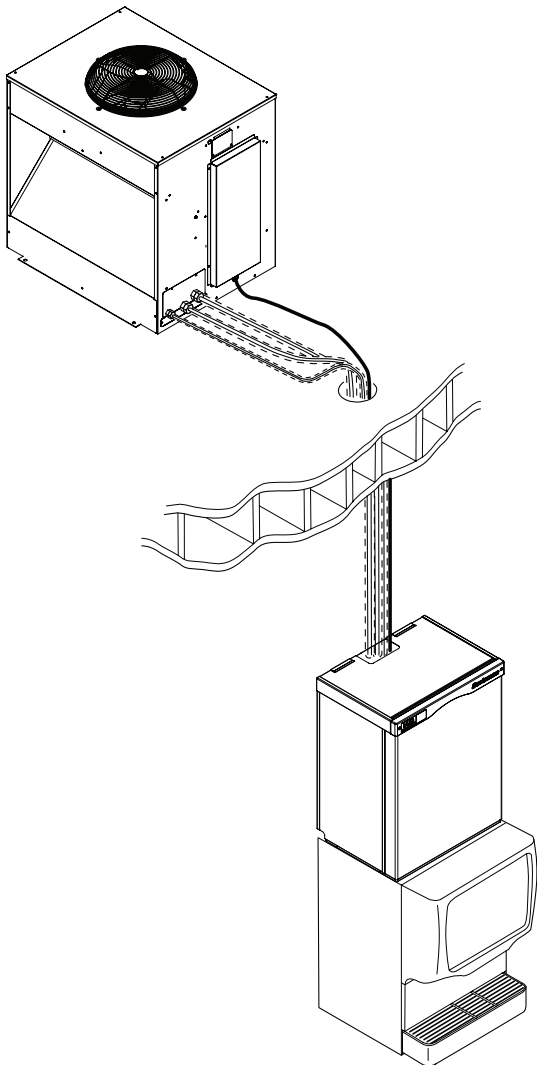




Service Manual  
for  
Prodigy Eclipse Cuber  
model EH222 with ECC Condensing Unit  
Includes Prodigy Plus D Models



# EH222 and Condensing Unit Remote Low Side Cuber Service Manual

## Introduction:

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This manual covers the assembly, installation, start up, operation and maintenance of the 800 and 1000 remote low side cuber systems.

|   |         |   |         |
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# EH222 and Condensing Unit Remote Low Side Cuber Service Manual Configuration

A remote low side cuber system includes two sub systems: an ice making head and a remote air cooled condensing unit. This manual covers the EH222 head and the condensing units that go with it.

The ice making heads are designed for use indoors in a controlled environment. The remote condensing units are designed to operate outdoors. Each sub-system has limits for power, water and temperature.

### Operational Limitations:

|                    | Minimum            | Maximum |
|--------------------|--------------------|---------|
| Air Temp (at head) | 50°F               | 100°F.  |
| Air Temp (CU)      | -20°F.             | 120°F.  |
| Water Temp         | 40°F.              | 100°F.  |
| Water Pressure     | 20 psi             | 80 psi  |
| Water Conductivity | 10 microSiemens/cm | any     |
| Voltage (at head)  | 104                | 126     |
| Voltage (CU)       | 198                | 253     |

CU= Condensing Unit

Do Not operate the machine in conditions beyond these limitations. Doing so will void the warranty.

| System Size | Condensing Unit (CU) |                             | Ice Making Head |                             |
|-------------|----------------------|-----------------------------|-----------------|-----------------------------|
|             | Model                | Electrical (volts/Hz/phase) | Model           | Electrical (volts/Hz/phase) |
| 800         | ECC0800-32A          | 208-230/60/1                | EH222SL-1C      | 115/60/1                    |
| 800         | ECC0800-3A           | 208-230/60/3                | same            | same                        |
| 1000        | ECC1410-32A          | 208-230/60/1                | same            | same                        |
| 1000        | ECC1410-3A           | 208-230/60/3                | same            | same                        |

Scotsman ice systems are designed and manufactured with the highest regard for safety and performance. They meet or exceed common agency standards.

Scotsman assumes no liability of responsibility of any kind for products manufactured by Scotsman that have been altered in any way, including the use of any part and/or other components not specifically approved by Scotsman.

Scotsman reserves the right to make design changes and/or improvements at any time. Specifications and design are subject to change without notice.

### Warranty

Refer to the warranty coverage in effect when the equipment was sold. Warranty statements are included with each product.

### Systems:

Ice making heads and condensing units have their own model and serial numbers. They must be combined to create a remote cuber low side system.

Notes: Voltage Codes are at the end of the model number. Codes read Voltage/Hertz/Phase. Those related to these products include:

-1 = 115/60/1

-3 = 208-230/60/3

-32 = 208-230/60/1

### System Information

Tubing kits are required to connect the head to the condensing unit.

Interconnecting 24 volt control wire ships with the condensing unit.

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Specifications and Location Information**

| Model      | Electrical volts/Hz/phase | Minimum Circuit Ampacity | Maximum Fuse Size | System Charge, oz of R-404A | Cabinet Size* w" x d" x h" | Unit Weight (lb) |
|------------|---------------------------|--------------------------|-------------------|-----------------------------|----------------------------|------------------|
| EH222SL-1C | 115/60/1                  | 1.13                     | 15                | shipped w/none              | 22 x 16.5 x 29             | 90               |
| ECC0800-32 | 208-230/60/1              | 14.8                     | 20                | 192                         | 32 x 39 x 39.75            |                  |
| ECC0800-3  | 208-230/60/3              | 10.6                     | 15                | 192                         | 32 x 39 x 39.75            |                  |
| ECC1410-32 | 208-230/60/1              | 14.5                     | 30                | 224                         | 32 x 39 x 39.75            |                  |
| ECC1410-3  | 208-230/60/3              | 9.1                      | 20                | 224                         | 32 x 39 x 39.75            |                  |

\* See cabinet drawings for detailed dimensions.

**Location Limitations**

Maximum Distance between Head and Condensing Unit: Limited to the length of the longest available single tubing kit, 75 feet.

Maximum Condensing Unit Elevation over Ice Making Head: 35 feet.

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Note: Elevations greater than 20 feet require installation of a suction line trap at the 20 foot mark.

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Maximum Ice Making Head Elevation over Condensing Unit: 15 feet.

**Line Routing:**

- Allowed: One rise after a drop.
- Allowed: One drop after a rise.
- Not Allowed: More than one rise after a drop
- Not Allowed: More than one drop after a rise.

**Model Number Locations**

**Ice Making Head**

The dataplate on the back of the ice machine contains the model number, serial number and electrical data.

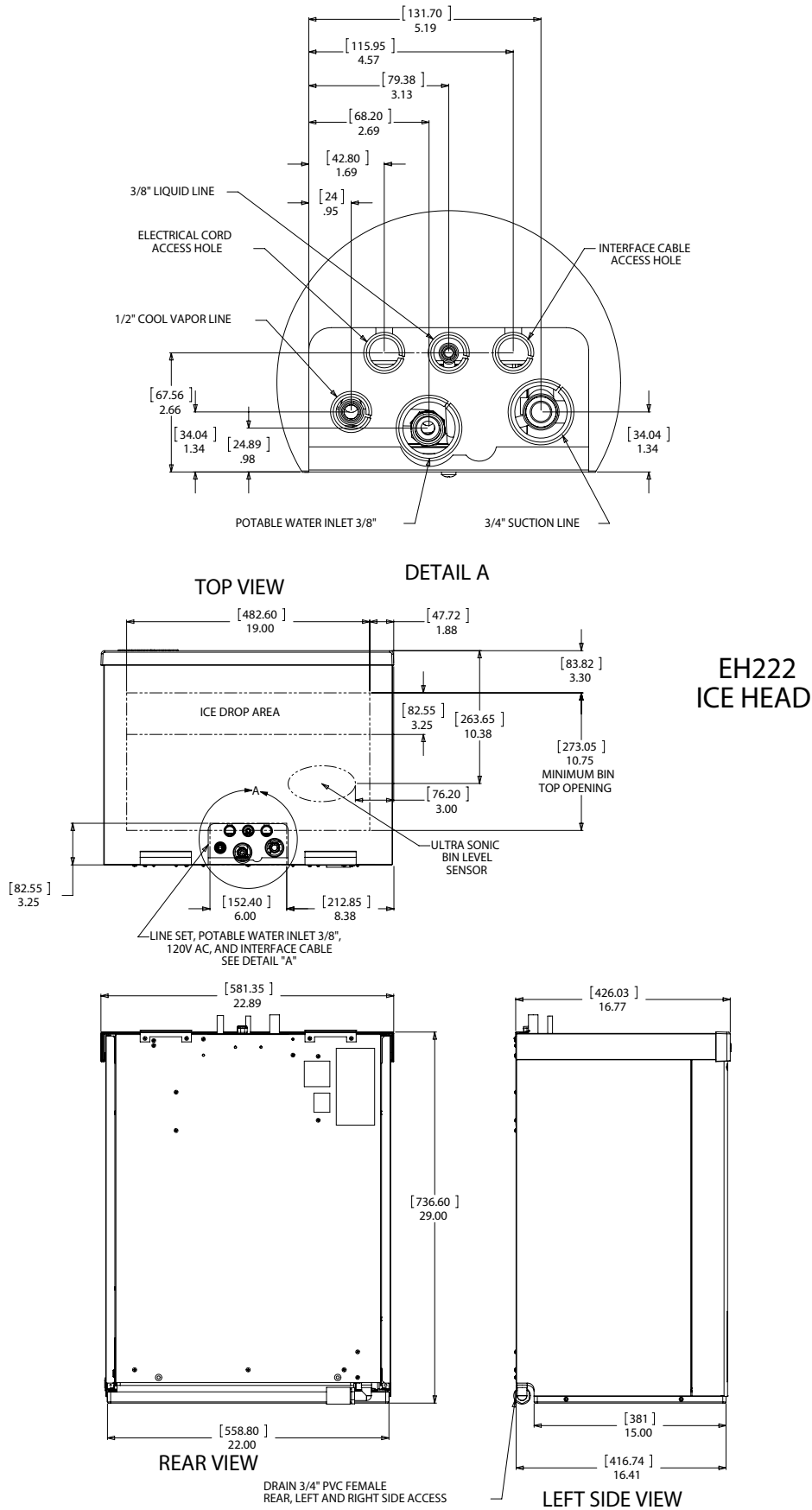
A second plate, located behind the front panel at the lower right front, also lists the model and serial numbers.

**Condensing unit**

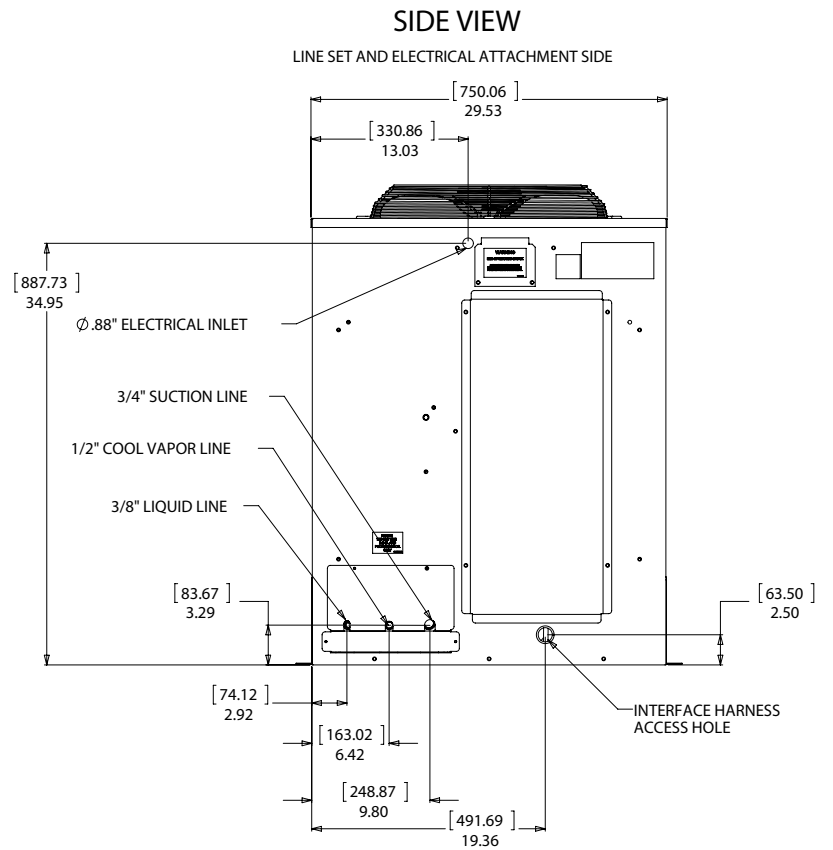
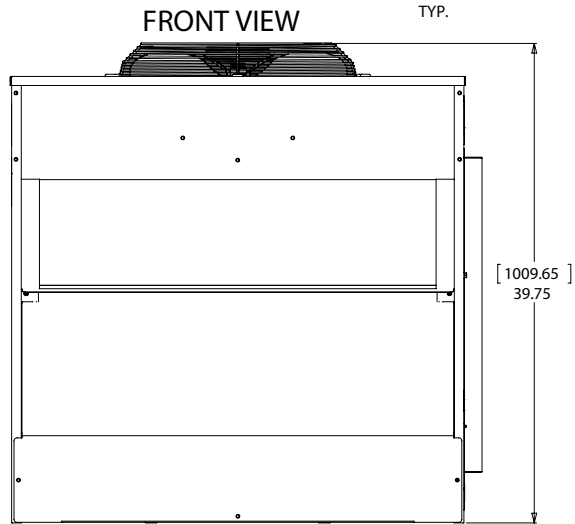
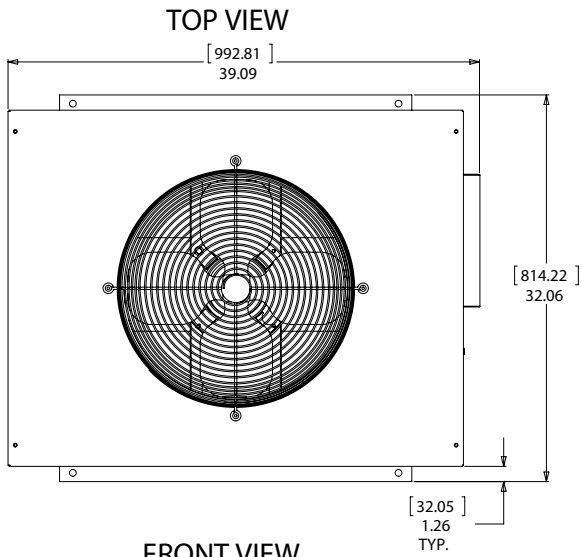
The dataplate on the end contains the model number, serial number, electrical data and system refrigerant charge.

A second plate, located behind the side panel on the deck, also lists the model number, serial number and refrigerant charge.

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Cabinet Drawings, Ice Making Head**



**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Cabinet Drawings, Condensing Unit**



# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Pre-Installation Details**

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Note: The ice making section cannot be stacked vertically.

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Accessories such as bin adapters and tubing kits are required to complete the installation.

## **Dispenser Adapter Kits:**

- Cornelius ABS: KBTABS ED150: KBT40
- Scotsman ID150: KBT40
- Scotsman ID200 or ID250: KBT41

## **Bin Adapter Kits:**

- B530P or B530S: KBT32
- B948S: KBT34

## **Tubing Kits:**

- 20 foot: 3BRTE20-EH
  - 35 foot: 3BRTE35-EH
  - 50 foot: 3BRTE50-EH
  - 75 foot: 3BRTE75-EH
- 

Note: Line set may have quick connects. The condensing section may have quick connects. See refrigeration system detailed instructions connection details.

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## **Items required for installation:**

- Ice making head
- Condensing unit (includes interconnecting control system wire)
- Tubing kit. 20', 35', 50' or 75' triple line set (liquid, vapor and suction)
- Bin or dispenser adapter

## **Special Considerations**

The ice making section's footprint is 22" wide by 16.5" deep. The refrigeration connections can be routed up or to the back. The drain may be routed out the back at any position left to right; it may also be routed to either side.

## **Water**

Pure water does not exist. All water supplies contain some amounts of impurities, although potable water is, by definition, fit for human consumption. Because the contents of the water to an ice machine directly impact its performance, consideration should be given to improving the water's quality.

There are two ways water can contain impurities: in suspension or in solution. Suspended solids can be filtered out of the water. In solution or dissolved solids must be diluted or treated. Water filters are recommended to remove the suspended solids.

Some filters or filter systems have treatment chemicals in them for treating the suspended solids.

This ice machine has an adjustment for the amount of water rinsed or purged. Water use adjustments are customer convenience adjustments; they are not factory defects and are not covered by warranty.

# **Eh222 and Condensing Unit Remote Low Side Cuber Service Manual Create the System**

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Plan the installation. The system consists of three parts: the ice making head, the condensing unit and the interconnecting tubing. Of these, the biggest variable is the interconnecting tubing.

Tubing: The tubing consists of three insulated and sealed soft copper tubes. One tube, the liquid line, is 3/8" OD. The vapor tube is 1/2" OD and the suction tube is 3/4" OD. A site inspection will determine what length of tubing is required for the installation.

In 2013 Scotsman made a change to the Eclipse tubing kits:

- Prior Tubing Kits: They each contain a small holding charge of R-404A and have quick connects at the ends.
- Current Tubing Kits: They do not contain any refrigerant and do not have quick connects.

**Either type can be used to connect the head and condensing unit.**

Check condensing unit for quick connects. If none, recover refrigerant from tubing and cut the quick connects off.

|                                      |  |  |
|--------------------------------------|--|--|
| Lineset                              | Ice machine head and condensing unit both have stubs | Ice machine head has stubs, condensing unit has quick connects.                    |
| Has Quick Connect Fittings           | Cut quick connects off both ends                     | Cut off quick connects at condensing unit end only                                 |
| Does NOT have Quick Connect Fittings | Use as supplied                                      | Use as is at head, obtain kit KTE6-EH, use 3 of 6 fittings on condensing unit end. |

**Excess tubing must be shortened at the job site.**

Installations with greater than 20 feet of vertical lift between ice machine and the compressor require a suction line trap. The suction line requires careful handling and large radius bends to prevent kinking.

Roof mounting: Some installations will require the use of a hoist to lift the components to the roof.

Pad mounting: The condensing unit may be located below the ice making section, up to a limit of 15 feet.

Distance from unit: Limited to the length of the available tubing.

Elevation: Condensing unit limited to 35 feet above the ice making section.

Condensing Unit: Electrical power must be supplied to the condensing unit, it will be separate from the head.

Ice making section location and attachment: The unique footprint of the EH222 requires adapter kits to allow placement on dispensers and bins.

The remote tubing connections are at the top of the machine, and connections should not be made until the machine is nearly in its final installed position.

The 115/60 Hz ice making section is cord connected and requires an outlet within 6 feet of the installation.

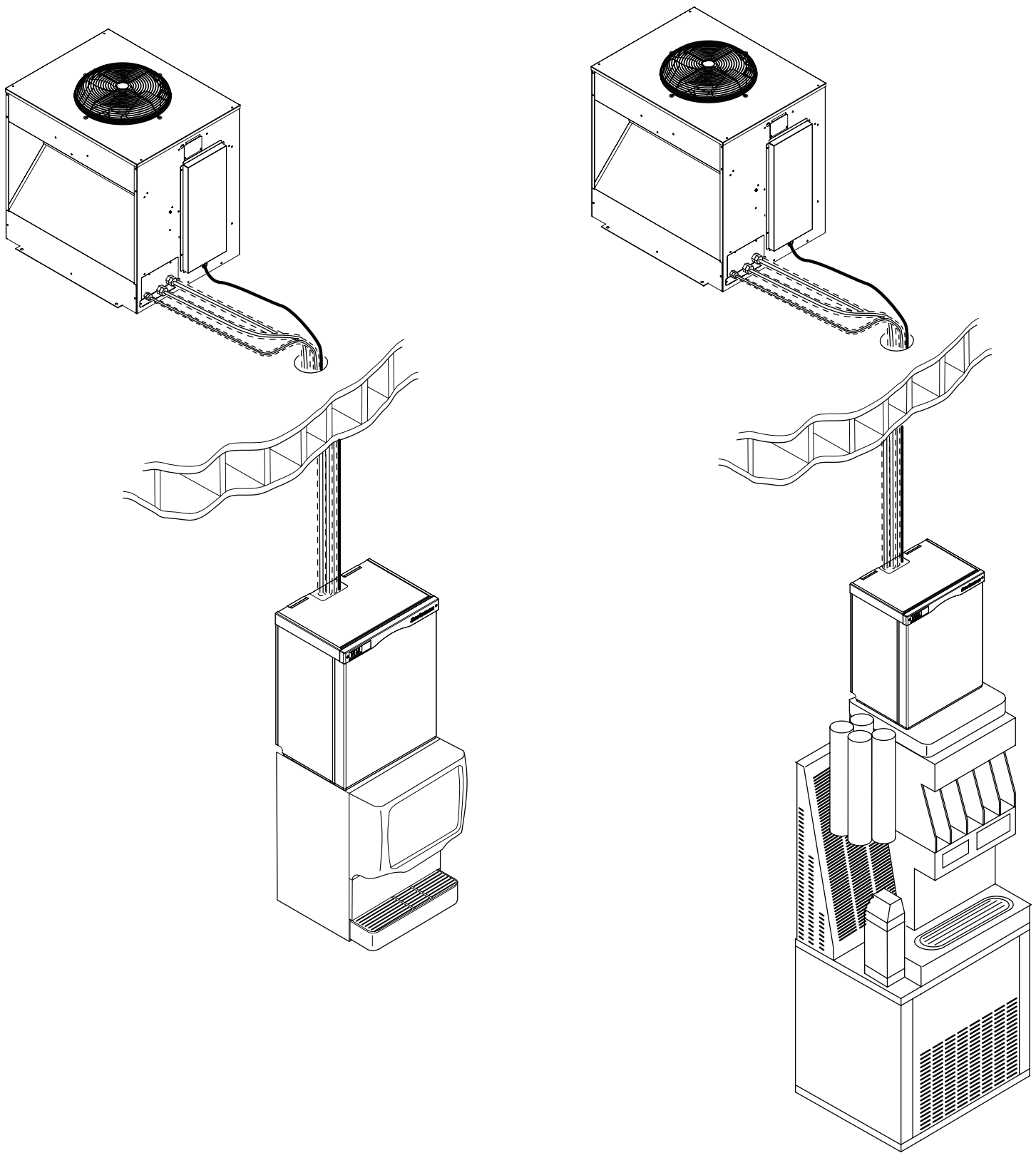
Interconnecting wires: An interconnecting wire harness is included with the condensing unit. One end plugs into the ice making section and the other into the condensing unit. The system will NOT operate without this harness.

Exposed tubing: Minimize the amount of tubing exposed outdoors.



**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Completed System Example**

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# **Eh222 and Condensing Unit Remote Low Side Cuber Service Manual Place Remote System**

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## **Roof preparation**

Most installations of this system will place the condensing unit on the roof of a building. The roof must be physically able to accept the load of the equipment and the roofing material must be prepared to prevent water leaks.

Follow local codes for the placement and attachment of the equipment.

## **Location**

The condensing unit requires unobstructed air flow to operate efficiently. A four foot space between each intake side and a wall or other cabinet is recommended.

Do not place where it will pick up hot discharged air from an air conditioner or other refrigeration system condensing unit.

Space must also be reserved for service on the condensing unit.

## **Roof Piercing:**

The roof (or wall) must have a passage large enough for the three refrigeration tubes and the control wire to pass through. The minimum recommended size is 4" ID. In most areas the power supply may also pass through the same passage. If there isn't a passage one must be created. In most cases this must be done by a licensed and bonded roofer in order to maintain the roof's integrity.

## **Roof Pipe Curb or Pitch Pocket:**

To avoid potential kinking of the refrigeration tubing, avoid small, tight radius types of covers on pitch pockets.

## **Suggestions:**

In most cases a mechanical lift, boom truck or crane will be required to hoist the condensing unit.

Mount unit to roof rails or curbs and secure with lag screws or similar field supplied fasteners.

Orient the assembled unit so that the unit's mounts are parallel to the pitch of the roof to allow water to drain freely.

Do NOT place the unit directly onto roof rock.

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual**

**Tubing**

The line set must be routed between the condensing unit and the ice maker's location. During the transition from quick connects to braze connections, the ice maker, condensing unit and line set may or may not have quick connects, use this chart as a guideline for the proper action based on what is available at the site.

|                                       | Condensing unit has sweat connections  | Condensing unit has quick connects   |
|---------------------------------------|--|--|
| Ice making head has sweat connections | <p>If line set does not have quick connects, route and use as is.</p> <p>If line set has quick connects, recover refrigerant from line set and cut all quick connects off.</p>   | <p>If line set has quick connects, recover refrigerant from line set and cut one end of quick connects off.</p> <p>If line set does not have quick connects, must use KTE6-EH stub kit to add for condensing unit end.</p> |
| Ice making head has quick connects    | <p>If line set has quick connects, recover refrigerant from line set and cut one end of quick connects off.</p> <p>If line set does not have quick connects, must use KTE6-EH stub kit to add for ice machine end.</p> | <p>C0800CP or C1410CP will have quick connects and may be used with this head by obtaining KTE6-EH.</p> <p>Use the quick connects to make the connection.</p>  |

In all cases the line set will need to be shortened to fit.

Do NOT leave excess line set exposed outdoors, especially on a roof.

**Refrigerant Recovery and System Evacuation Notice**

**In the event the refrigerant must be recovered from this system and the system evacuated, recover and evacuate from the three ball valve access valves with the ball valves open.**

# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Place Ice Making Head**

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Remove from carton.

Place adapter kit onto bin or dispenser top. If adapter does NOT have gasket tape install tape such as Scotsman part number 19-0503-04. The adapter to ice head base MUST be sealed with gasket tape or food grade sealant.

## **Attachment**

ABS (Automatic Beverage Dispenser) in drive up installations: Route refrigerant tubing and install drain and water supply tubing onto ice making section before placing unit on the dispenser.

Place EH222 onto adapter, do not secure at this time. Uncoil power cord and route to the power supply.

Plug interconnecting control wire to the wire harness in the ice making head.

Located at the top panel:

- Refrigeration connections.
- Interconnecting control wire.
- Access port for water supply.
- Power cord.

The drain may be routed to the left or right, allowing the ice making section to be placed with its back tight against a wall.

## **Water and Drain**

The ice maker requires an adequate potable water supply and a gravity drain.

Determine how the drain will be connected to the ice making section.

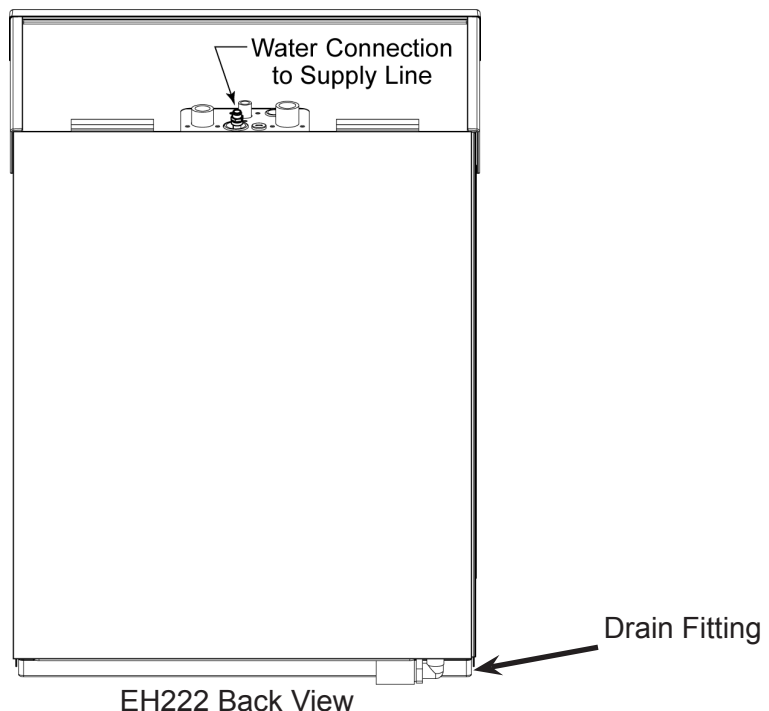
- If access is available behind the unit, route the drain in from the back.
- If the unit is to be flush mounted to the back of the dispenser and tight against the wall, route the drain out either the left or right.

In some tight situations it will be necessary to assemble the ice making section to the dispenser or bin and install the water and drain connections before placing the system in its installed position. A loop of water supply tubing will aid movement of the system.

In other tight situations the unit should have its water and drain tubing connected and stubbed out before placing on the dispenser or bin.

The drain fitting is adaptable to drain connections to the left, right and back.

The unit is shipped ready to drain right. The drain fitting elbow with PVC adapter can be rotated to drain right, left or back.



# EH222 and Condensing Unit Remote Low Side Cuber Service Manual

## Drain Connections

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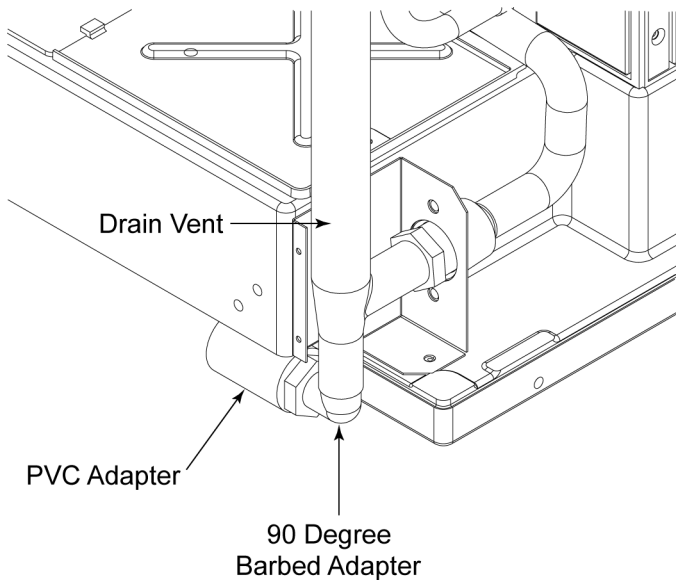
### Right Draining:

1. Connect  $\frac{3}{4}$ " PVC to the female PVC fitting. If copper is required by code, remove the PVC connector and install a  $\frac{3}{4}$ " FPT female copper fitting onto the  $\frac{3}{4}$ " NPT male fitting. Do all soldering before connecting to the male fitting.

2. In tight locations do the next step after the unit is placed on the dispenser or bin.

3. Connect rigid drain tubing to the reservoir drain tube. Route the drain either out the back, under the unit (through the notch in the base) to the left side or to the right side. A vent is built into the unit, so no external vent is required.

Run the drain tubing to the building drain. Do not "Tee" into any other drain, including the bin or dispenser drain.



### Left Draining: Rotate elbow to the other direction.

Connect  $\frac{3}{4}$ " PVC to the PVC fitting.

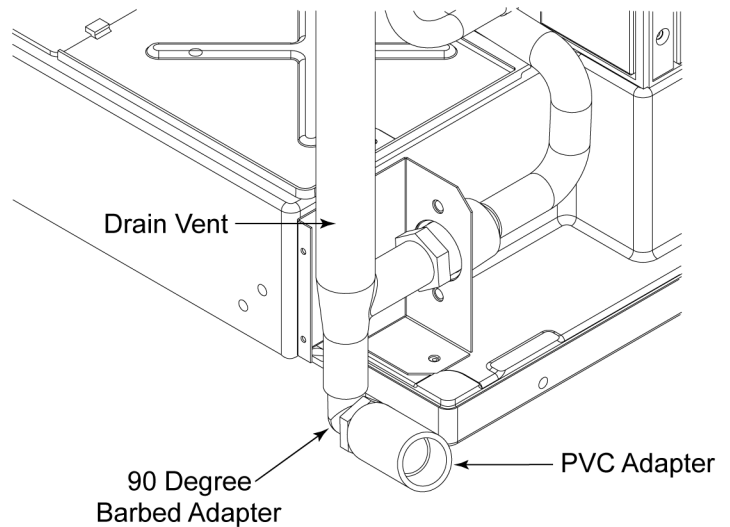
Back Draining: Rotate elbow to face the back or connect PVC directly into the  $\frac{3}{4}$ " FPT drain fitting.

No external drain vent is required, venting is internally provided for.

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Note: External drain tubing must be supported to insure that it does not move and kink the internal rubber tube.

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**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Water Supply:**

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A 3/8" flare nut on tubing is located at the top panel, near the refrigeration tubing.

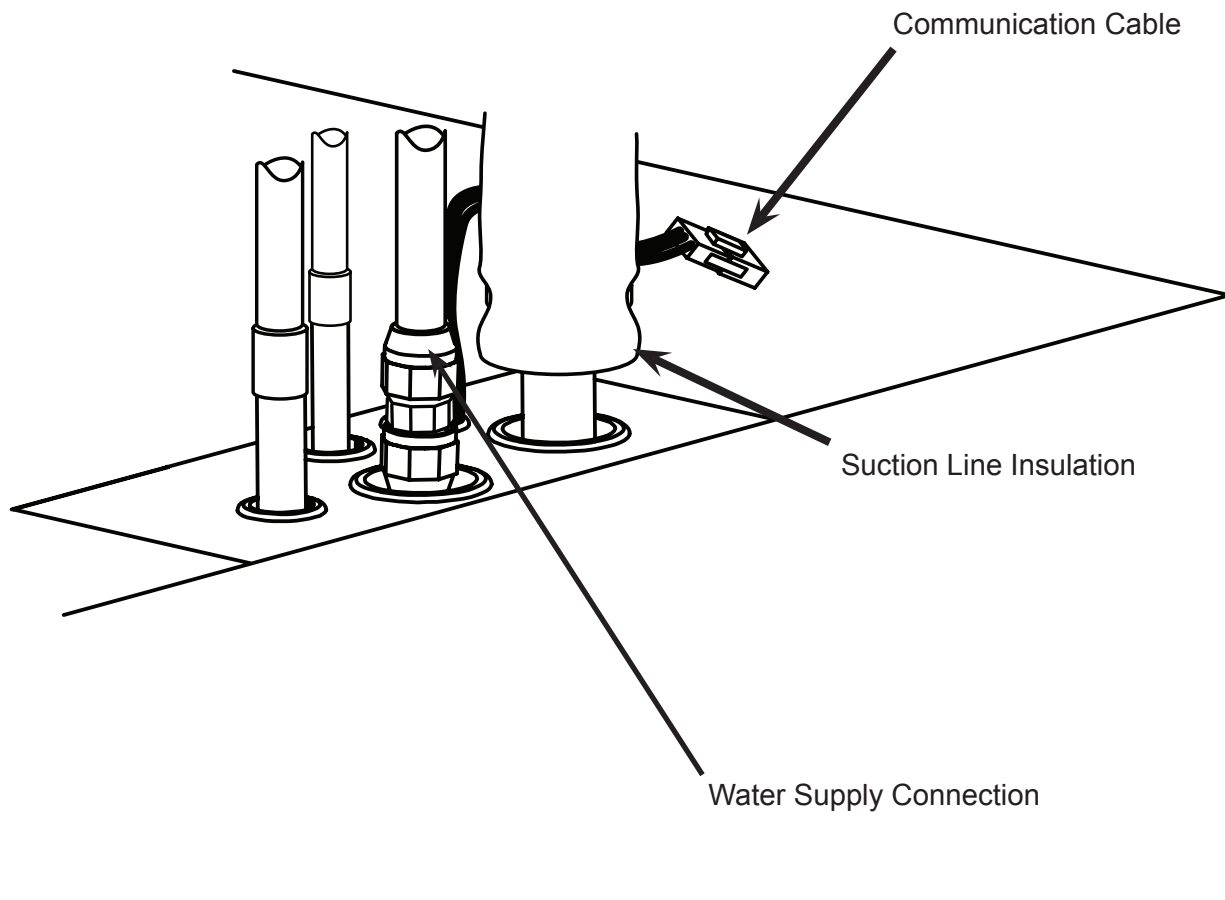
Inside the hardware bag, inside the cabinet, a 3/8" inch double male flare adapter (flare union) is supplied. Use the supplied adapter to make a 3/8" male flare fitting for the water inlet.

Connect a cold, potable water supply to the 3/8" water inlet fitting installed above. Use 3/8" OD copper or other comparable sized tubing for the water supply.

---

Note: This is an NSF listed ice machine and contains provisions for back-flow prevention in its design. No external back flow preventer is required.

---



# EH222 and Condensing Unit Remote Low Side Cuber Service Manual

## Electrical:

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### Condensing Unit

Route interconnecting control wire through proper hole end of condensing unit and plug into the connection on the control box.

Route power conduit (liquid tight) and wires to the junction box of the ECC unit. Secure with the proper type of connector.

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Note: The power supply wires must be the correct size and type per the National Electric Code.

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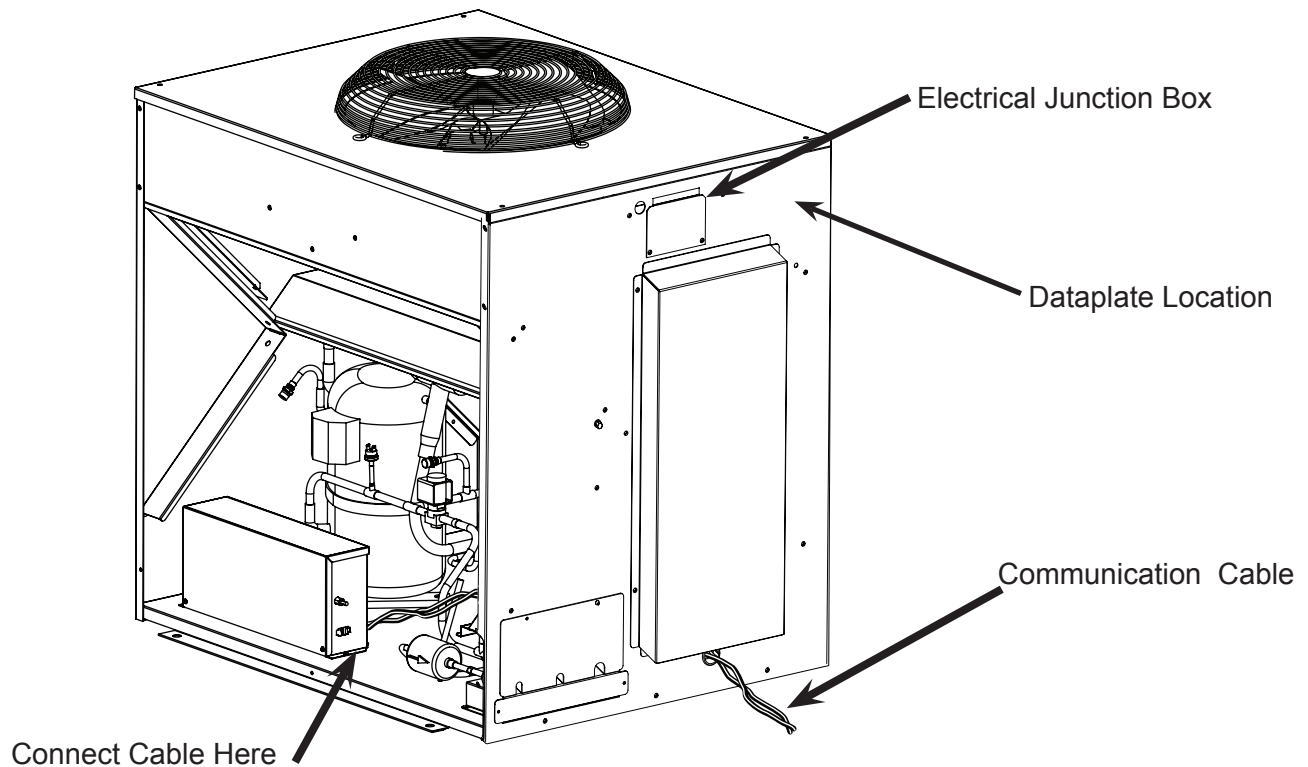
Locate the nameplate on the ECC unit for the Voltage, Phase, Minimum Circuit Ampacity and Maximum Fuse Size. Either fuses or HACR type circuit breakers may be used.

Follow all Local, State and National Codes.

**Three Phase Notice:** Check voltage between legs at contactor. If there is a “wild leg” in the three phase power supply move supply wires at the contactor so the higher voltage is on L3, which connects to the compressor motor only.

### Head

Plug head's power cord into a nearby 115 volt electrical outlet.



# EH222 and Condensing Unit Remote Low Side Cuber Service Manual Connect Refrigeration

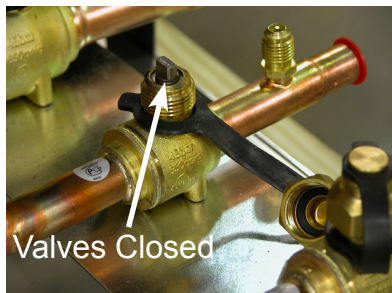
Requires brazing, steps must be performed by an EPA certified type II or higher technician.

## At Head:

1. Remove protective plugs from all three connections and vent the nitrogen from the ice machine.
2. Route the each of the three tubes to its connection.
3. Remove the top panel and attach a refrigeration hose with depressor to the 1/2" vapor line access valve so the valve is OPEN. This is a vent for nitrogen purging.
4. Remove screws holding tubing bracket to back panel and lower it out of the way for brazing.
5. Clean tubing ends and position into stubs.

## At Condensing Unit

1. Confirm connection valves are fully closed.
2. Remove protective plugs from all three connections.
3. Remove caps from access valve connections.
4. Remove cores from access valves.
5. Connect refrigeration hoses to access valves.
6. Connect dry nitrogen source to liquid line connection and vapor line connection.
7. Shorten tubing to correct length, clean ends and insert them into valve stubs.



---

Note: Be sure tube and stubs are round, dress with swage tool if needed.

---

8. Add heat sink material to ball valve body.
9. Open nitrogen and flow 1 psi nitrogen into liquid line and vapor line tubes and braze the liquid line, vapor line and suction line tubes to the valve stubs.

## At Head

1. With nitrogen flowing from condensing unit, braze the liquid, vapor and suction line connections.
2. Remove refrigeration hose from head. Be sure valve cap is on tight.
3. Pull tubing bracket up and secure to back panel.

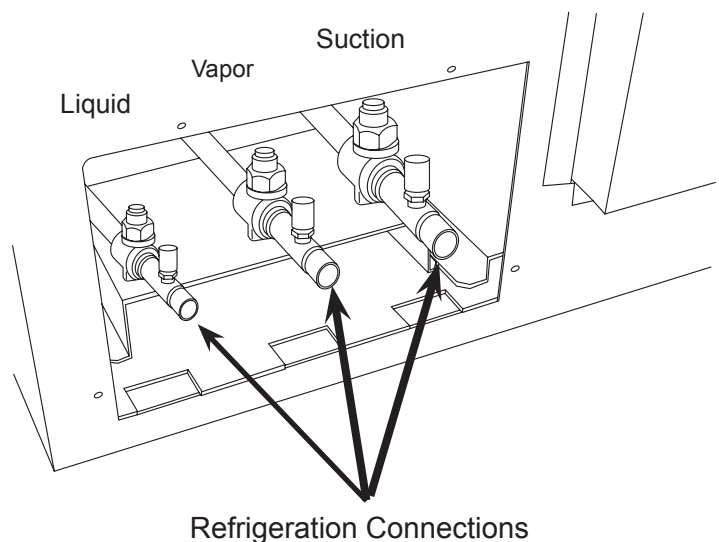
## At Condensing Unit

1. Remove nitrogen source.
2. Return valve cores to access valves.
3. Connect vacuum pump to **all three** access valves (use two manifolds or two extra hoses and a tee) and evacuate the tubing and head to at least a 300 micron level.
4. Remove vacuum pump and add R-404A vapor to all three tubes to provide a positive pressure.
5. Leak check the braze connections and repair any leaks.
6. Open all three valves to full open.

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Note: The full refrigerant charge is contained in the receiver of the ice machine.

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# Eh222 and Condensing Unit

## Remote Low Side Cuber Service Manual

### Complete the Installation

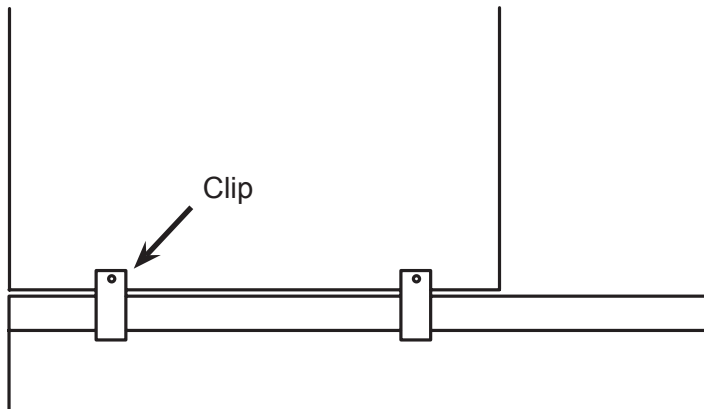
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After the utilities and refrigeration connections have been made, secure the unit to the dispenser or bin top.

Secure ice making section to dispenser or bin adapter.

Use strap/clips to secure unit:

- When used with Cornelius ABS adapter, install clip on the side of the cabinet. Clip under edge of adapter and secure to ice making section using the screws provided in the hardware bag.

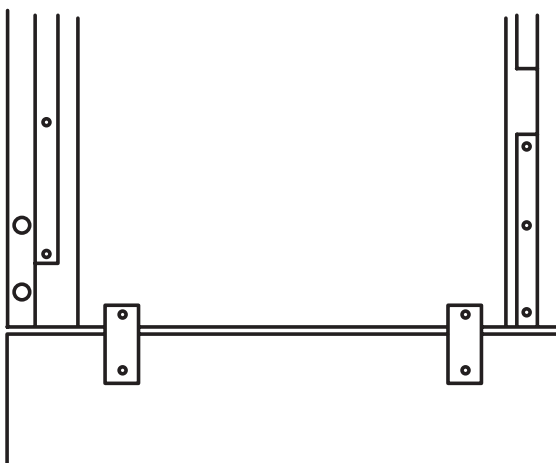


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Note: If one side will be against a wall, do not use a clip on that side. One clip is sufficient to secure the unit.

---

- For use on bin adapter, use clip (as a strap) on back.



If the ice maker & bin or dispenser is not yet in its final position gently move it there.

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Note: The refrigerant lines above the machine must be able to move freely while the machine is being moved into position.

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### Final Check List Before Initial Start Up

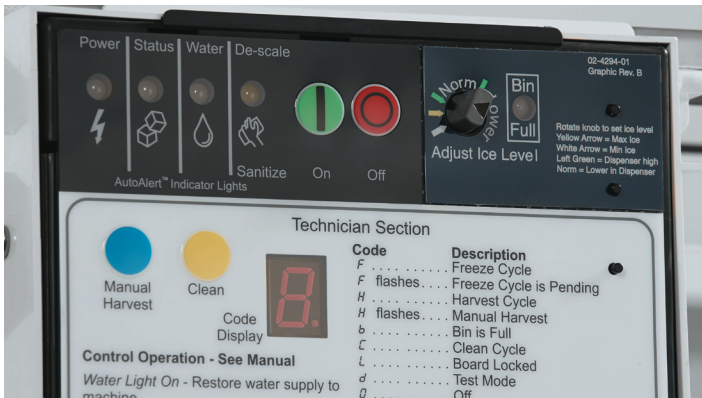
1. Confirm that the ice making section is installed indoors in a controlled environment.
2. Confirm that all packing materials have been removed from all products.
3. Confirm that the ice making section is level.
4. Confirm that all the refrigerant connections have been made and checked for leaks.
5. Confirm that the proper power supply has been turned on to the condensing unit.
6. Confirm that cold, potable water has been supplied to the ice making section and checked for leaks.
7. Confirm that the water supply is adequate.
8. Confirm that there is adequate water pressure and that any water filters have been checked to confirm that the cartridges do not need changing.
9. Confirm that the proper size drain tubing has been installed and properly routed.
10. Confirm that the ice making section has been connected to the proper power supply.
11. Confirm that the interconnecting wire has been routed and connected between the ice making section and the condensing unit.

# EH222 and Condensing Unit

## Remote Low Side Cuber Service Manual

### Reference for Start Up: Controller Operation

The controller and remote switch panel have four indicator lights and the On and Off buttons.



#### Lower light and switch panel

#### Indicator Lights

- Power - on when there is power to the controller
- Status - on in ice making mode
- Water - on and blinking when there is no water
- De-scale & Sanitize - on when it is time to clean the machine

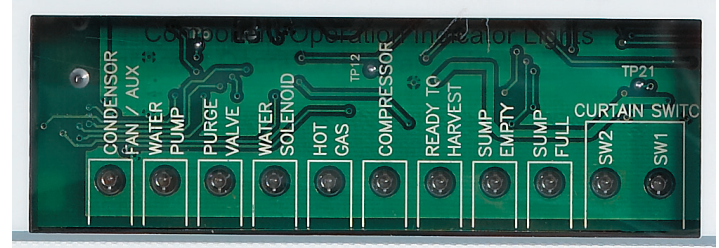
#### Code Display

- Displays status and diagnostic codes

#### Push Buttons

- On
- Off
- Manual Harvest
- Clean

#### Component indicator lights



- Fan - not used on this model
- Water Pump - on when the pump is
- Purge Valve - on when the purge valve is
- Water Solenoid - on when the inlet water solenoid valve is
- Hot Gas - on when the vapor inlet valve and harvest assist solenoid / mechanism have power
- Compressor - on when the compressor contactor is energized
- Ready to Harvest - on when the ice thickness sensor has water touching it
- Sump Empty - on when there is no water touching the mid-length probe
- Sump Full - on when water is touching the shortest probe
- SW2 - on when the curtain is open
- SW1 - on when the curtain is open

#### Cycle Definitions:

**Freeze:** The refrigeration system is operating to remove heat from the evaporators. The compressor, fan motor, and water pump are on.

**Harvest:** The refrigeration system and water system are operating to harvest the ice and rinse the reservoir. The compressor is on for the full cycle, the pump is on until the purge valve closes.

The inlet water valve opens and refills the reservoir. The vapor and condenser by-pass valves are open during the entire harvest cycle, as is the harvest assist mechanism.

# EH222 and Condensing Unit

## Remote Low Side Cuber Service Manual

### Initial Start Up

---

#### Pre Start

A soak-out period of four hours is optional for this system. If desired, powering the compressor unit for four hours prior to start up allows the crankcase heater to warm up the oil in the compressor.

#### Start Up

1. Connect power to the condensing unit and move its toggle switch to Run or On.
2. Open the water supply valve.
3. Remove the head's front panel. Check for any packing or wires rubbing moving parts. Note location of control board in upper left corner of the machine's front.
4. Remove any tape securing curtain to evaporator.
5. Switch on the electrical power to the EH222. Observe that some of the control's indicator lights glow and its display shows  $\emptyset$ .
6. **Locate lower light and switch panel.** Push and release the ON button on that panel. The code display will begin to blink F.

The purge valve opens, the water pump starts and the inlet water valve opens to add water to the reservoir. In a few seconds the purge valve closes and the water pump stops. Water will flow into the machine until the reservoir is full. The vapor valve and harvest assist device will activate, then the compressor and water pump will start. F will be on steady.

---

Note: Because the condensing unit is external to the ice making section, no visible signs of operation will be noticeable until the water begins to cool and frost forms on the evaporator tubing.

---

7. Go to the condensing unit and confirm that the compressor and fan motor are operating. Warm air will be discharged from the condenser.

Observe the Ready for Harvest indicator light. It may blink early in the cycle, that is normal. The control will ignore that signal for the first 6 minutes of freeze.

During the Freeze cycle move the curtain and observe that either the SW1 or SW2 light on the control board blinks On when the curtain moves away from the evaporator and Off when returned to its normal position.

---

Note: Moving the curtain during the Freeze cycle has no affect on control function, but will cause water to flow into the cube chute.

---

When enough ice has frozen, the Ready for Harvest indicator light will be on steady. After it's been on steady for a few seconds Harvest will begin.

The display shows an H. The vapor valve in the EH222 opens, and the harvest assist mechanism activates. In the CU the condenser bypass valve opens and the receiver inlet valve closes. In the EH222, the purge valve opens to drain some water, when it does the inlet water valve opens to refill the reservoir. After a few seconds the purge valve closes but the inlet water valve continues to fill the reservoir. Harvest continues until the ice is released as a unit and forces the curtain to open.

When the curtain opens it signals the controller that harvest is complete, and it returns the unit to a freeze cycle.

8. Check the ice harvested for proper bridge thickness. The ice bridge is factory set at 1/8 inch. If needed, adjust bridge thickness. Do NOT make it too thin.
9. Return the front panel to its normal position and secure it to the machine.
10. Instruct the user in the operation of the machine and its maintenance requirements.
11. Fill out and mail the warranty registration form or register it on line at [www.scotsman-ice.com](http://www.scotsman-ice.com).

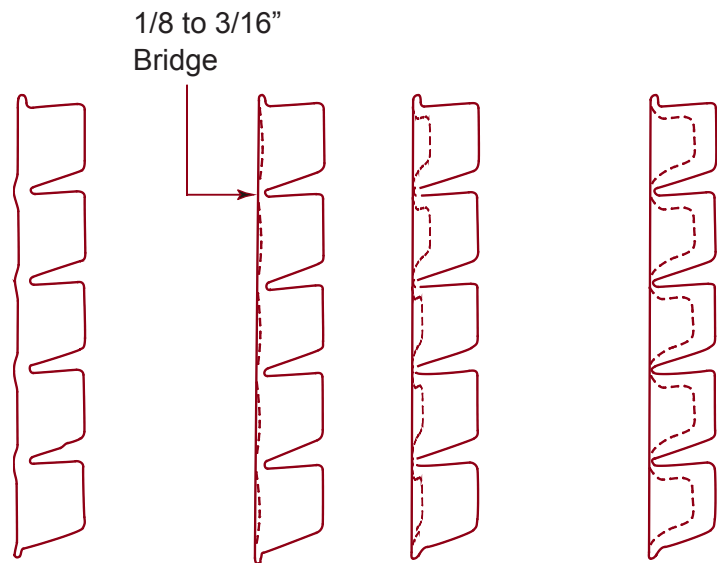
# EH222 and Condensing Unit Remote Low Side Cuber Service Manual Ice Thickness and Water Purge Adjustment

## Bridge Thickness - For the Service Tech Only

1. Push and hold Off till the machine stops.
2. Remove evaporator cover.
3. Remove curtain.
4. Use a hex wrench and rotate the bridge thickness adjustment screw in 1/16 turn increments CW to increase bridge thickness.
5. Rotate CCW to decrease bridge thickness.

Caution: Do not make the bridge too thin or the machine will not harvest properly. Bridge thickness adjustments are not covered by warranty.

6. Return curtain and evaporator cover to their normal positions.
7. Push and release the On button. Check next harvest of ice. Repeat steps 1-6 if needed.

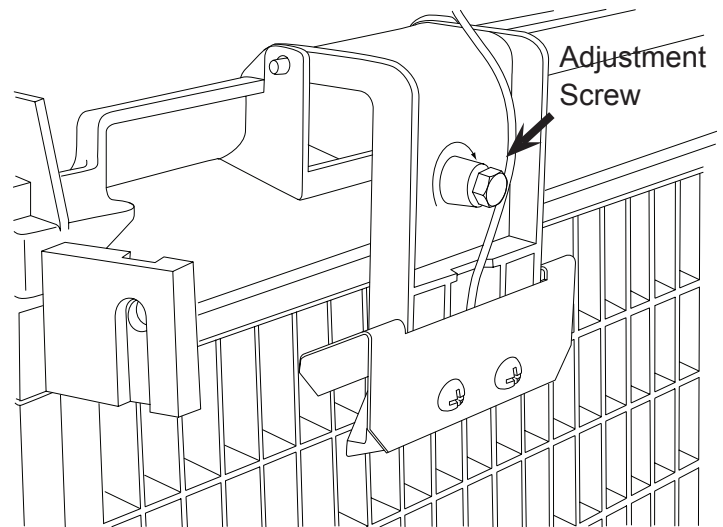


ice Bridge Thickness

## Water Purge Setting

The water purge is factory set to the automatic position, suitable for most water conditions. The setting can be changed to one of 5 manual settings or left on automatic.

| Setting | Water Type                        |
|---------|-----------------------------------|
| 1       | Minimum - RO water or equivalent  |
| 2       | Moderate - Low TDS, non RO        |
| 3       | Standard - Use with typical water |
| 4       | Heavy - High TDS                  |
| 5       | Maximum - Very high TDS           |
| A       | Automatic - Factory setting       |



Bridge Thickness Adjustment Mechanism

To set:

1. Switch the machine OFF by holding the Off button in until a number or the letter A shows on the display.
2. Press and release the On button repeatedly until the number on the display corresponds to the desired setting.
3. Press and release the Off switch again to return to the normal control state.

# **Eh222 and Condensing Unit Remote Low Side Cuber Service Manual Adjustable Ice Level Control**

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There is an adjustment post and an additional indicator light to the right of the four indicator lights. The ultrasonic ice level control allows the user to control the point that the ice machine will stop making ice before the bin or dispenser is full. Reasons for this include:

- Seasonal changes in ice used
- Planning to sanitize the bin
- Certain dispenser applications where maximum ice level is not desired

### **Use of control**

There are several positions the ice level can be set to, including Off (knob and label indicators lined up), where it fills the bin until the standard bin control shuts the machine off.



Rotate the adjustment post to the desired ice level.

The machine will fill up to that level and when it shuts off the indicator light next to the adjustment post will be On.

Suggested Adjustment Knob Position for use with the ABS or Freestyle: first CW position - as shown above.

### **DO NOT ADJUST TOO LOW OR THE MACHINE WILL STOP MAKING ICE**

---

Note: Ice will build up in the bin or dispenser at an angle, the distance set will be from the sensor to the top of the ice. The sensor position is shown in the cabinet layout diagrams.

---

The actual distance between the highest point of the ice may be closer or further away than the distance set, depending upon the angle of the ice.

### **Ice**

The cuber drops ice in large sections. That ice will break up into random parts as it falls into the bin, but some large sections may remain on top of the ice in the bin. In a dispenser this ice will break up into mostly individual cubes as the dispense mechanism moves the ice.

### **Noise**

The ice machine will make little noise when it is in ice making mode. The compressor and fan motor are remote from the ice making head. The water pump in the ice making head will produce some sound. It is also normal to hear some cracking just before the harvest cycle begins. In addition, during the harvest cycle the harvest assist solenoid / mechanism will click twice as it pushes the ice out and returns to its normal position. The ice harvests as a unit or slab, which makes some noise when it impacts the bin or dispenser. These noises are all normal for this machine.

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Cleaning, Sanitation and Maintenance - A and C Series**

---

This ice system requires three types of maintenance:

- Remove the build up of mineral scale from the ice machine's water system and sensors.

- Sanitize the ice machine's water system and the ice storage bin or dispenser.
- Clean the remote air cooled condenser.

It is the User's responsibility to keep the ice machine and ice storage bin in a sanitary condition. Without human intervention, sanitation will not be maintained. Ice machines also require occasional cleaning of their water systems with a specifically designed chemical. This chemical dissolves mineral build up that forms during the ice making process.

Sanitize the ice storage bin as frequently as local health codes require, and every time the ice machine is cleaned and sanitized.

The ice machine's water system should be cleaned and sanitized a minimum of twice per year.

1. Remove the front panel.
2. Remove the evaporator cover.
3. If the machine is operating, push and release the Harvest button. When the machine completes the Harvest cycle it will stop. If the bin is full (b shows in display) push and release the Off button.
4. Remove all ice from the storage bin or dispenser.
5. Push and release the Clean button. The yellow Clean light will blink and the display will show c. The machine will drain the reservoir and refill it. Go onto the next step when the purge valve light goes out.
6. Pour 8 ounces of Scotsman Clear 1 nickel safe scale remover into the reservoir.

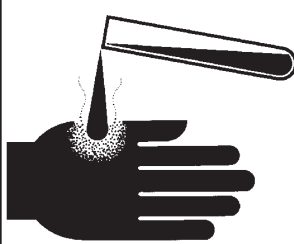
8. Push and release the Clean button again. The yellow Clean light will be on continuously and the machine will drain and refill the reservoir to flush out the ice machine cleaner and residue.
9. Allow the drain and refill process to continue for at least 20 minutes.
10. Push and release the Off button. The clean cycle will stop and the display will show d.

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Note: If unit has not been de-scaled for an extended period of time and significant mineral scale remains, repeat steps 5 - 10.

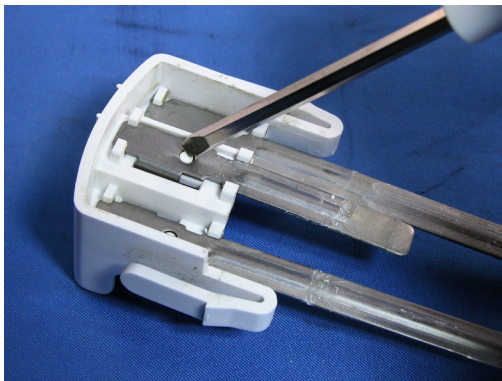
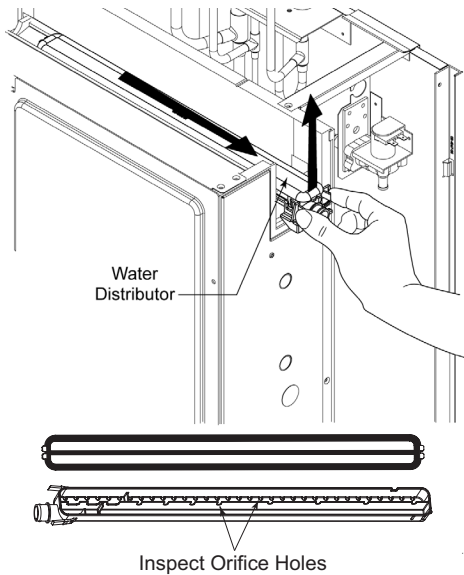
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11. Mix a cleaning solution of 1 oz of ice machine cleaner to 12 ounces of water.
12. Remove curtain from unit.
13. Locate ice thickness sensor. Squeeze mounting legs together to release sensor.
14. Remove water distributor from ice machine by disconnecting its hose, squeezing the retaining snaps together and pushing the distributor to the right as far as possible. Lift up to remove. Inspect distributor for restricted orifice holes. Be sure all holes are full open.
15. Locate water level sensor. Squeeze catches together and pull up to remove sensor. Separate probes from housing and wash all surfaces with ice machine scale remover solution. Return probes to holder.

|  |  |
|--|--|
| <p><b>CAUTION</b></p>  | <p>Ice machine scale remover contains acids. Acids can cause burns.</p>  |
|  | <p>If concentrated cleaner comes in contact with skin, flush with water. If swallowed, do NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. Keep out of the reach of children.</p> |

7. Allow the ice machine cleaner / scale remover to circulate in the water system for at least 10 minutes.

## Eh222 and Condensing Unit Remote Low Side Cuber Service Manual



Step 15.  
Release probes by pushing in on white buttons and pulling probe down out of holder.

16. Wash the metal surfaces of the ice thickness sensor and the adjustment screw with ice machine cleaner solution. Also wash the water distributor, water level sensor probes and curtain with the ice machine cleaner solution.
17. Create a solution of sanitizer. Mix 8 ounces of NuCalgon IMS II and 5 gallons of 105-115 degree F. potable water to create a 200 ppm active quaternary solution.
18. Thoroughly wash all surfaces of the ice thickness sensor, water level sensor, curtain and water distributor with the sanitizer solution.
19. Thoroughly wash all interior surfaces of the freezing compartment, including evaporator frames, evaporator cover and the part of the top panel covering the freezing compartment with the sanitizer solution.
20. Return water level sensor, ice thickness sensor, water distributors and curtains to their normal positions. Be sure hose is reattached to water

distributor. Be sure all surfaces of the ice thickness sensor are dry.

21. Push and hold the clean button to drain the reservoir. Push and release the clean button again and when the purge valve indicator light goes out, immediately pour the remaining sanitizer solution into the reservoir.
22. Circulate the sanitizer solution for 10 minutes, then push and release the Clean button.
23. Allow the water system to be flushed of sanitizer for at least 20 minutes, then push and release the Off button.
24. Return the evaporator cover and front panel to their normal position and secure with the original fasteners.
25. Push and release the On button to resume ice making.

### Other Maintenance

The remote air cooled condenser coil must be cleaned occasionally to keep the system operating at high efficiency.

Remove any large debris from the outside of the coil.

Vacuum accumulated dust.

Wash out the coils with water.

Caution: Do NOT use excessive water pressure as that will bend the fins.

If the coils have become coated with grease, a coil cleaner will have to be used to wash the coils.

Disconnect power to the condensing unit and remove the condenser top.

Inspect the fan blade to be sure it is not cracked and is clean.

Return the condenser top to its original position and reconnect the power supply.

# Eh222 and Condensing Unit

## Remote Low Side Cuber Service Manual

### Cleaning, Sanitation and Maintenance - D Series

This ice system requires three types of maintenance:

- Remove the build up of mineral scale from the ice machine's water system and sensors.

- Sanitize the ice machine's water system and the ice storage bin or dispenser.
- Clean the remote air cooled condenser.

It is the User's responsibility to keep the ice machine and ice storage bin in a sanitary condition. Without human intervention, sanitation will not be maintained. Ice machines also require occasional cleaning of their water systems with a specifically designed chemical. This chemical dissolves mineral build up that forms during the ice making process.

Sanitize the ice storage bin as frequently as local health codes require, and every time the ice machine is cleaned and sanitized.

The ice machine's water system should be cleaned and sanitized a minimum of twice per year.

- Remove the front panel.
- Remove the evaporator cover.
- Remove all ice from the storage bin or dispenser.
- Push and release the Clean button. The yellow Clean light will blink and the display will show C. The machine will harvest any ice, drain the reservoir and begin to refill it. Remove all ice from the storage bin or dispenser.
- Observe code display, when it blinks the characters "A d 1" immediately go to the next step. Observe code display, when it blinks the characters "A d 1" immediately go to the next step.
- Pour 8 ounces of Scotsman Clear 1 ice machine scale remover into the reservoir. The unit will circulate the scale remover, then drain and flush it. This will take 35 minutes, then the machine will stop and the display will show O.

- Mix a cleaning solution of 1 oz of ice machine cleaner to 12 ounces of water.

Note: If unit has not been de-scaled for an extended period of time and significant mineral scale remains, repeat steps 6 - 8.

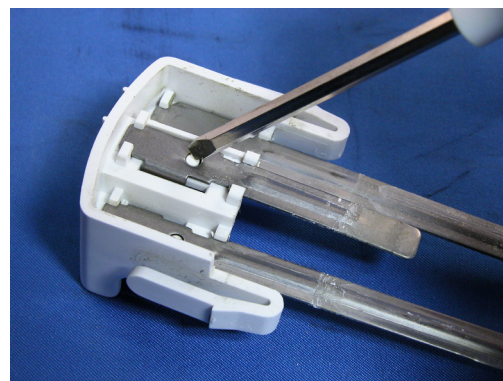
- Remove curtain from unit.
- Locate ice thickness sensor. Squeeze mounting legs together to release sensor.
- Remove water distributor from ice machine by disconnecting its hose, squeezing the retaining snaps together and pushing the distributor to the right as far as possible. Lift up to remove. Inspect distributor for restricted orifice holes. Be sure all holes are full open..
- Locate water level sensor. Squeeze catches together and pull up to remove sensor. Separate probes from housing and wash all surfaces with ice machine scale remover solution. Return probes to holder.

#### CAUTION

Ice machine scale remover contains acids. Acids can cause burns.



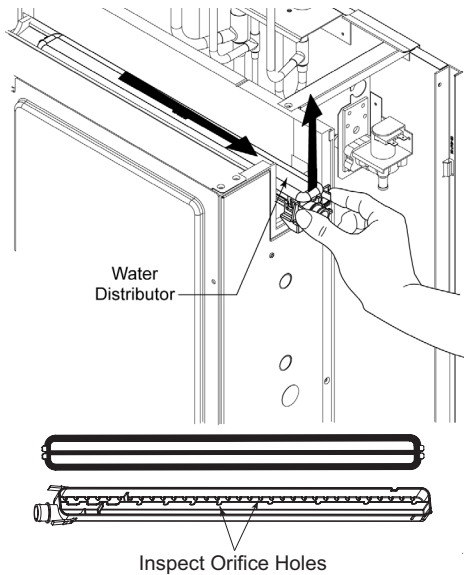
If concentrated cleaner comes in contact with skin, flush with water. If swallowed, do NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. Keep out of the reach of children.



Step 13  
Release probes by pushing in on white buttons and pulling probe down out of holder.



## EH222 and Condensing Unit Remote Low Side Cuber Service Manual



12. Wash the metal surfaces of the ice thickness sensor and the adjustment screw with ice machine cleaner solution. Also wash the water distributor, water level sensor probes and curtain with the ice machine cleaner solution.
13. Create a solution of sanitizer. Mix 8 ounces of NuCalgon IMS II and 5 gallons of 105-115 degree F. potable water to create a 200 ppm active quaternary solution.
14. Thoroughly wash all surfaces of the ice thickness sensor, water level sensor, curtain and water distributor with the sanitizer solution.
15. Wash all interior surfaces of the freezing compartment, including evaporator cover and right side panel liner with the sanitizer solution.
16. Return water level sensor, ice thickness sensor, water distributor and curtain to their normal positions. Be sure water level sensor and ice thickness sensor are completely dry.
17. Push and release the Clean button. The yellow Clean light will blink and the display will show C. The machine will go through a harvest cycle, drain the reservoir and begin to refill it.
18. Observe code display, when it blinks the characters "Ad1" immediately go to the next step.
19. Pour the sanitizing solution into the reservoir until it is full. The unit will circulate the sanitizer, then drain and flush it. This will take 35 minutes, then the machine will stop and the display will show O.

20. Return the evaporator cover and front panel to their normal position and secure with the original fasteners.
21. Push and release the On button to resume ice making.

### Other Maintenance

The remote air cooled condenser coil must be cleaned occasionally to keep the system operating at high efficiency.

Remove any large debris from the outside of the coil.

Vacuum accumulated dust.

Wash out the coils with water.

Caution: Do NOT use excessive water pressure as that will bend the fins.

If the coils have become coated with grease, a coil cleaner will have to be used to wash the coils.

Disconnect power to the condensing unit and remove the condenser top.

Inspect the fan blade to be sure it is not cracked and is clean.

Return the condenser top to its original position and reconnect the power supply.

**Eh222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Critical Maintenance - Spillway**

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The freeze cycle on a Prodigy cuber is controlled by an ice thickness sensor positioned in front of the ice making surface. It is triggered by water contact. Normally water only contacts the sensor when the ice is at the proper size. However, irregular water flow can cause premature contact resulting in a short freeze cycle, small bridge, long harvest and even a shut down on short freeze (code 8).

The primary procedure for correcting poor water flow is to scrub the spillway surface.

1. Shut machine off.
2. Remove right side panel liner and panel.
3. Disconnect ice thickness sensor from its bracket and move out of the way.



Other short freeze causes include:

- Mis-adjustment of ice thickness sensor.
- Broken, bent, or dismantled ice thickness sensor.

## **EH222 and Condensing Unit Remote Low Side Cuber Service Manual**

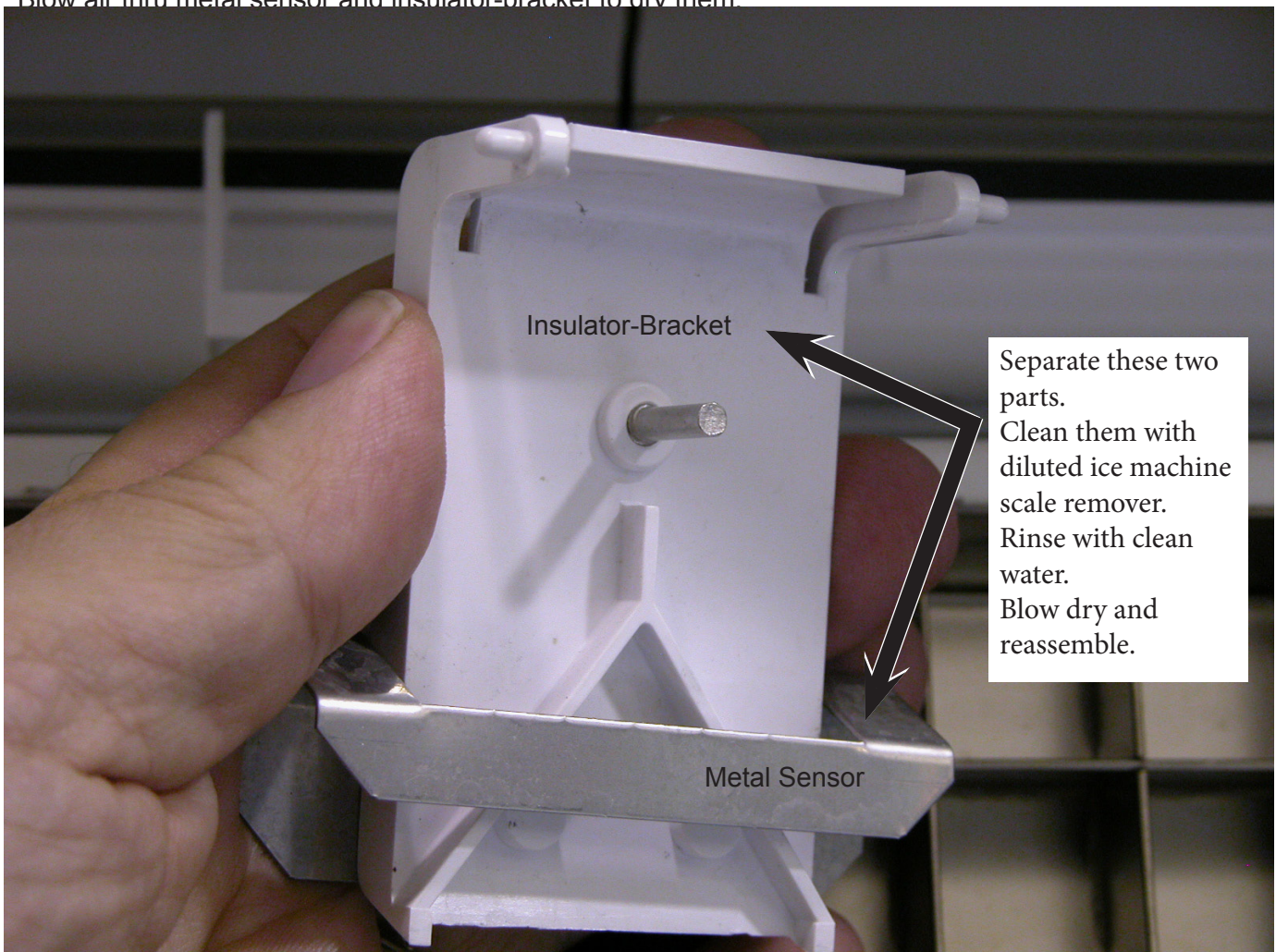
### **Critical Maintenance - Ice Thickness Sensor**

The freeze cycle on a Prodigy cuber is controlled by an ice thickness sensor positioned in front of the ice making surface. It is triggered by water contact. Water contacts the sensor when the ice is at the proper size.

During use the Ice Thickness Sensor will become coated with mineral scale from the water, which if left untreated can cause changes in bridge thickness.

To correct, the Ice Thickness Sensor must have the mineral scale removed.

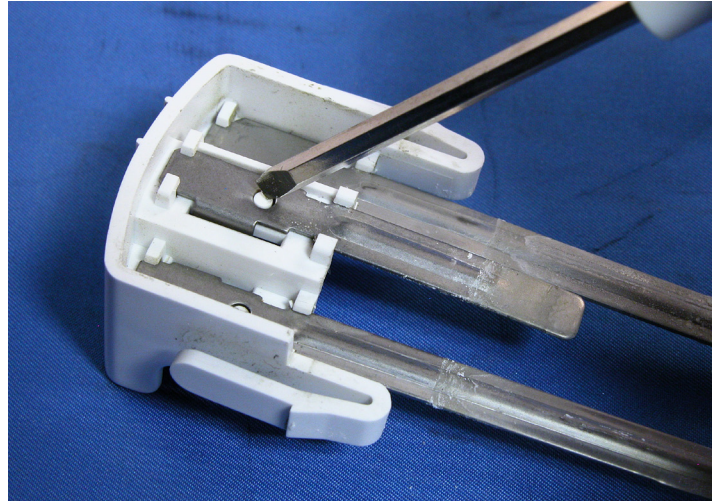
1. Remove the ice thickness sensor from the water distributor bracket.
2. Separate the metal sensor from the plastic insulator-bracket.
3. Wipe the sensor with diluted ice machine scale remover,
4. Scrub the white or dark gray plastic insulator-bracket with diluted ice machine scale remover and remove all traces of mineral build up
5. Wipe the wire to the bulkhead with diluted ice machine scale remover.
6. Wash all ice thickness sensor parts off with clean water.
7. Blow air thru metal sensor and insulator-bracket to dry them.



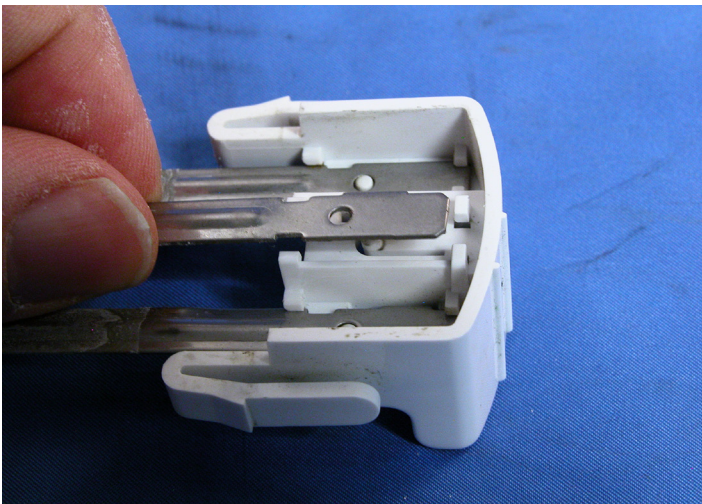
**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Critical Maintenance - Water Level Sensor**



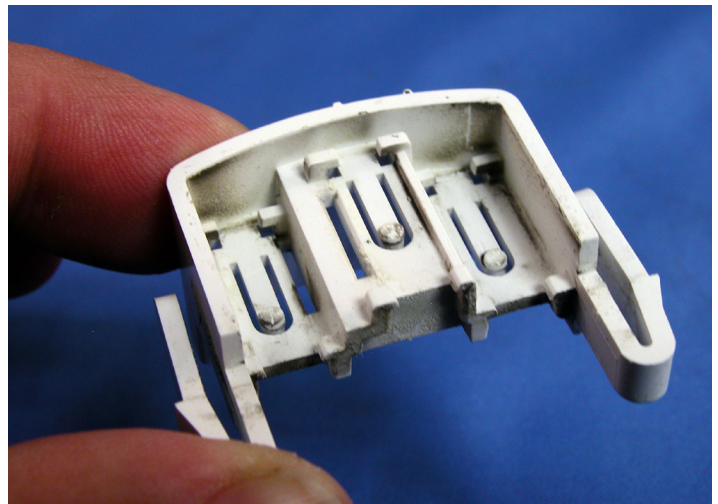
1. Remove Water Level Sensor



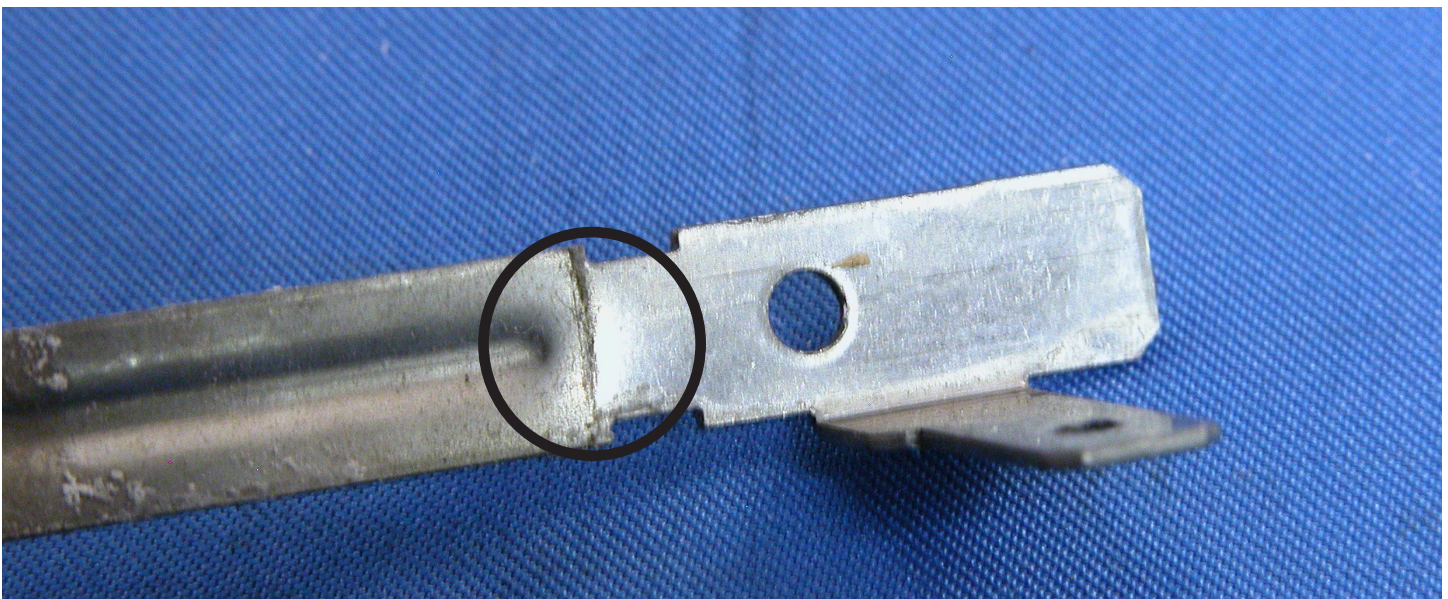
2. Release probes by pushing pints in.



3. Pull down, then lift up to remove probe.



4. Clean all dirty and scale from the housing.



5. Clean entire probe, be sure circled area is clean.

**Eh222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Operational Characteristics 800 lb system**

Cycle Times @ Condenser Temp/Cabinet Temp/Water Temp in degrees F.

|         | -20/50/40       | 70/70/50         | 90/90/70         | 120/110/100      |
|---------|-----------------|------------------|------------------|------------------|
| Freeze  | 9 to 10 minutes | 10 to 12 minutes | 13 to 15 minutes | 19 to 21 minutes |
| Harvest | 2 to 3 minutes  | 1 to 1.5 minutes | 1 to 1.5 minutes | .5 to 1 minute   |

System Pressures @ Condenser Temp/Cabinet Temp/Water Temp in degrees F

|  | -20/50/40     | 70/70/50        | 90/90/70        | 120/110/100     |
|--|---------------|-----------------|-----------------|-----------------|
| Suction at head, end of Freeze                         | 26 to 27 PSIG | 26 to 31 PSIG   | 26 to 31 PSIG   | 30 to 35 PSIG   |
| Suction at head, Harvest - Peak                        | 88 PSIG       | 85 to 105 PSIG  | 105 to 125 PSIG | 140 to 160 PSIG |
| Discharge at Condensing Unit:<br>Freeze - 5 minutes in | 217 PSIG      | 230 to 250 PSIG | 250 to 270 PSIG | 330 to 350 PSIG |

**Operational Characteristics 1000 lb system**

Cycle Times @ Condenser Temp/Cabinet Temp/Water Temp in degrees F.

|         | 20/70/40       | 70/70/50         | 90/90/70         | 120/110/100      |
|---------|----------------|------------------|------------------|------------------|
| Freeze  | 7 to 8 minutes | 8 to 9 minutes   | 10 to 11 minutes | 16 to 18 minutes |
| Harvest | 2 to 3 minutes | 1 to 1.5 minutes | 1 to 1.5 minutes | .5 to 1 minute   |

System Pressures @ Condenser Temp/Cabinet Temp/Water Temp in degrees F

|  | -20/50/40 | 70/70/50        | 90/90/70        | 120/110/100     |
|--|-----------|-----------------|-----------------|-----------------|
| Suction at head, end of Freeze                         | 22 PSIG   | 26 to 31 PSIG   | 27 to 32 PSIG   | 30 to 35 PSIG   |
| Suction at head, Harvest - Peak                        | 88 PSIG   | 85 to 105 PSIG  | 90 to 110 PSIG  | 140 to 160 PSIG |
| Discharge at Condensing Unit:<br>Freeze - 5 minutes in | 219 PSIG  | 230 to 250 PSIG | 240 to 250 PSIG | 345 to 380 PSIG |

Below information applies to both size systems:

Headmaster maintains a minimum discharge pressure during freeze of 217 PSIG + 25, -15 PSIG.

CPR Valve Setting: 55 - 60 PSIG.

Note: CPR allows a maximum low side pressure at the compressor. Maximum only occurs during harvest.

**Refrigerant Charge**

- 800: 192 oz.
- 1000: 224 oz

**Compressor Amps, 800 model**

- Single Phase - 6 to 8 Three Phase - 5 to 7

**Compressor Amps, 1000 model**

- Single Phase - 8 to 9, Three Phase - 6.3 to 5.2

**Batch Weight: 8 lb**

**Discharge Pressure Cut Out Switch**

- Cuts Out at: 450 PSIG Resets at: 350 PSIG

# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Controller Information**

---

## Machine Indicator Lights

- Power
- Status
- Water
- Clean

## Code Display

Main codes - automatically displayed

|          |                                 |
|----------|---------------------------------|
| <i>F</i> | Freeze Cycle                    |
| <i>F</i> | flashes Freeze Cycle is Pending |
| <i>H</i> | Harvest Cycle                   |
| <i>H</i> | flashes Manual Harvest          |
| <i>b</i> | Bin is Full                     |
| <i>C</i> | Clean Cycle                     |
| <i>L</i> | Board Locked                    |
| <i>d</i> | Test Mode                       |
| <i>0</i> | Off                             |
| <i>E</i> | Self Test Failed                |
| <i>1</i> | flashes Max Freeze - Retrying   |
| <i>1</i> | Max Freeze Time Shut Down       |
| <i>2</i> | flashes Max Harvest - Retrying  |
| <i>2</i> | Max Harvest Time Shut Down      |
| <i>3</i> | Slow Water Fill                 |
| <i>4</i> | High Discharge Temp             |
| <i>5</i> | Sump Temp Sensor Failure        |
| <i>7</i> | Discharge Temp Sensor Failure   |
| <i>8</i> | flashes Short Freeze - Retrying |
| <i>8</i> | Short Freeze - Thin ice         |

Settings - requires push button sequence for access

Water Purge Settings Available - A is factory default

A, 1, 2, 3, 4, 5

De-scale Interval Settings Available - 6 is factory default

6, 5, 3, 0

## Diagnostic Code (numbers) Notes:

1. Retrying means the controller will try at least one more cycle before a manual reset is required.
2. A non-blinking code number means the retry periods have not been successful.
3. Codes may be recalled for review. Recalled codes that blink indicate that the unit recovered from that code. If it failed to recover, the code will be on steady.

## EH222 and Condensing Unit Remote Low Side Cuber Service Manual Operation

---

Once started, the ice machine will automatically make ice until the bin or dispenser is full of ice. When ice level drops, the ice machine will resume making ice.

Caution: Do not place anything on top of the ice machine, including the ice scoop. Debris and moisture from objects on top of the machine can work their way into the cabinet and cause serious damage. Damage caused by foreign material is not covered by warranty.

There are four indicator lights at the front of the machine that provide information on the condition of the machine.

Indicator Lights:

- Power
- Status
- Water
- De-scale & Sanitize

Indicator Lights & Their Meanings

|                 | Power             | Status  | Water         | De-Scale & Sanitize           |
|-----------------|-------------------|---|---------------|-------------------------------|
| Steady Green    | Normal            | Normal – bin full or making ice                                   | -             | -                             |
| Blinking Green  | Self Test Failure | Switching on or off   | -             | -                             |
| Blinking Red    | -                 | Diagnostic shutdown or, if making ice, temperature sensor failure | Lack of water | -                             |
| Yellow          | -                 | -   | -             | Time to de-scale and sanitize |
| Blinking Yellow | -                 | -   | -             | In Cleaning mode              |
| Light off       | No power          | Switched off  | Normal        | Normal                        |

If the Water light is on, the machine has sensed a lack of water. Check the water supply to the machine. The water could have been shut off or the water filter cartridges might need to be changed.

If the De-Scale light is on, the machine has determined that it needs to be cleaned. Contact an authorized Scotsman service agent and have the machine cleaned, de-scaled and sanitized.

## **EH222 and Condensing Unit Remote Low Side Cuber Service Manual System Operation:**

---

This section is intended for the technician. Understanding it is not necessary for the normal operation and maintenance of this ice making system.

Major Components:

Ice making section sub-system:

- Controller,
- Water Level Sensor,
- Transformer,
- Evaporators,
- Expansion Valve
- Vapor Inlet Valve
- Water Pump,
- Inlet Water Valve
- Purge Valve.
- Harvest Assist Solenoid / mechanism

Condensing Unit

- Compressor,
- Contactor,
- Condenser Bypass Valve,
- Liquid Inlet Valve,
- Receiver,
- Accumulator,
- CPR Valve,
- Headmaster.
- Coils
- Fan Motor

Freeze:

In the air cooled condensing unit sub-system the compressor is on, the condenser by-pass valve is closed, the fan motor is rotating the fan blade.

Harvest:

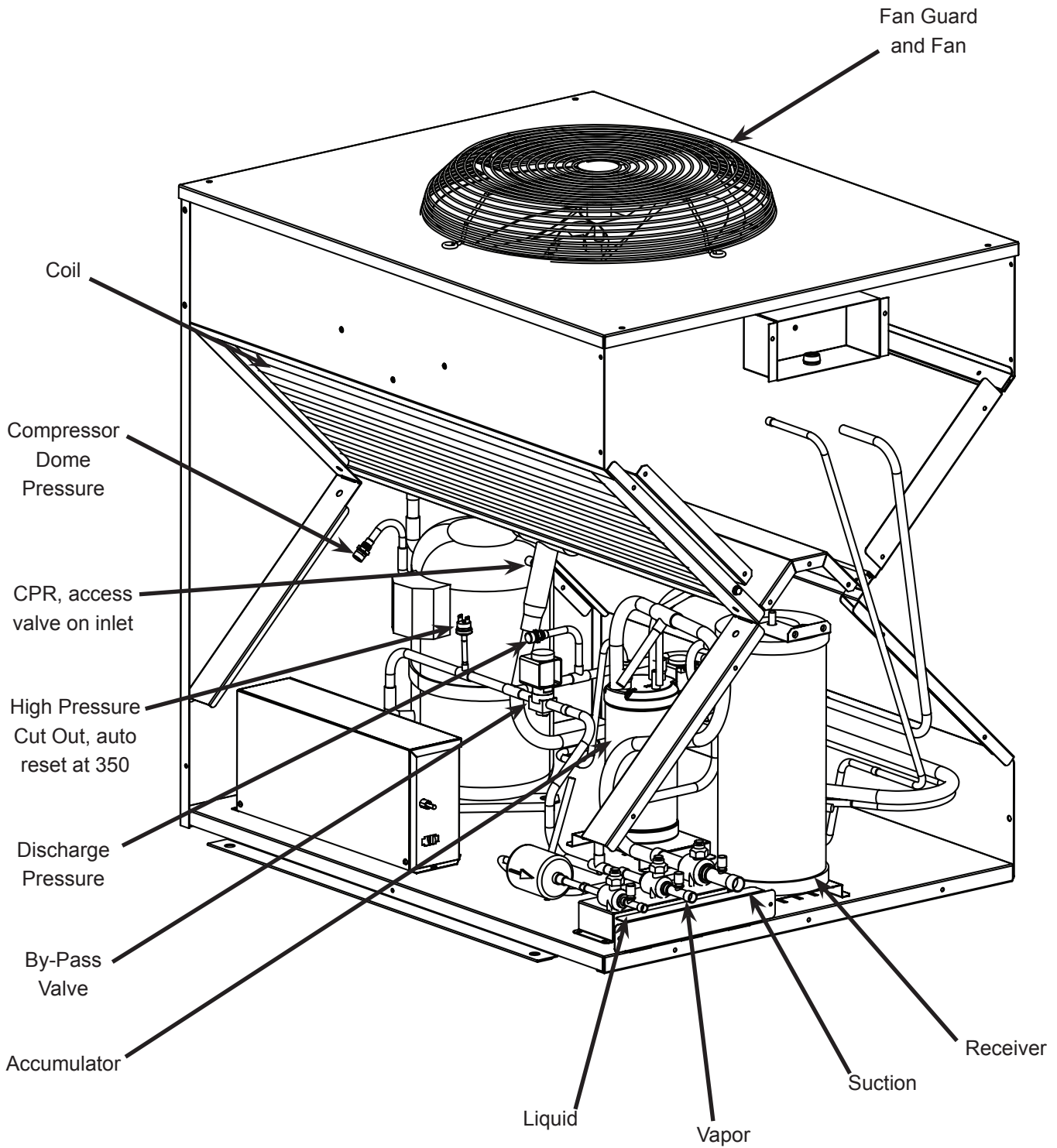
During harvest the compressor and fan motor continue to operate. The vapor inlet, condenser bypass, receiver inlet solenoid (normally open) and harvest assist solenoid / mechanisms are energized.

Ice releases and falls into the bin or dispenser.



**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Condensing Unit Component Location**

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# EH222 and Condensing Unit Remote Low Side Cuber Service Manual Refrigeration Details:

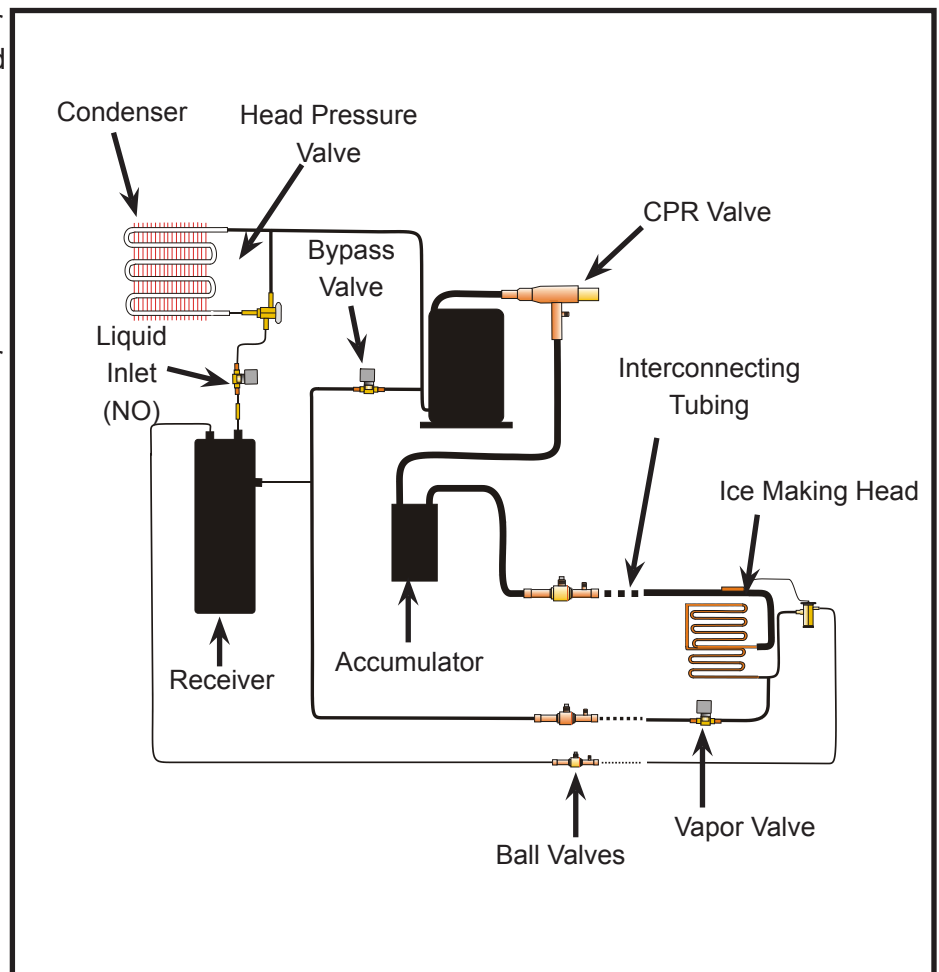
The compressor provides the force that circulates refrigerant in the refrigeration system. During freeze, when the vapor inlet and condenser by pass valves are closed, discharge gas flows from the compressor into the condenser, where its heat is discharged into the air stream. Liquid refrigerant flows out of the condenser and through the normally open liquid line outlet valve on its way to the receiver inlet. Under low ambient/low pressure conditions, the head pressure valve or headmaster closes the liquid outlet of the condenser and opens a bypass route to direct refrigerant gas to the receiver inlet until discharge pressure builds back up to the headmaster's set point.

From the receiver liquid outlet, liquid refrigerant flows into the liquid line and into the ice making section. At the ice making section, the refrigerant flows into the expansion valve where a pressure change takes place. The liquid refrigerant moves from the expansion valve into a low-pressure area (the evaporator) where it can rapidly evaporate and absorb heat. Heat is absorbed from the copper evaporator tubing, attached copper and the water flowing over the evaporator. The low-pressure refrigerant gas then flows into the suction line, which carries it back to the condensing unit, where it enters the accumulator. In the accumulator most of any liquid carried with the suction gas is separated and only vapor flows out of the accumulator through the CPR valve and to the compressor where the cycle continues.

During harvest discharge gas flows through the open condenser by pass valve into the vapor line. Power is also applied to the coil of the liquid inlet valve, closing it. At the same time, in the ice making section, the vapor inlet valve opens.

Discharge gas, combined with some vapor from the receiver's outlet, then flows through the vapor line to the evaporator inlet. The gas-vapor combination, when entering the relatively cold evaporator, condenses,

transferring latent heat to the evaporator, which warms it. Ice releases and falls into the bin. The low-pressure refrigerant then flows out of the evaporator and into the suction line. The suction line brings the refrigerant, now consisting of a vapor-liquid combination, to the accumulator. From the accumulator the vapor-liquid combination (now more vapor than liquid) goes to the Crankcase Pressure Regulator valve which limits the amount of dome pressure in the compressor, where the cycle continues.



## **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Freeze Cycle Sequence of Operation**

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This sequence begins with a restart after the unit has shut off with the bin full. Ice has been consumed, causing the ice sensors to become un-blocked.

1. The controller (four minutes has to have passed since the machine shut off on bin full for the machine to restart)
2. The purge valve is opened and the pump started.
3. After the purge valve closes the inlet water valve opens and fills the reservoir.

---

Note: If the water reservoir does not fill within the time period expected the controller will shut off and switch on the water indicator light. It will re-try to fill the reservoir in 20 minutes. If successful the freeze cycle will continue.

---

4. The compressor and fan motor start and the freezing process begins.

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Note: The controller is connected to two external relays in the EH222, one for the condensing unit's compressor contactor and the other for the condensing unit solenoid valves. A separate 24 volt transformer is in the condensing unit supplying power to the contacts of these two line voltage relays through the interconnecting wire.

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5. The controller will shut the water pump off for a few seconds when the reservoir's water temperature reaches a pre-set point.
6. The freeze cycle continues until water makes continuous contact with the ice thickness sensor. That signals the controller to terminate the freeze cycle and begin the harvest cycle. The Ready to Harvest light will be ON.

# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Harvest Cycle Sequence of Operation**

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When harvest begins, the controller connects power to the Harvest relay for the condensing unit's solenoids.

It also connects power to the vapor inlet solenoid valve in the cabinet of the EH222.

The vapor inlet solenoid valve and the condenser bypass valve open. The receiver inlet solenoid valve closes. Vapor flows from the condensing unit to the EH222 evaporator inlet.

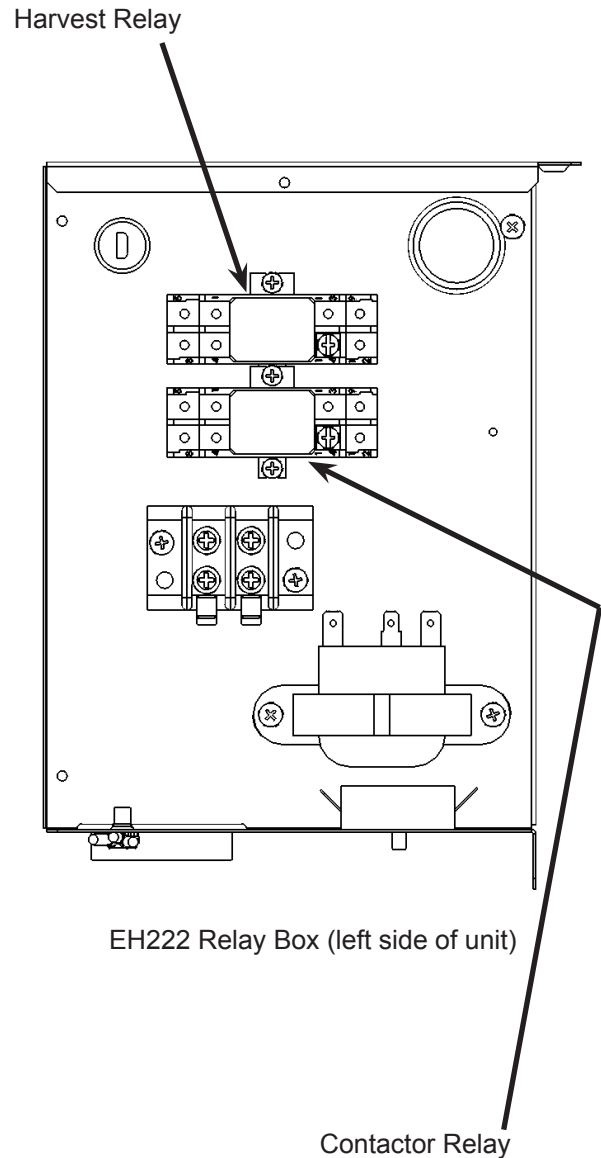
The water pump and purge valve will be on for a period of time during the first part of harvest to purge the water reservoir of a portion of the water.

The inlet water solenoid valve opens to fill the reservoir when the water level sensor indicates an empty sump. It continues to fill when the pump and purge valve have shut off and will stop filling when the water level sensor senses a full sump.

Harvest will continue until both curtains have opened. The curtain switch, attached to the edge of each curtain, will sense the curtain opening.

If the curtains both close, harvest will terminate and the freeze cycle will resume.

If the curtain remains open for 30 seconds, the machine will shut down



# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Control Safeties**

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## **Max freeze time – 45 minutes**

When exceeded, the controller will attempt another freeze cycle. If the condition is exceeded again the next cycle, the control will again attempt another freeze cycle. If the freeze cycle exceeds the maximum time in 3 consecutive cycles, the controller will shut the machine off and it must be manually reset.

## **Min freeze time – 6 minutes**

If the controller switches the machine into harvest within 20 seconds of the minimum freeze time, the controller will harvest for a preset time and does not stop if the curtain switch opens. If this occurs again in the next three cycles, the machine will shut down and must be manually reset.

## **Max harvest time – 3.5 minutes**

If the harvest cycle has continued for 3.5 minutes without the curtain opening, the controller will shut the machine off for 50 minutes and then restart. If there is another the machine will shut the machine off for another 50 minutes and then restart. If it fails a third consecutive time the controller will shut the machine down and must be manually reset.

- Time between resets – 50 minutes
- Number of automatic resets – 2
- Max water fill time – 5 minutes. Machine will attempt a restart every 20 minutes.
- Max discharge temp – 250 degrees F.
- Time interval between cleanings – 6 months power on time - adjustable in one month increments, can be set at 6, 5, 4 or 3 months of power up time.
- Manual harvest time – 3 minutes
- Pump down interval – remote only. 12 hours.
- Pump down is 30 seconds of compressor only on time.
- Minimum compressor off time – 4 minutes
- Continuous Run Time Maximum Cycles - 25

## **Restarts**

### **Power Interruption**

The controller will automatically restart the ice machine after adequate voltage has been restored.

- H blinks on code display
- Status indicator light blinks
- Reservoir is drained and refilled
- Default harvest is initiated. The curtain switch does not have to open to terminate harvest, harvest will continue until the default harvest time expires. Default harvest time is 3 minutes. The machine will then return to a normal freeze cycle.

### **Water Interruption**

The controller will attempt to fill the reservoir every twenty minutes until it is successful.

# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Controller Operation**

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## **Control Button Use (from standby - status light off)**

Set purge level, 1-5 (1 is minimum, 5 is maximum) or Automatic:

- Hold off button in for 3 seconds. Release.
- Press and release the On button to cycle through and select one of the five purge settings or to use the automatic setting.

Recall diagnostic code:

- Hold off button in for 3 seconds. Release.
- Press and release the Harvest button to cycle through each of the last 10 error codes from most recent to oldest.

Clear diagnostic code:

- Hold Clean and Harvest buttons in for 3 seconds to clear all prior codes.

Reset control:

- Depress and release Off, then depress and release On

Start Test Mode:

- Hold Off button in for 3 seconds. Release.
- Hold Clean button in for 3 seconds. Release.

Lock / Unlock control:

- Hold On button in for 3 seconds, keep holding then press and release Off twice.

Empty reservoir:

- Hold Clean button in for 3 seconds. Release. Pump and purge valve will be ON for 30 seconds. Repeat as needed.

Test Mode:

- Depress Off for 3 seconds, release. Then depress Clean for 3 seconds.
- The sump will fill the first 30 seconds of the test. If the sump is full it will overflow into the bin. At 30 seconds the Water Inlet Valve will shut off and the Water Pump will turn on. You will be able to see and hear the water running over the plates. After 10 seconds the Purge and Vapor Inlet Valves will turn on. Water will be purging from the machine. After 10 more seconds the compressor will start. 5 seconds later the VIV will close. The compressor will run for a total of 20 seconds. After which everything will turn off for 5 seconds. After that time the VIV will open and you'll be able to hear the hissing as the pressure is equalized. After 10 seconds all will be off and the output test will be complete.

Change De-Scale Notification Interval

- Like the others, this feature is accessible only from standby (Status Light Off).
- Press and hold harvest button for 3 seconds.
- This will allow control to enter Time to Clean Adjustment State.
- Display current time to clean months on 7 segment display.
- Pressing clean button repeatedly will cycle through one of 4 possible settings:

6 months (4380 hours) (default)

5 months (3650 hrs)

4 months (2920 hrs)

3 months (2190 hrs)

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Service Diagnosis**

| Problem or Symptom                          | Possible Cause  | Probable Correction   |  |
|---|---|---|--|
| No ice                                      | No power to ice making section  | Restore power   |  |
|   | No power to condensing unit   | Restore power   |  |
|   | No lights on controller   | Check transformer   |  |
|   | Unit manually switched off  | Push and release the On button, ask user why it was shut off      |  |
|   | Power to both sections, controller reset, but condensing unit does not operate              | Interconnecting control wire disconnected, reconnect it           |  |
|   |   | Low or high pressure cut outs open, check system pressures        |  |
|   | No power to compressor contactor coil.  | Check toggle switch in condensing unit.                           |  |
|   |   | Check EH222 compressor relay.                                     |  |
|   | No water to ice making section, controller blinking water light                             | Restore water supply, check water filters, reset controller       |  |
|   |   | Check inlet water valve operation                                 |  |
|   |   | Check water level sensor  |  |
|   | Ice making section has exceeded maximum freeze time and controller has shut down the system | Condenser coils may need cleaning                                 |  |
|   |   | Check condenser fan blade and motor                               |  |
|   |   | Check for excessive air intake temperatures at condenser coil     |  |
|   |   | Check compressor contactor  |  |
|   |   | Check compressor and starting components                          |  |
|   |   | Check water pump  |  |
|   |   | Check purge valve for leak through                                |  |
|   |   | Check vapor inlet valve for leak though                           |  |
|   | Ice making section has exceeded maximum harvest time and shut down the system               | Check ice making section for lime scale build up, clean as needed |  |
|   |   | Check condenser by pass valve                                     |  |
|   |   | Check vapor inlet valve   |  |
|   |   | Check headmaster  |  |
|   |   | Check curtain switch  |  |
|   |   | Check inlet water valve for leak through                          |  |
|   | Check for obstruction in ice delivery chute   |   |  |
|   | Condensing unit solenoids do not activate during harvest                                    | Check solenoid relay in EH222                                     |  |
| Bin full code displayed but bin is not full | Check curtain switch and setting of the Vari-Smart adjustment switch                        |   |  |

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Service Diagnosis**

| Problem or Symptom              | Possible Cause   | Probable Correction   |
|---------------------------------|--|---|
| No ice                          | No refrigeration, unit shut down, maximum freeze time code displayed   | Check compressor, refrigerant charge, and liquid inlet valve. Note that if liquid inlet valve is not open, compressor will pump down and suction pressure will be very low.   |
|                                 | Sump frozen  | Check for welded contactor  |
| No water to ice making section  | Water level sensor working properly  | Clean or replace sensor   |
| Slow ice release during harvest | Cubes are too large  | Check ice thickness sensor  |
|                                 |  | Check for water leak  |
|                                 | Condenser by-pass valve does not open  | Check coil of valve<br>Check power to valve during harvest  |
| No ice sensed during harvest    | Ice sensing system failure   | Check curtain switch  |
|                                 | No ice released to bin   | Ice outlet blocked - check for obstruction  |
|                                 | No ice released, vapor inlet valve does not open   | Check coil for continuity, if open replace coil   |
|                                 |  | Check for 24 volts to coil during harvest, if none, check at relay in EH222   |
|                                 | Check low side pressure, if pressure does not rise during harvest, and valve is electrically OK, replace vapor inlet valve |   |
| No ice, Code 1 Displayed        | Freeze cycle too long  | Check for false sump full indication (See page 28)<br>Check condensing unit operation<br>Check refrigeration including head pressure control valve, vapor valve, bypass valve<br>Check water valve for leak thru<br>Check purge valve for leak thru |
| No ice, Code 2 Displayed        | Harvest cycle too long   | Check harvest assist<br>Check for false sump full<br>Check curtain switch<br>Check bypass and vapor valve operation   |
| No ice, Code 3 Displayed        | Water supply inadequate  | Check water supply and inlet water solenoid valve   |
| No ice, Code 8 Displayed        | Freeze cycle too short   | Check / clean ice thickness sensor<br>Clean water system<br>Scrub evaporator spillway (See page 26 & 27)  |

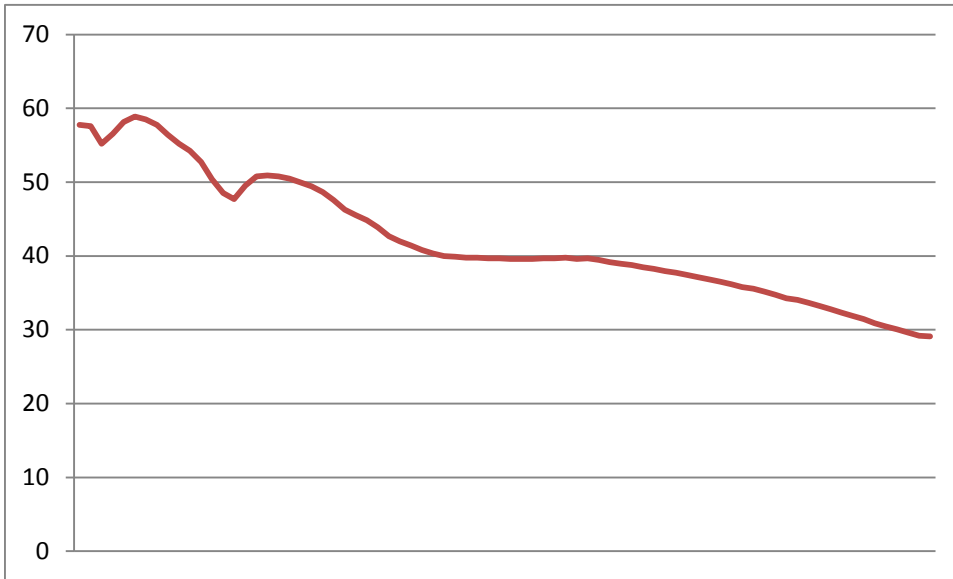


**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Service Diagnosis**

| Problem or Symptom  | Possible Cause  | Probable Correction  |  |
|---|---|--|--|
| Low capacity  | Dirty condenser   | Clean condenser  |  |
|   | Air temperature intake to condenser very high   | Re-orient condenser to avoid hot air intake  |  |
|   | Water temperature intake to ice making section very high  | Check for hot water supply to ice machine due to mal-functioning or non-existent hot water check valve at dishwashing sink   |  |
|   | Ice broken up and stuck between reservoir and curtain, happens almost every cycle   | Ice thickness set too thin   |  |
|   |   | Ice very uneven, check superheat   |  |
|   |   | Slow harvest, check headmaster   |  |
|   | Storage bin or dispenser not holding ice properly   | Check drains for water flow from ice machine (separate to correct) or restriction  |  |
|   | High volume of drinks dispensed, cold plate melting ice   | Suggest pre-cooler for water supply to cold plate  |  |
| Vapor inlet valve leaks through slightly during the freeze cycle            | Check valve body for similar temperatures on inlet and outlet, the outlet should be colder and frost develops on the tubes to the evaporators |  |  |
| Exceeding maximum freeze time, compressor unit trips on high discharge temp | Check condenser bypass valve  |  |  |
| Poor ice formation - very cloudy and misshapen                              | Dirty water system  | Clean the water distributor to remove built up mineral scale   |  |
|   | Low refrigerant charge.   | Add several pounds of refrigerant to check. If low on charge, locate leak. Recover refrigerant, repair leak, replace drier, evacuate to 300 microns and weigh in the nameplate charge. |  |
| Whistling noise at condensing unit during harvest                           | By pass and liquid inlet valve coils not getting power  | Check harness  |  |

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
Refrigeration Data**

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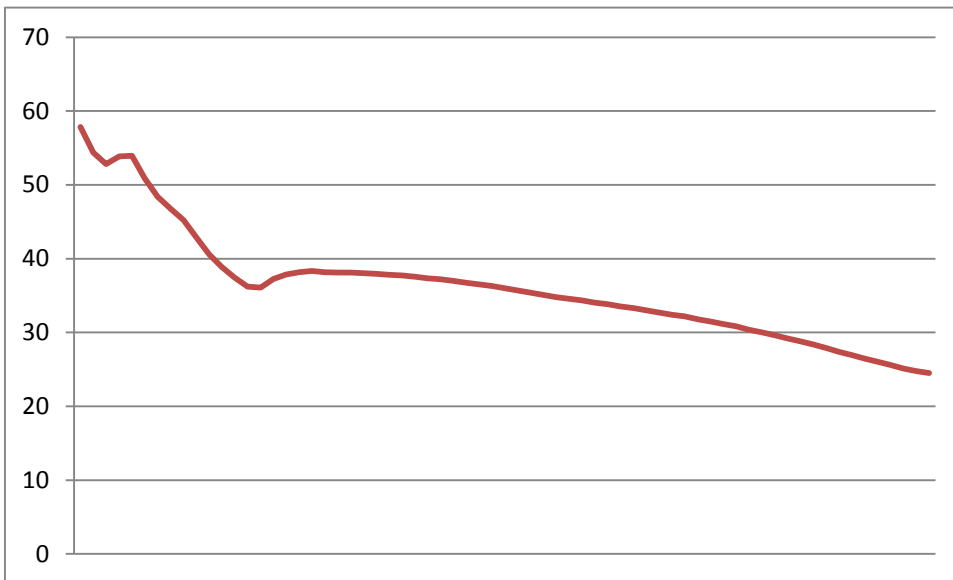
ECC0800 with EH222 90/90/70  
Freeze Cycle Suction Pressure  
in PSIG.

Because the CPR limits dome pressure during harvest, check suction pressure at head or ball valve to obtain evaporator pressure.

See page 24 for more information.

Discharge pressure at 90/70 will peak at 250 - 260 PSIG and drop to 130 during harvest.

Typical cycle time is 13.5 to 15 minutes, including 1:30 for harvest.



ECC1410 with EH222 90/90/70  
Freeze Cycle Suction Pressure  
in PSIG.

Because the CPR limits dome pressure during harvest, check suction pressure at head or ball valve to obtain evaporator pressure.

See page 24 for more information.

Discharge pressure at 90/70 will peak at 260 - 270 PSIG and drop to 170 during harvest. Discharge pressure in cold ambient conditions will be near 217-220. In high ambient it will peak at 380 but operate at 350 for most of the freeze cycle.

Typical 90/70 cycle time is 12-13 minutes, including 1:30 for harvest. Cold ambient cycle time is 9-10 minutes, high ambient cycle time will be about 16-18 minutes including 45 seconds for harvest.

# EH222 and Condensing Unit Remote Low Side Cuber Service Manual Refrigerant Recovery

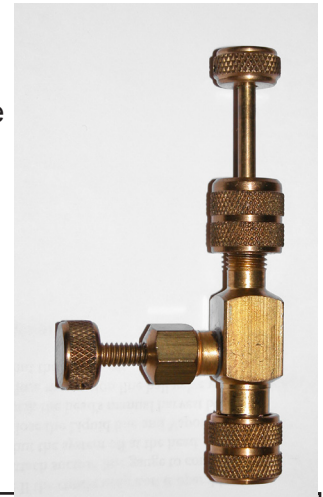
Recover the refrigerant from the ball valve access valves in this condensing unit.

1. Shut unit off. Confirm ball valves are in the open position.
2. To speed recovery use 3 Schrader valve removal / access port tools and remove the valve cores from the ball valve access valves.
3. Attach refrigeration manifold to all three ports (use two manifolds or two extra hoses and a tee).

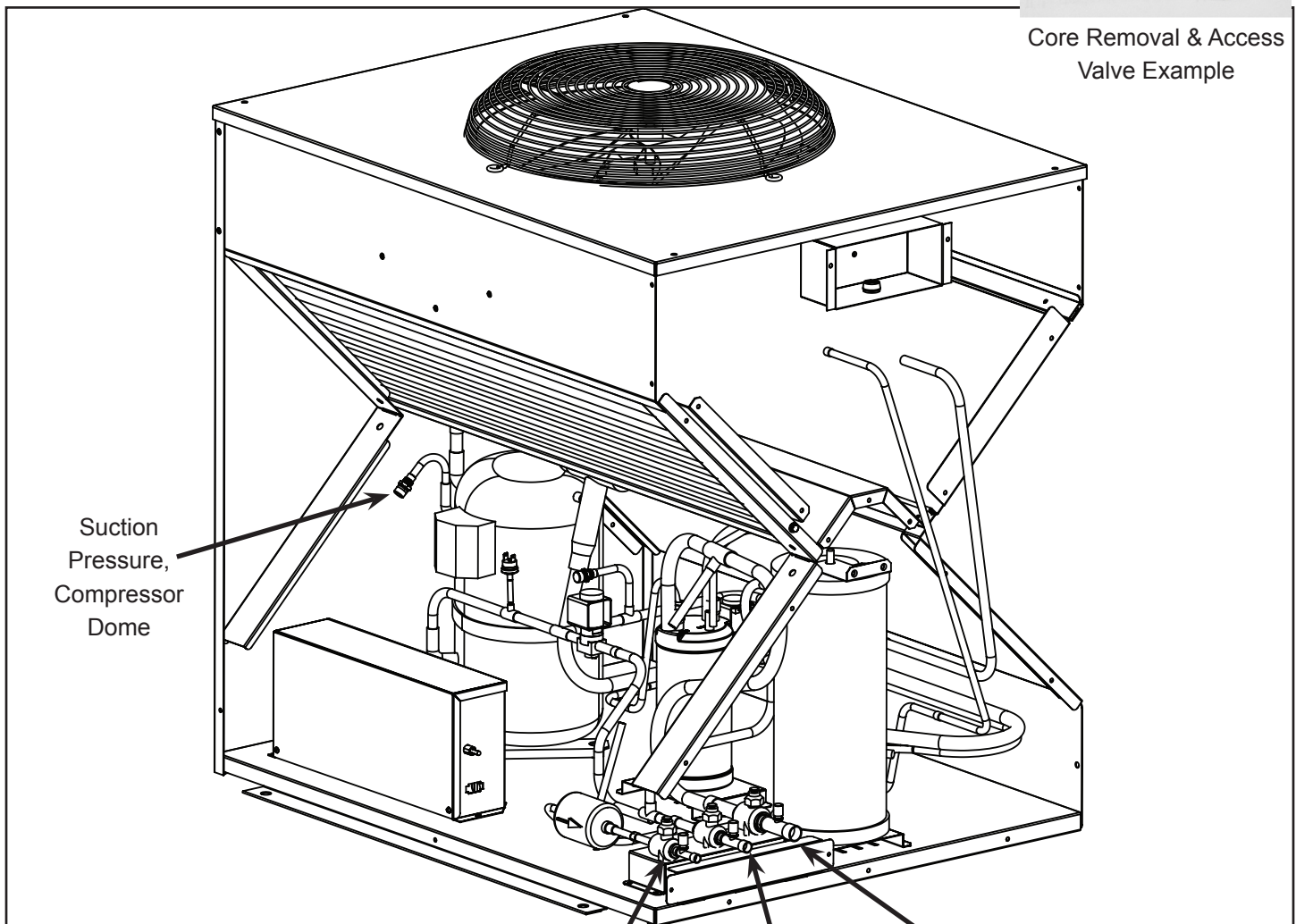
If only two connections are available, connect to Liquid and Suction.

For single point recovery, connect to liquid ball valve.

4. Attach recovery system and recover refrigerant.



Core Removal & Access  
Valve Example

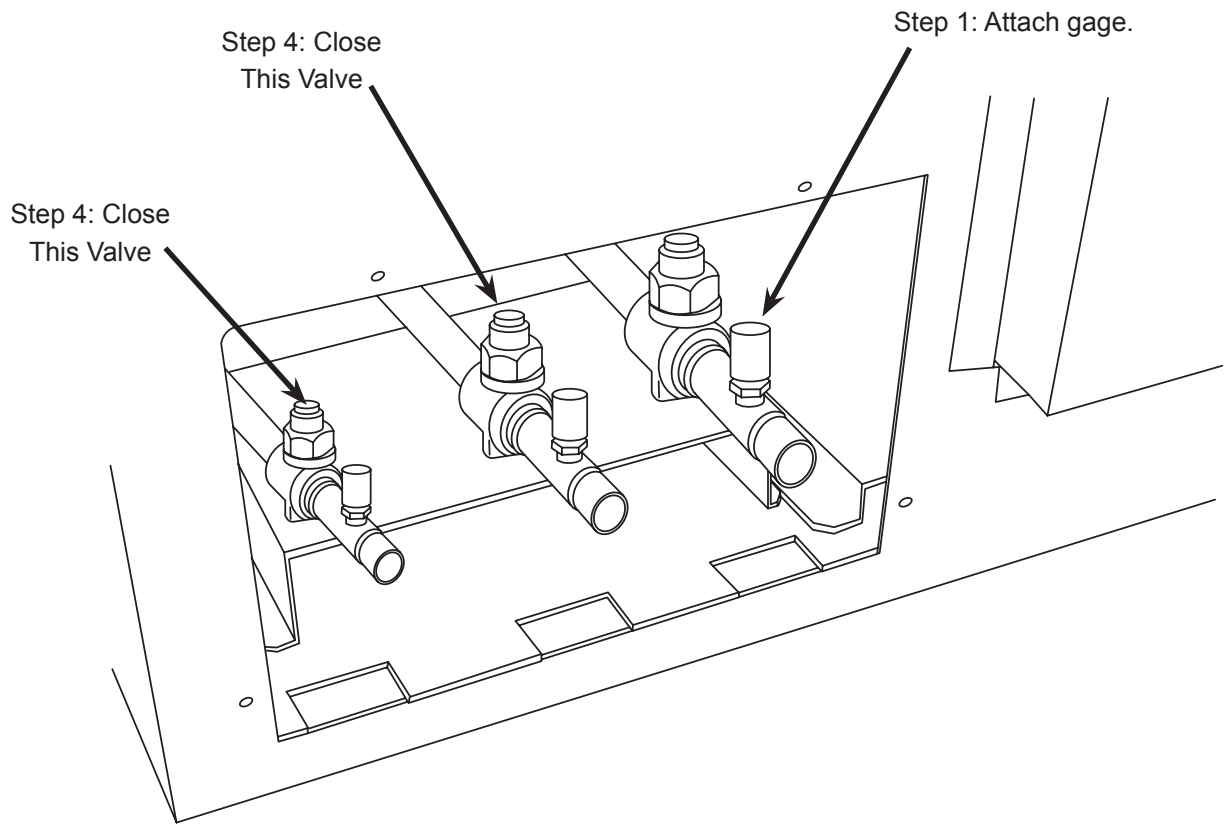


# **EH222 and Condensing Unit Remote Low Side Cuber Service Manual System Isolation**

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Note: If the condensing unit is operable, the head may be isolated from the condensing unit:

1. Attach suction line gauge to condensing unit ball valve access valve.
2. Unplug the liquid line solenoid valve (receiver inlet) coil.
3. Shut the system off at the head (push and hold the OFF button until it stops).
4. Close the Liquid line and Vapor line ball valves.
5. Push the head's manual harvest button or connect 115 volt power to head's vapor valve(s) and manually operate the compressor contactor.
6. Close the suction line ball valve when suction pressure drops to zero PSIG.
7. Shut the system off. Refrigerant is isolated to the condensing unit.



## **EH222 and Condensing Unit Remote Low Side Cuber Service Manual Condenser Coil**

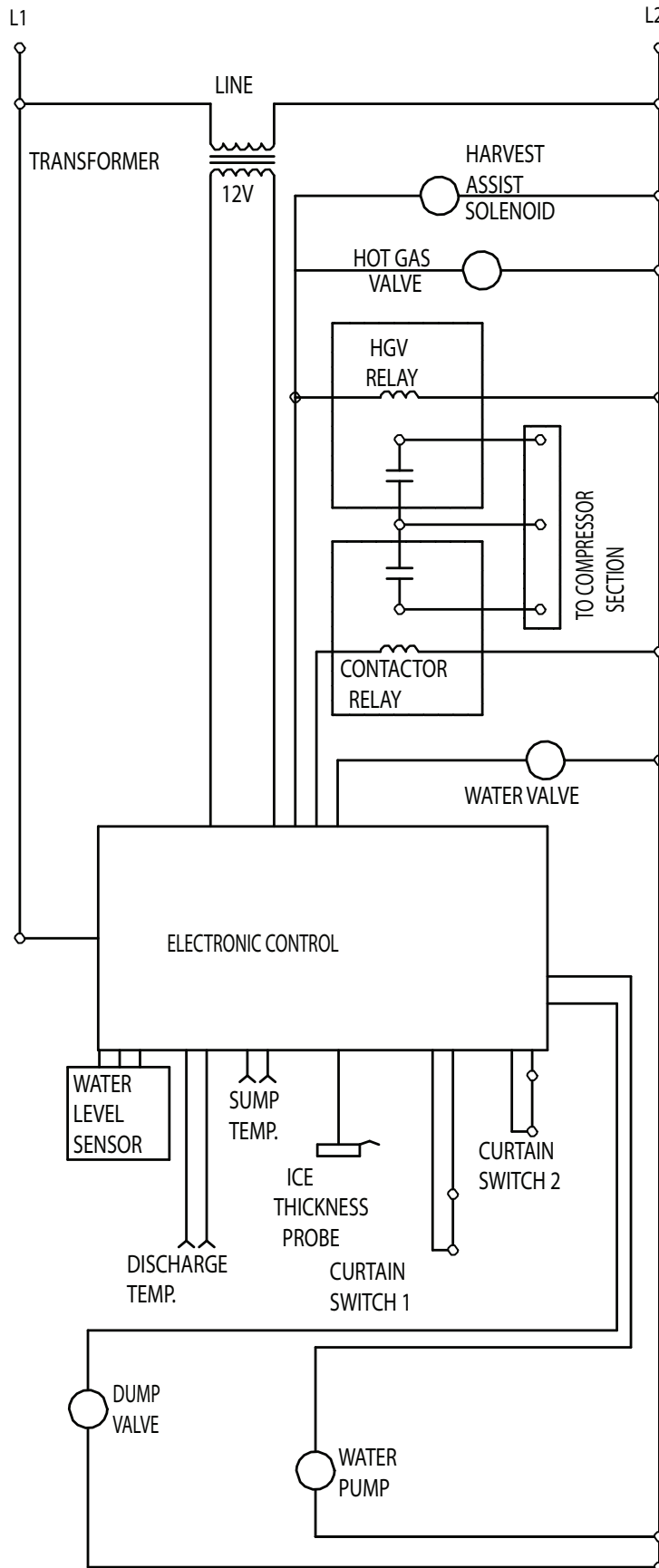
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The condenser's coil is micro-channel aluminum and may be replaced in the field without changing the condensing unit. The replacement coil ships with attached stainless steel stubs.

To replace it:

1. Recover refrigerant
2. Disconnect electrical power.
3. Remove top panel.
4. Remove fan blade, fan motor and fan motor brackets.
5. Disconnect tubing to condenser coil.
6. Remove fasteners that secure coil to unit and remove coil from machine.
7. Place new coil in position and secure with original fasteners.
8. Attach dry nitrogen source to system and bleed nitrogen at 1 PSIG while brazing.
9. Braze new coil stubs to unit tubing. Be sure to NOT overheat the stubs:
  - Apply heat to the copper tubing first and move the flame toward the stub.
  - Heat the copper tubing for approximately 10 to 15 seconds then direct the heat to the stub.
  - Heat the stub for 2 to 5 seconds and apply 15% silver solder to joint (do not use flux).
  - Do not attempt to fill the joint with solder, solder will draw into joint.
10. Shut off and remove nitrogen source.
11. Install new dryer, evacuate system and recharge with nameplate charge.
12. Return fan motor, blade, brackets and top panel to unit, reconnect power, restart machine, check operation.

**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
EH222 Schematic Diagram**

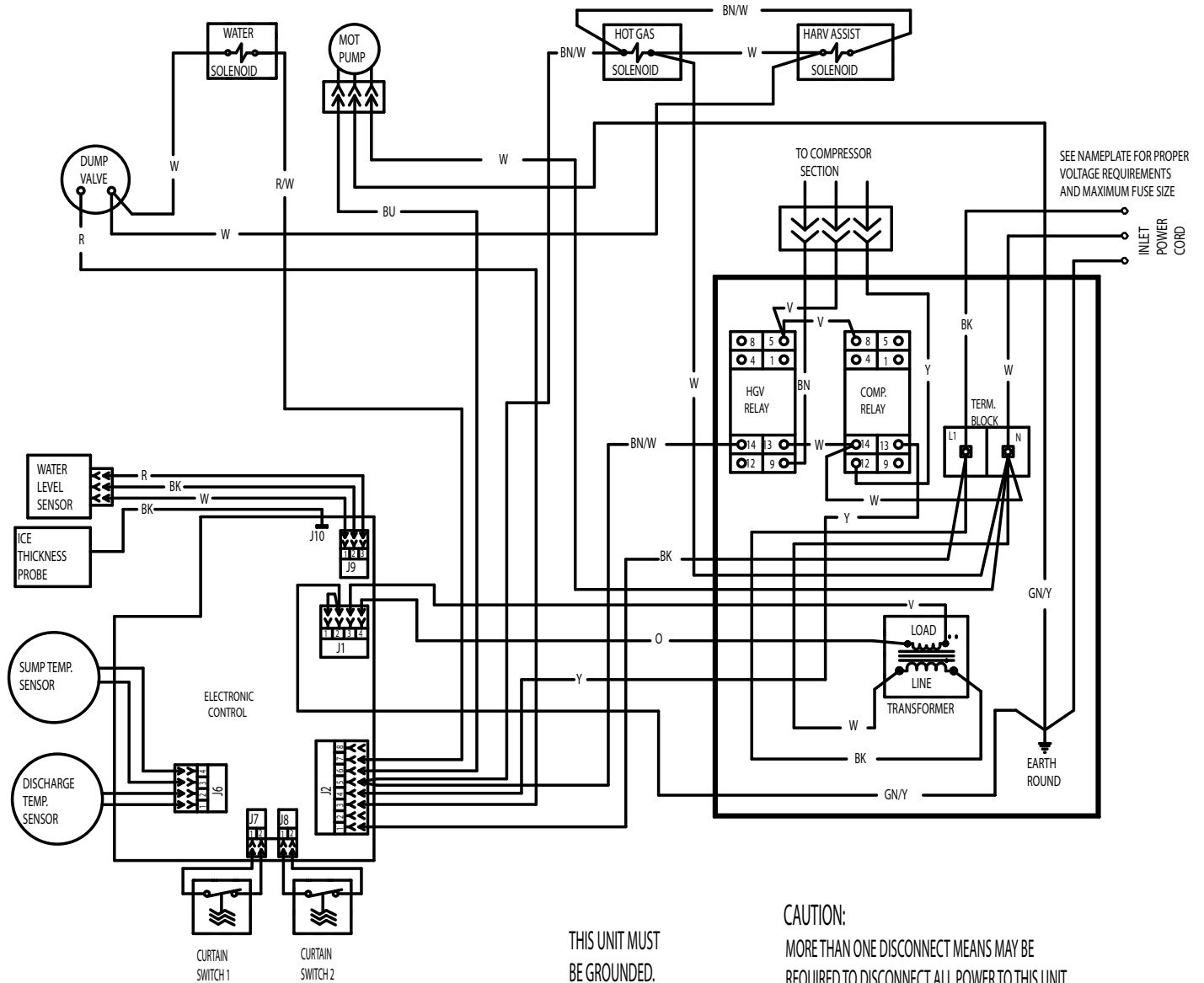


**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
EH222 Wiring Diagram**

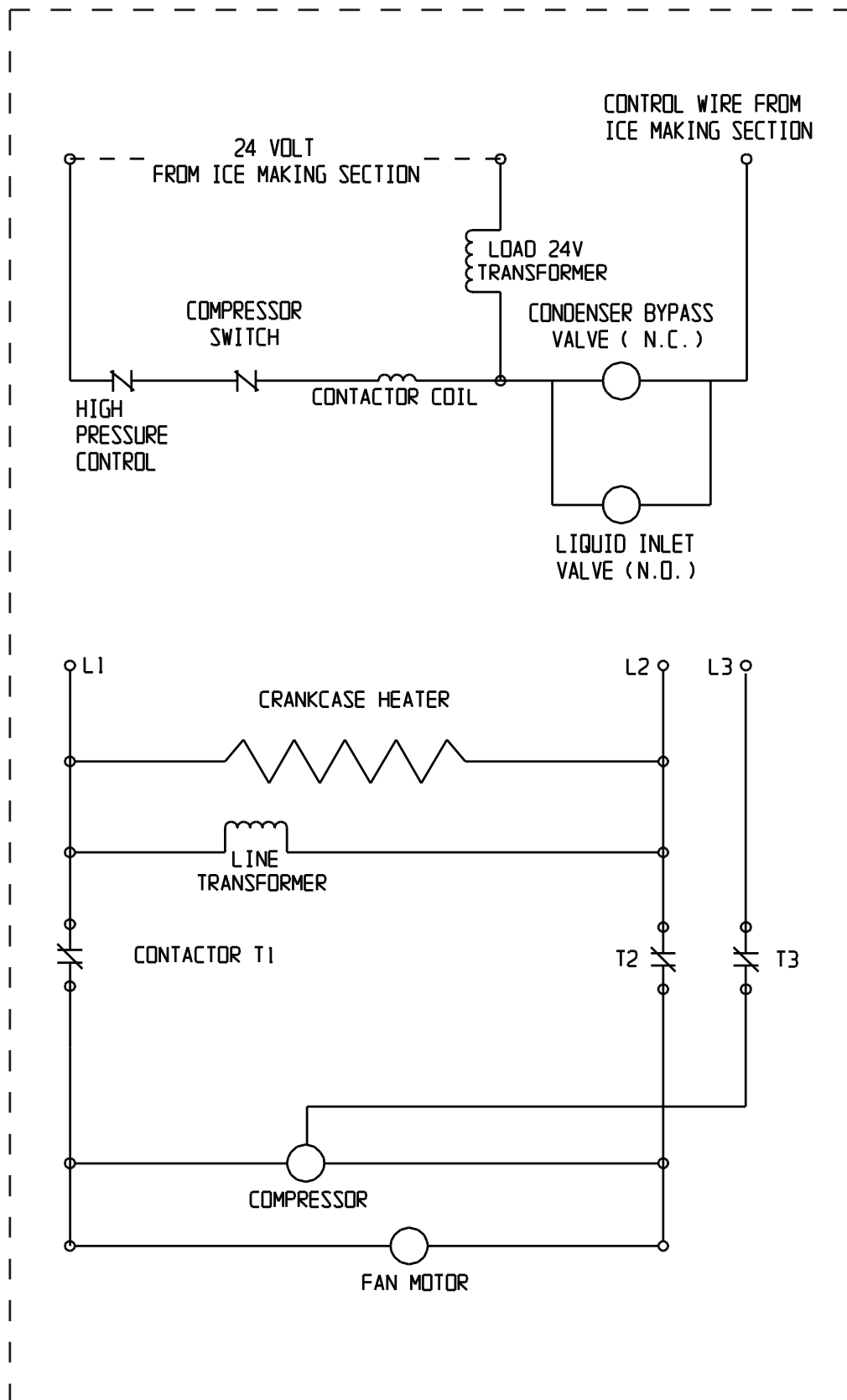
17-3111-01

**⚠** DASHED LINES INDICATE FIELD WIRING WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.

**USE COPPER CONDUCTORS ONLY**



**Eh222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
ECC Three Phase Schematic Diagram**

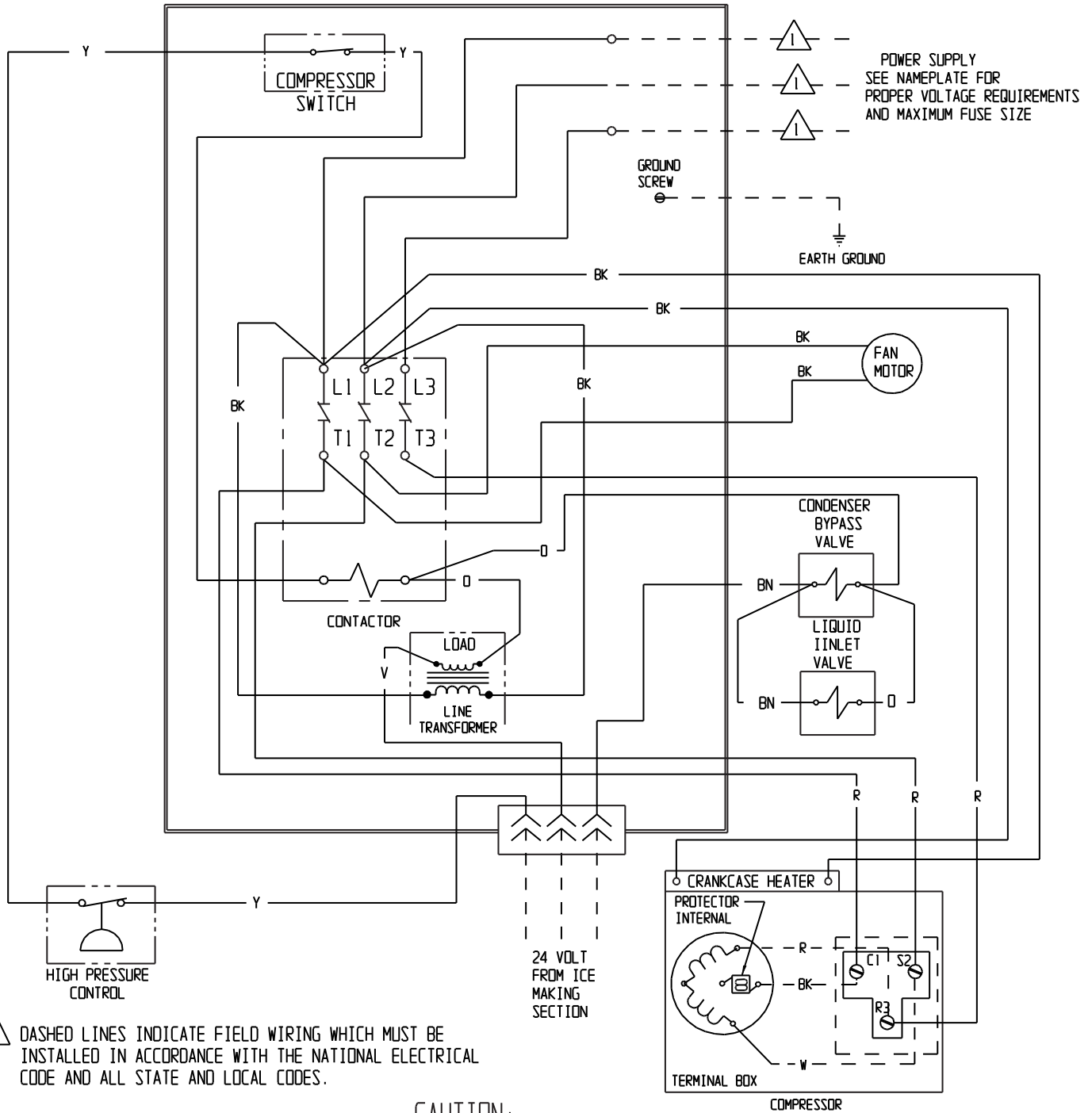




**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
ECC Three Phase Wiring Diagram**

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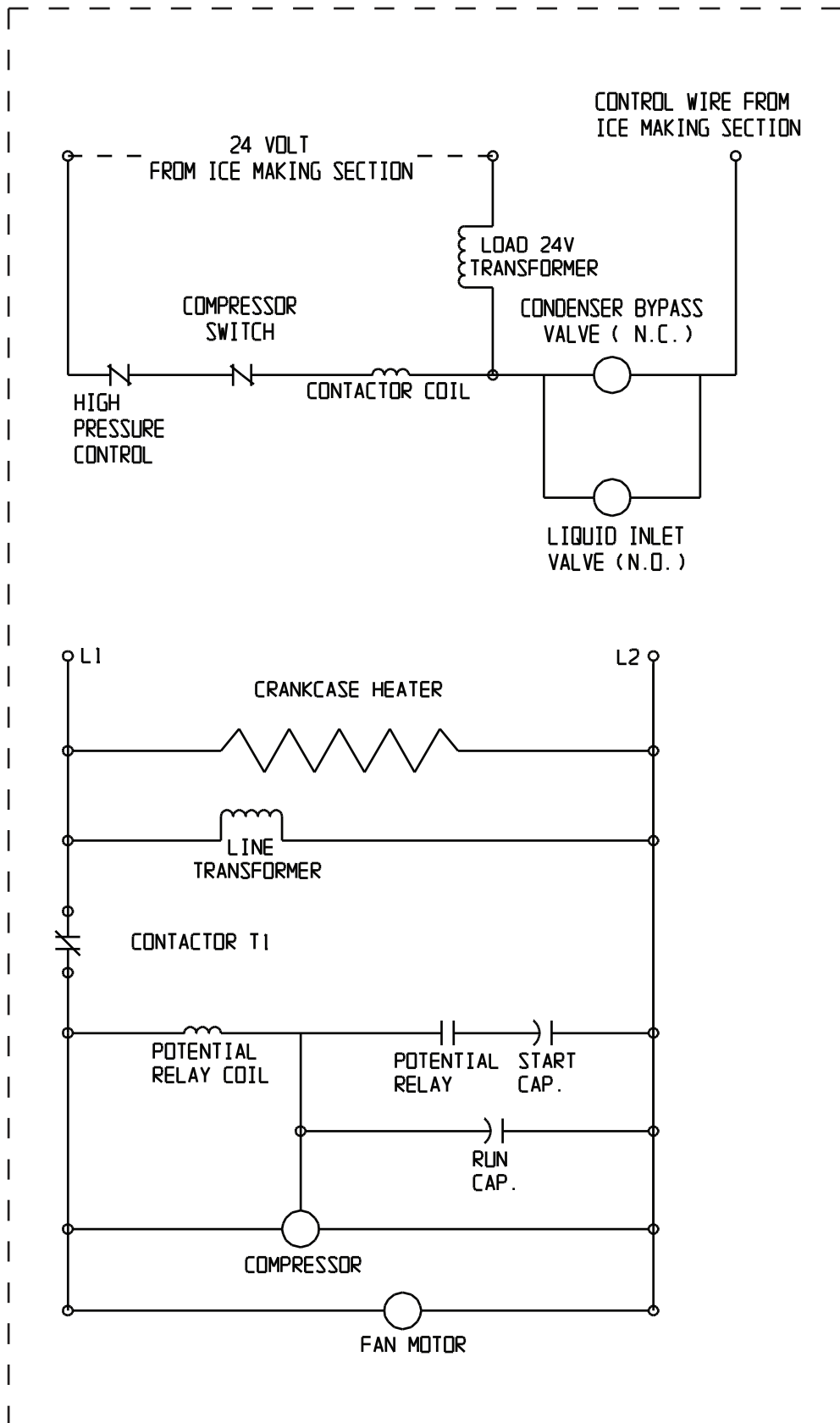
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THIS UNIT MUST  
BE GROUNDED.

**CAUTION:**  
MORE THAN ONE DISCONNECT MEANS MAY BE  
REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

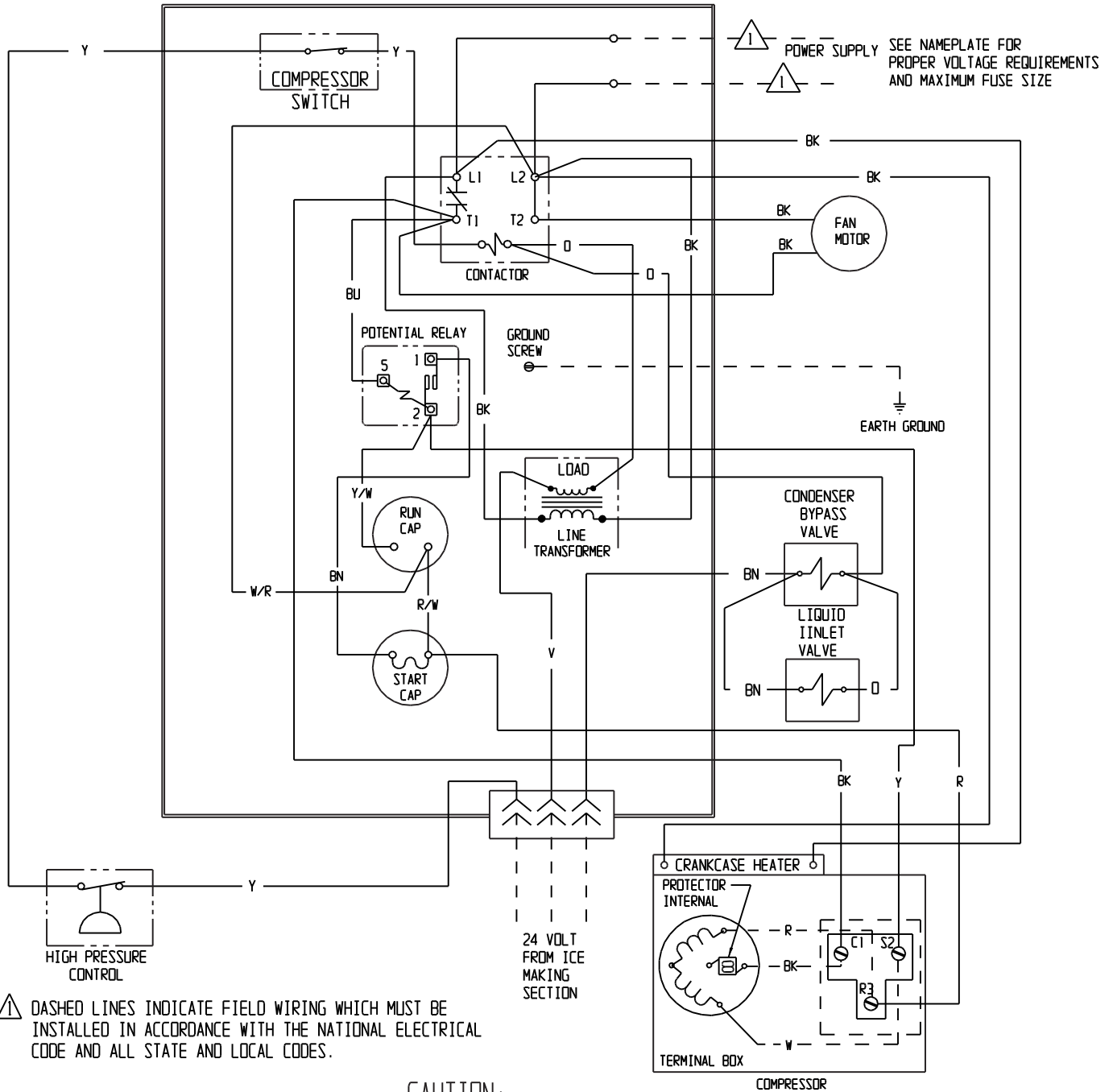
**Eh222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
ECC Single Phase Schematic Diagram**



**EH222 and Condensing Unit  
Remote Low Side Cuber Service Manual  
ECC Single Phase Wiring Diagram**

17-3461-01

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⚠ DASHED LINES INDICATE FIELD WIRING WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.

CAUTION:

MORE THAN ONE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

THIS UNIT MUST BE GROUNDED.

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