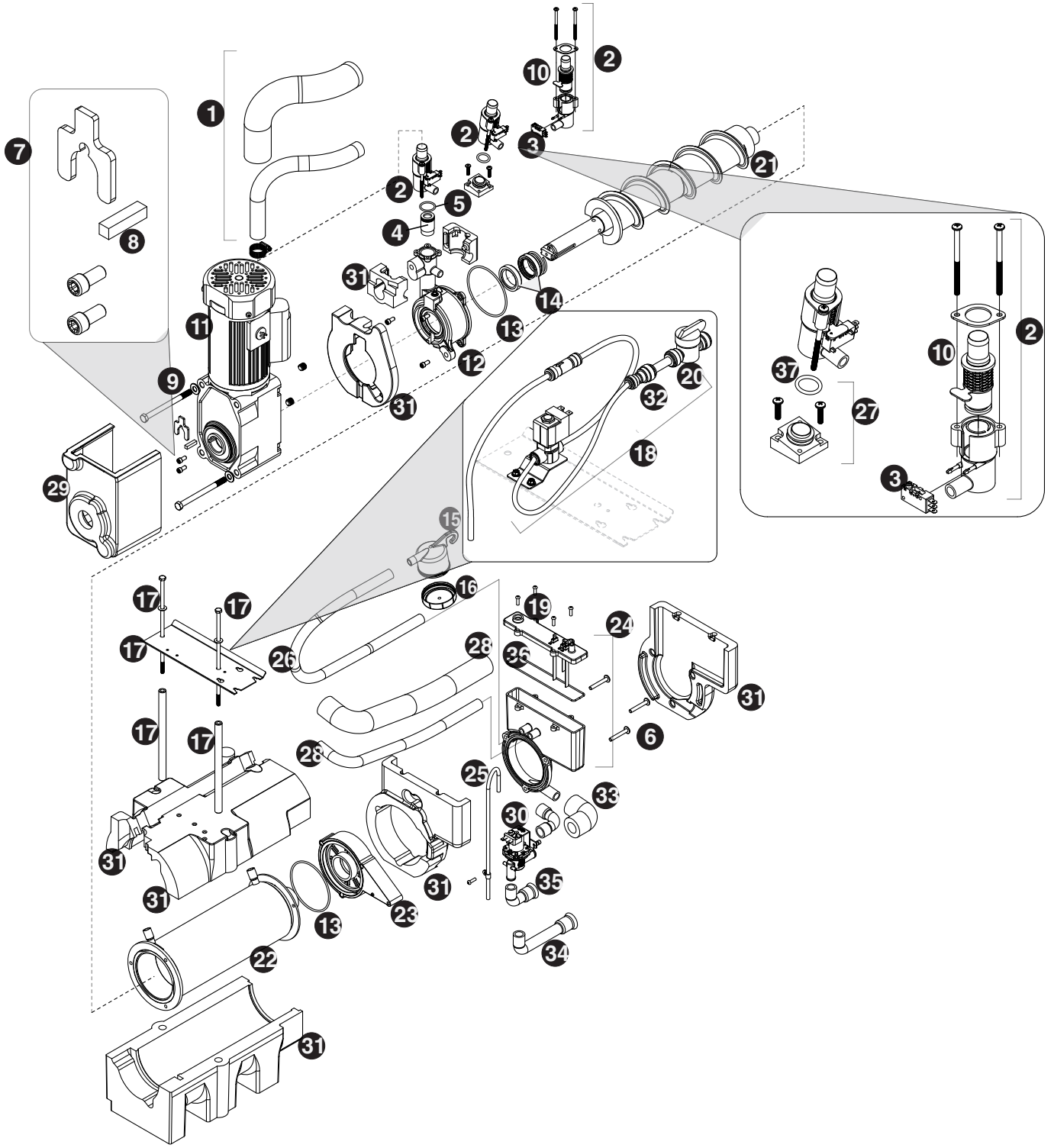
- R-290 is a much higher purity than standard propane; this level is greater than 97.5%. R-290 has a low moisture content; moisture damages the refrigeration system and components. Also, R-290 is odorless, unlike standard propane.

10. Can I retrofit older appliances to R-290?

- No, retrofitting existing equipment is prohibited.

Replacement parts

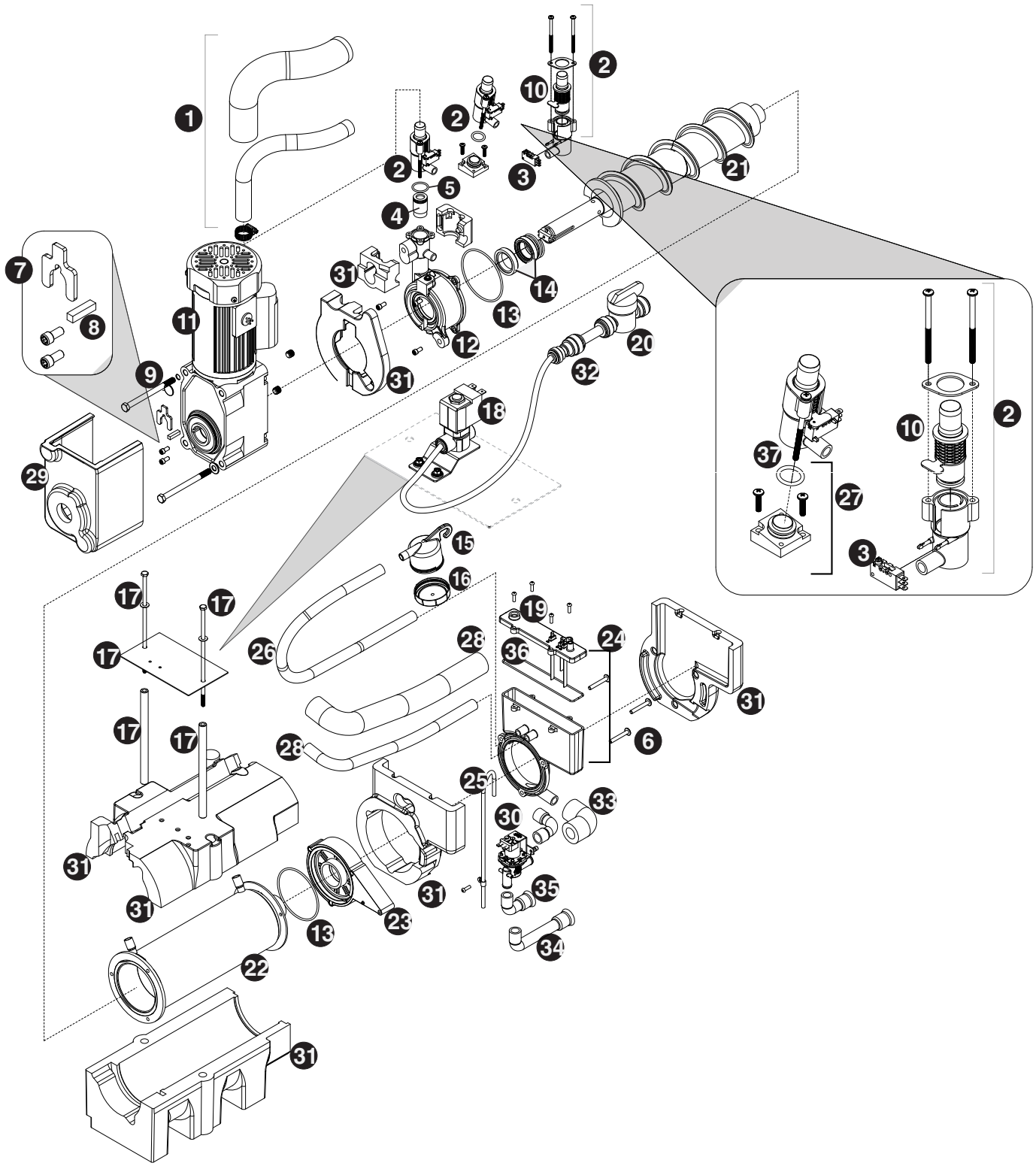
Air-Cooled Evaporator assembly



Reference #	Description	Part #
1	Tube, ice transport, insulated	01118181
2	Shuttle assembly	01118132
2	Shuttle assembly, IMDV (dual spring, not for IMDV-2CM)	01118140
3	Switch, shuttle	01006261
4	Compression nozzle	01278654

5	O-ring, shuttle	01164920
6	Screw, reservoir (10 pack)	01333830
7	Auger hardware (includes screws, key, retainer)	01118611
8	Key	01164938
9	Bolt, gearmotor mounting (2) (self-contained units), includes washers	01118629
10	Cartridge assembly, shuttle spring	01118033
10	Cartridge, shuttle dual spring, IMDV (not for IMDV-2CM)	01118041
11	Gearmotor, 220 V (includes capacitor)	01568641
Not shown	Capacitor, Gearmotor, run, 220 V	01568666
12	Main housing, self-contained	01117969
13	O ring	01301720
14	Seal, auger shaft	01302249
15	Cup, sanitizer	01164995
16	Cap, sanitizer	01118637
Not shown	Tubing, water, 3/8" OD	502719
Not shown	Tubing, water, 1/4" OD	502079
17	Retainer kit, evaporator (air-cooled only)	01592732
18	Solenoid, water feed (220 V)	01442045
19	Reservoir lid and sensors (includes screws and o-ring)	01118108
20	Valve, shut-off, water	502921
21	Auger, 1014 self-contained (includes seal, key, and auger hardware)	01117928 (1014 only)
21	Auger, 1414 self-contained (includes seal, key, and auger hardware)	01117936 (1414 only)
22	Evaporator, 1014	01118066 (1014 only)
22	Evaporator, 1414	01118074 (1414 only)
23	Rear bushing housing and bushing (includes (1) o-ring)	01118082
24	Reservoir assembly, water (includes lid)	01118116
25	Tube, vent (17" required)	502079
26	Tube, sanitizer	01118660
27	Kit, MicroChewblet	01161843
28	Tube, shuttle drain, insulated	01118678
29	Insulation, gearbox, 220 V	01165240
30	Solenoid, purge, 220 V	01148733
31	Insulation kit, 1014 evaporator/reservoir	01302256 (1014 only)
31	Insulation kit, 1414 evaporator/reservoir	01302264 (1414 only)
32	Check valve	01122381
33	Tube, drain, reservoir, insulated	01118124
34	Tube, drain, 1014	01302272 (1014 only)
35	Tube, drain, 1414	01302280 (1414 only)
36	O-ring, reservoir lid	01302298
Not shown	Kit, scale (includes reservoir, purge solenoid, drain tubes and fitting)	01122654
37	O-ring, MicroChewblet	01161850
38	Journal, threaded	01477538
39	Bolt, journal	01478759
Not shown	Drain kit (includes 2 ft. x 1" OD silicone tubing, 3/4" x 1" slip, 3/4" barb 3/4" FPT (2), 3/4" barb x 3/4" FPT elbow)	01210350

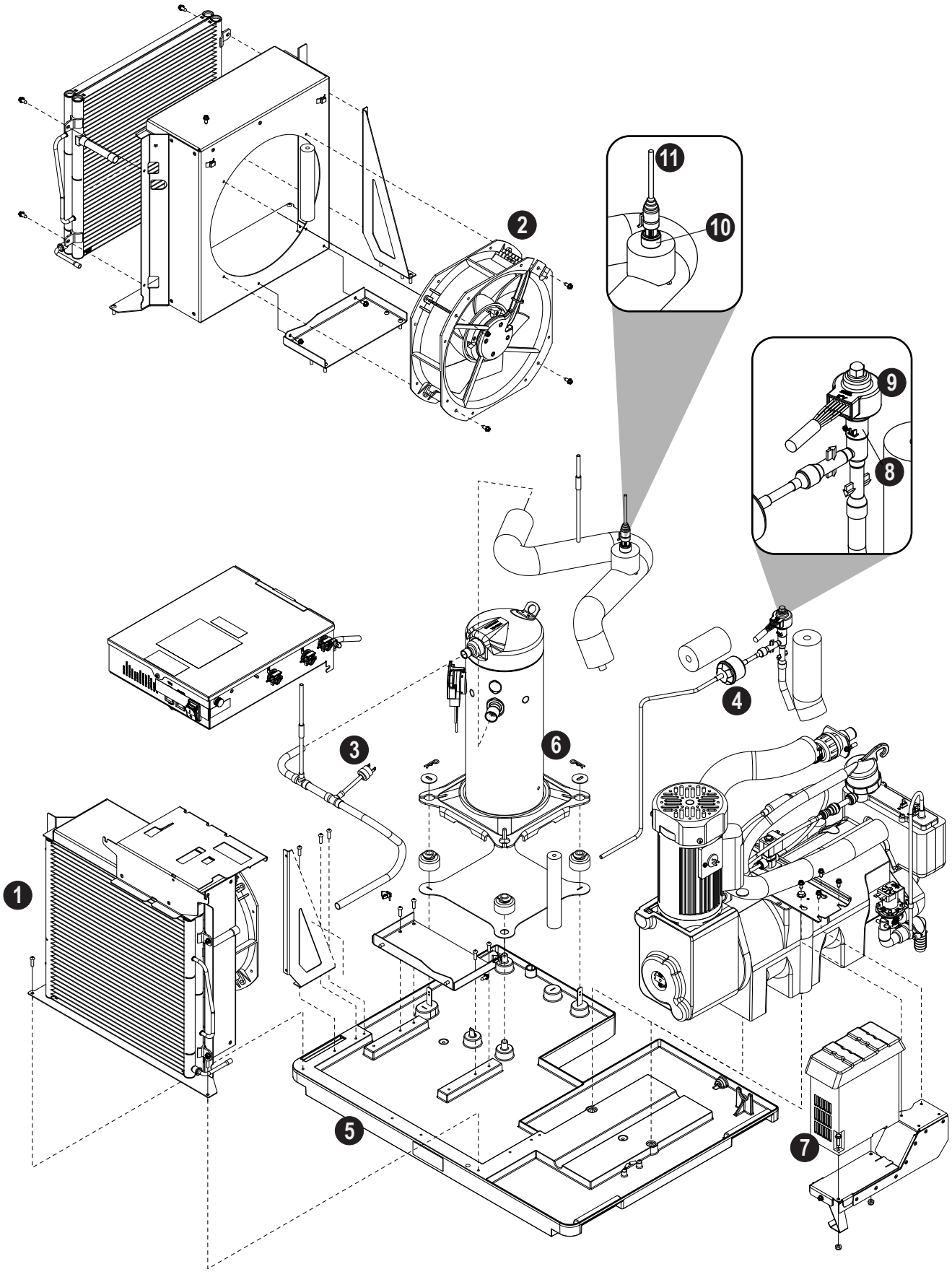
Water-Cooled Evaporator assembly



Reference #	Description	Part #
1	Tube, ice transport, insulated	01118181
2	Shuttle assembly	01118132
2	Shuttle assembly, IMDV (dual spring, not for IMDV-2CM)	01118140
3	Switch, shuttle	01006261

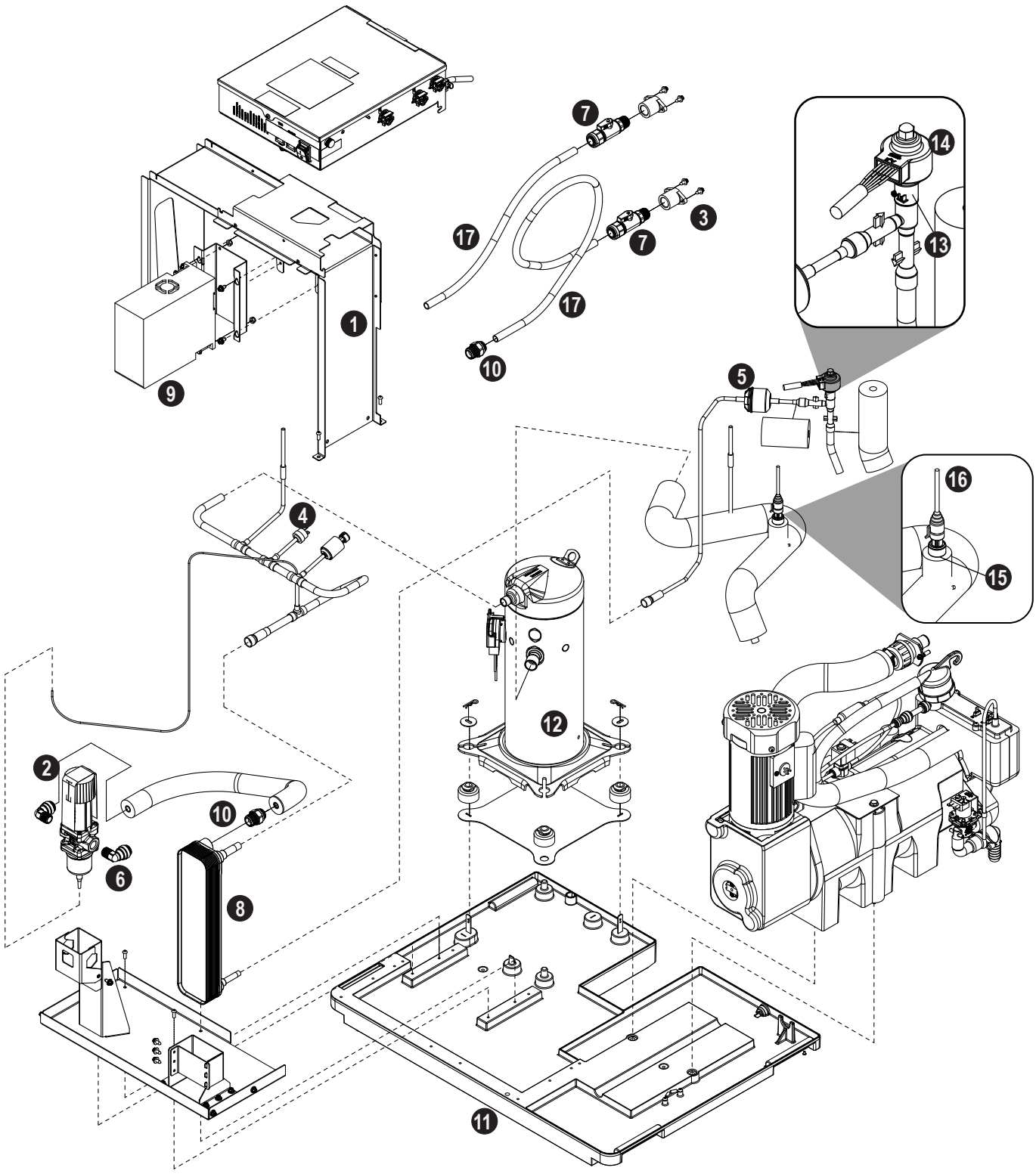
4	Compression nozzle	01278654
5	O-ring, shuttle	01164920
6	Screw, reservoir (10 pack)	01333830
7	Auger hardware (includes screws, key, retainer)	01118611
8	Key	01164938
9	Bolt, gearmotor mounting (2) (self-contained units), includes washers	01118629
10	Cartridge assembly, shuttle spring	01118033
10	Cartridge, shuttle dual spring, IMDV (not for IMDV-2CM)	01118041
11	Gearmotor, 220 V (includes capacitor)	01568641
Not shown	Capacitor, Gearmotor, run, 220 V	01568666
12	Main housing, self-contained	01117969
13	O ring	01301720
14	Seal, auger shaft	01302249
15	Cup, sanitizer	01164995
16	Cap, sanitizer	01118637
Not shown	Tubing, water, 3/8" OD	502719
Not shown	Tubing, water, 1/4" OD	502079
17	Retainer kit, evaporator	01118652
18	Solenoid, water feed (220 V)	01442045
19	Reservoir lid and sensors (includes screws and o-ring)	01118108
20	Valve, shut-off, water	502921
21	Auger, 1014 self-contained (includes seal, key, and auger hardware)	01117928 **(1014 only)**
21	Auger, 1414 self-contained (includes seal, key, and auger hardware)	01117936 **(1414 only)**
22	Evaporator, 1014	01118066 **(1014 only)**
22	Evaporator, 1414	01118074 **(1414 only)**
23	Rear bushing housing and bushing (includes (1) o-ring)	01118082
24	Reservoir assembly, water (includes lid)	01118116
25	Tube, vent (17" required)	502079
26	Tube, sanitizer	01118660
27	Kit, MicroChewblet	01161843
28	Tube, shuttle drain, insulated	01118678
29	Insulation, gearbox, 220 V	01165240
30	Solenoid, purge, 220 V	01148733
31	Insulation kit, 1014 evaporator/reservoir	01302256 **(1014 only)**
31	Insulation kit, 1414 evaporator/reservoir	01302264 **(1414 only)**
32	Check valve	01122381
33	Tube, drain, reservoir, insulated	01118124
34	Tube, drain, 1014	01302272 **(1014 only)**
35	Tube, drain, 1414	01302280 **(1414 only)**
36	O-ring, reservoir lid	01302298
Not shown	Kit, scale (includes reservoir, purge solenoid, drain tubes and fitting)	01122654
37	O-ring, MicroChewblet	01161850
38	Journal, threaded	01477538
39	Bolt, journal	01478759
Not shown	Drain kit (includes 2 ft. x 1" OD silicone tubing, 3/4" x 1" slip, 3/4" barb 3/4" FPT (2), 3/4" barb x 3/4" FPT elbow)	01210350

Air-cooled assembly



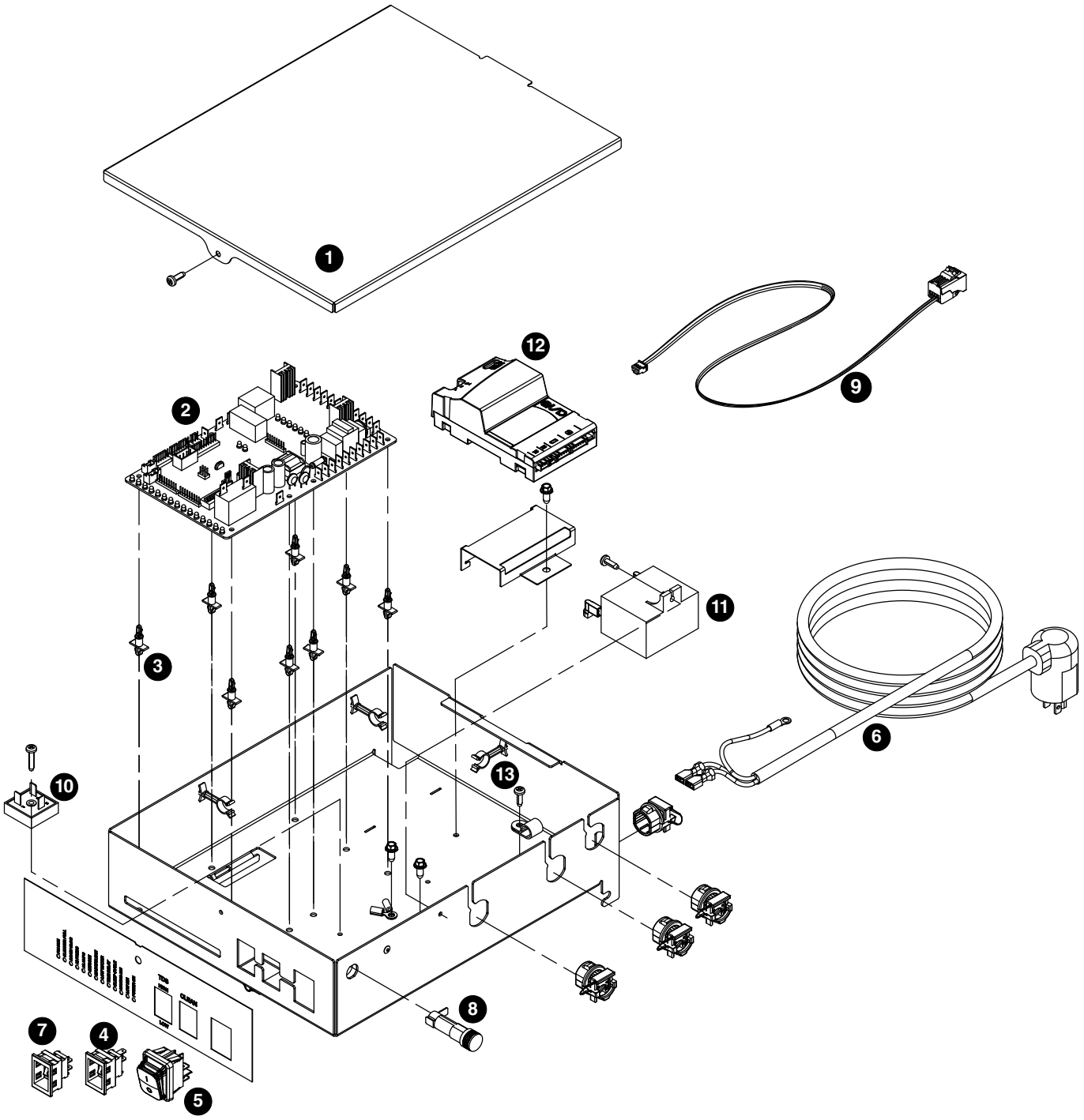
Reference #	Description	Part #
1	Condenser (air-cooled only)	01568815
2	Fan motor assembly - 220 V/60 Hz	01568823
3	Cut-out, high pressure safety	01232941
4	Drier	01568799
5	Base, ice machine	01117795
6	Kit, Compressor 1014/1414 all models	01568807
7	VFD (1014A only), shown with cover	01596691
7	VFD (1414A only), shown with cover	01592302
Not shown	Compressor Wiring Harness	01571611
8	EEV (Valve) 1014/1414 all models	01568674
9	EEV Stator with cable	01568682
10	EEV Pressure Transducer	01568708
11	EEV Pressure Transducer Cable	01568716
Not shown	EEV Temperature Sensor with Cable	01568724
Not shown	EEV Power Cable	01568740
Not shown	Fan Wiring Harness (air-cooled only)	01568757
Not shown	VFD Cover, Waterproof (air-cooled only)	01592310

Water-cooled assembly



Reference #	Description	Part #
1	Electrical box support (water-cooled only)	01571645
2	Valve, water regulating	01571579
3	Coupling, 1/2" NPT female, with screws	01574888
4	Cut-out, high pressure safety	01302835
5	Drier	01568799
6	Fitting, 90˚, 1/2" tube x 3/8" NPT male (1), 2 required	01574854
7	Valve, two way, condenser water shut-off (1), 2 required	01574896
8	Condenser, w/c, 1414W (with John Guest fittings)	01571561
9	VFD (1414W only)	01588722
Not shown	Valve, shut-off, water	502222
10	Fitting, 1/2" tube x 1/2" NPT	01574847
11	Base, ice machine	01117795
12	Kit, Compressor 1014/1414 all models	01568807
Not shown	Compressor Wiring Harness	01571611
13	EEV (Valve) 1014/1414 all models	01568674
14	EEV Stator with cable	01568682
15	EEV Pressure Transducer	01568708
16	EEV Pressure Transducer Cable	01568716
Not shown	EEV Temperature Sensor with Cable	01568724
Not shown	EEV Power Cable	01568740
17	Tubing, condenser water, 1/2", with insulation	01592385

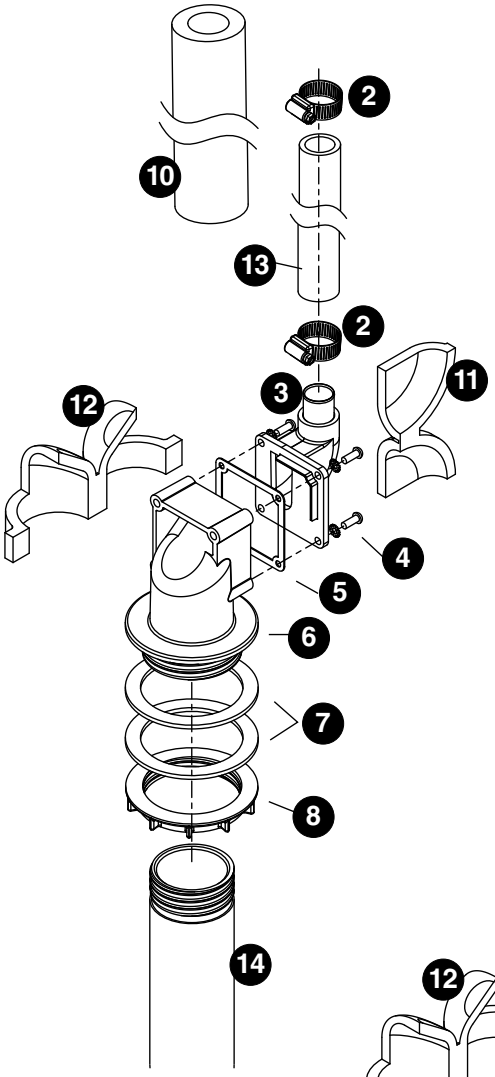
Electrical box

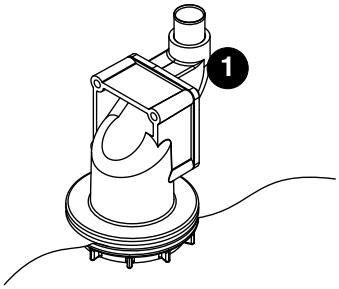


Reference #	Description	Part #
1	Cover, electrical box, air/water-cooled	01118967
2	Control Board, 1014A, 1414A/W	01584051
3	Stand-offs (set of 8)	00130906
4	Switch, evaporator clean	01165703
5	Switch, ice machine power, ignition proof	01568732
6	Cord, power 1014/1414	01583079
7	Switch, TDS	01165695
8	Gearmotor, 4A fuse	01568765
9	Cable, IMDV	01551365
10	Switch, start gearmotor	01568658
11	Capacitor, gearmotor, run	01568666
12	Controller, EEV 1014A	01588755
12	Controller, EEV 1414A/W	01588763
13	Holder, gearmotor spare fuse	01568773

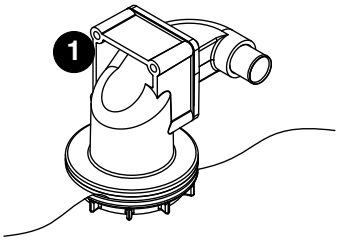
Integration kit – top-mount and RIDE remote ice delivery

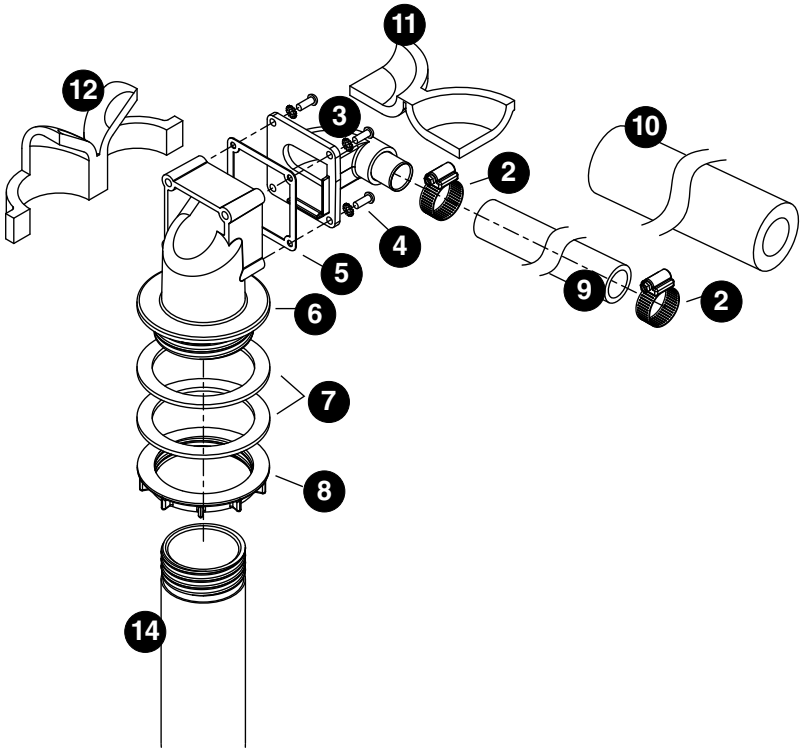
Top mount configuration





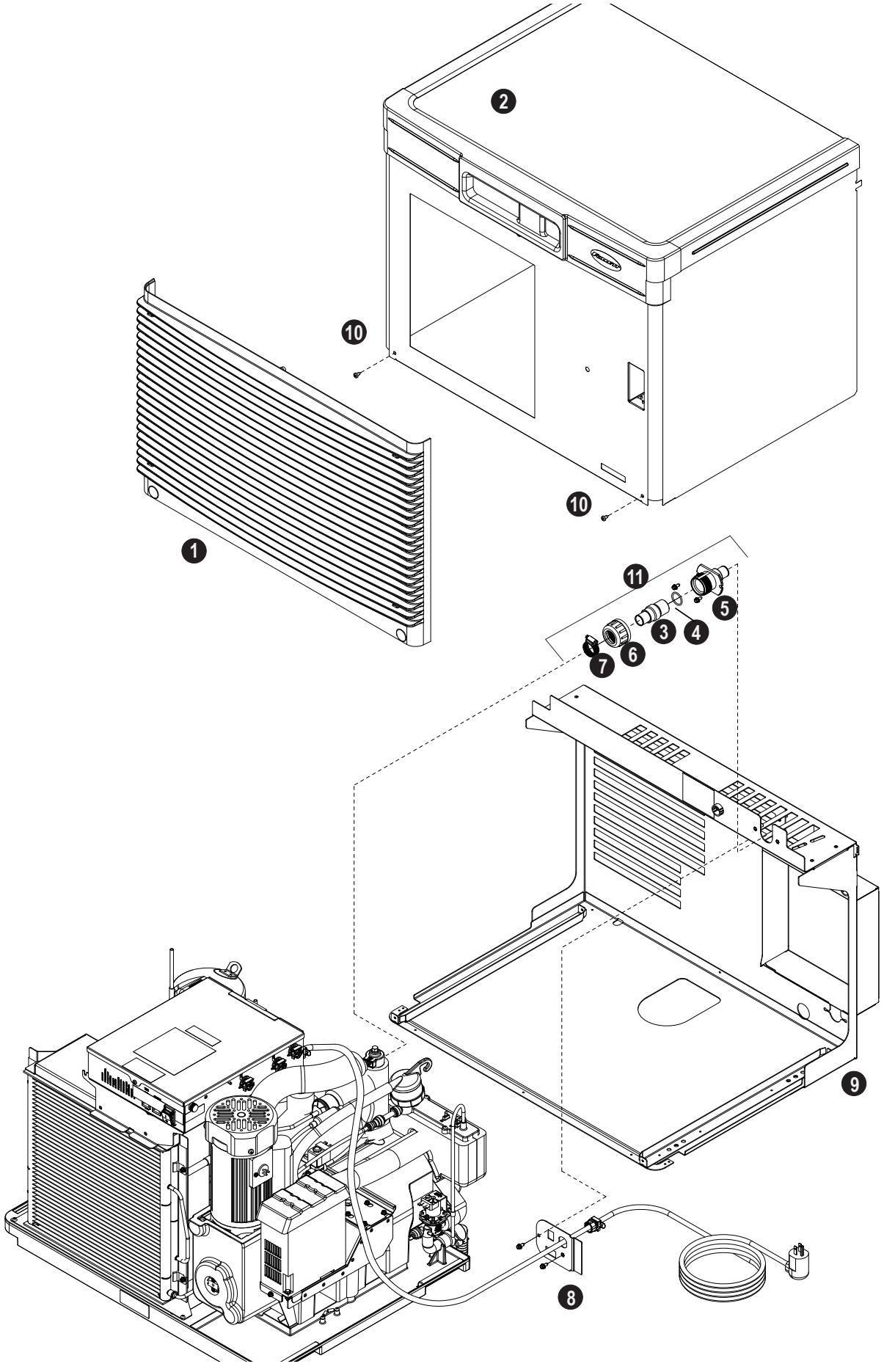
RIDE model configuration





Reference #	Description	Part #
1	Shuttle actuator	00171322
2	Clamp	500377
3	Actuator elbow (includes 00167122 and 209100)	00171264
4	Screws	01303064
5	Gasket	01303072
6	Actuator body	00171272
7	Gasket, coupling	01303080
8	Ring, locking (includes 00126532)	00171371
9	Ice transport tube, 10' (3 m)	00171280
9	Ice transport tube, 20' (6 m)	00171298
10	Insulation, transport tube	501176
Not shown	Insulated polywire ice transport tube, per foot	00174896
11	Insulation, elbow	01303098
12	Insulation, actuator	01303106
13	Ice transport tube, top mount, 30" (762 mm)	00171306
14	Extension-fill tube, 9"	01303114
14	Extension-fill tube, 4"	01303122
Not shown	Integration kit, top mount, Harmony or Bin	00171389
Not shown	Integration kit, RIDE model, Harmony or Bin, (includes 10' (3 m) of tube and insulation)	00171397
Not shown	Integration kit, drop in	00145334
Not shown	Integration kit, Cornelius PR150	00144774
Not shown	Integration kit, Vision (does not include ice tube)	00997171
Not shown	Diverter plate (single agitator Cornelius dispensers and left-hand dispense chute on dual-agitator Cornelius dispensers)	01303130
Not shown	Diverter plate (right-hand dispense chute on dual-agitator dispensers)	00996207
Not shown	SafeCLEAN Plus, case of 6	01149954
Not shown	SafeCLEAN Plus, case of 24	01149962
Not shown	SafeCLEAN Plus, case of 4 one gallon bottles	01555077
Not shown	Sani-Sponge kit	00132068
Not shown	High-capacity filter system	CARBONHICAPSYSTEM
Not shown	Primary filter (1)	CARBONHICAPFILTER
Not shown	Primary filter (6)	CARBONHICAPFILTER6
Not shown	Pre-filter (1)	SEDIMENTPREFILTER
Not shown	Pre-filter (12)	SEDIMENTPREFILTER12
Not shown	IMSII or IMSIII sanitizer concentrate - 16 oz.	00979674
Not shown	Sponge, sanitary, pack of 24	01075431
Not shown	Cable, Comm, IMDV-2CM board interface	01551365
Not shown	Kit, Legacy IMDV Dual spring, includes IMDV cartridge and communication cable (not for IMDV-2CM)	01116177
Not shown	3/4" Tubing, silicone (per foot), ice machine drain	01303155

Skins assembly



Reference #	Description	Part #
1	Grille, front 1014/1414 air-cooled only	01592377
2	Front cover, 1014/1414 air-cooled only	01598714
Not shown	Front cover, 1414W only	01594870
Not shown	Tubing, water, 3/8" OD	502719
3	Coupling (includes O-ring)	00171207
4	O-ring	01303171
5	Bulkhead fitting	00171215
6	Cap, nut, ice hose	01303189
7	Hose clamp	500377
8	Plate, strain relief	00192070
9	Docking station, 1014A only	01592534 **(1014A only)**
9	Docking station, 1414A only	01592542 **(1414A only)**
9	Docking station, 1414W only	01592559 **(1414A only)**
10	Screw	01303197
11	Bulkhead connector kit	00171223
Not shown	Gasket, front cover (inside), per foot (4 feet included)	00135574
Not shown	Fitting, drain	00109728

Evaporator Scale Removal

Topic

This procedure is to be used for hand cleaning Horizon Elite evaporators with difficult to remove scale. Standard chemical cleans (as described in the operation and service manuals) should be performed first. In the event that a standard cleaning does not remove the scale, this procedure can be performed.

Action

1. Follow the Evaporator disassembly instructions on page 20.
2. Thoroughly dry the inside of the evaporator barrel and let it warm to room temperature. The evaporator must be warm and dry before you will be able to observe the scale formation.
3. Confirm there is a white/gray haze inside the evaporator (Fig. 35).

Fig. 35



4. If scale is present, use 120 grit sanding cloth in an in-and-out motion only, sand off any scale inside the evaporator (Fig. 34). *Do not sand the front 2 inches of the barrel - by design that portion has a highly polished surface.*

   Caution! *Failure to follow this motion will result in further machine errors. Do not use a circular motion*.

Fig. 36



5. Inspect the stainless steel auger. When it is warm and dry, check for signs of accumulated scale. Scale will appear as a white or gray haze (Fig. 37).

Fig. 37



6. If there is any indication of scale on the auger, it can be cleaned with ice machine cleaner and a Scotch brite pad.

   Caution! *Do not use anything more abrasive than a Scotch brite pad on the auger surface. Failure to heed this warning will cause irreversible damage to the auger's finish.*

7. Once clean, rinse and allow auger to dry again to confirm all scale has been removed, if scale is still present, repeat Step 6.

8. When evaporator sanding is complete, thoroughly wipe out the inside of the barrel (Fig. 38).

Fig. 38



9. Reassemble the evaporator as described on Page 23.

   Note: Before placing gear motor on auger shaft, coat auger shaft with food safe grease - *DO NOT USE petrol gel!*

10. Inspect the purge solenoid, clean as necessary and reassembe.

11. Inspect the drain line to the manifold and clean as necessary.

12. Perform the Cleaning/sanitizing and preventive maintenance procedure (Page 9). Confirm proper operation afterwards and place the machine back into operation.

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