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## IMPULSE

### Non-Carbonated Post-Mix Beverage Dispenser Installation & Operation Manual



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### **Contact Information:**

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This document contains the original instructions for the unit described.

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# SAFETY INSTRUCTIONS

## READ AND FOLLOW ALL SAFETY INSTRUCTIONS

### Safety Overview

- Read and follow **ALL SAFETY INSTRUCTIONS** in this manual and any warning/caution labels on the unit (decals, labels or laminated cards).
- Read and understand ALL applicable OSHA (Occupational Safety and Health Administration) safety regulations before operating this unit.

### Recognition

<i>Recognize Safety Alerts</i>

<i>This is the safety alert symbol. When you see it in this manual or on the unit, be alert to the potential of personal injury or damage to the unit.</i>

## DIFFERENT TYPES OF ALERTS

### DANGER:

Indicates an immediate hazardous situation which if not avoided **WILL** result in serious injury, death or equipment damage.

### WARNING:

Indicates a potentially hazardous situation which, if not avoided, **COULD** result in serious injury, death, or equipment damage.

### CAUTION:

Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury or equipment damage.

## SAFETY TIPS

- Carefully read and follow all safety messages in this manual and safety signs on the unit.
- Keep safety signs in good condition and replace missing or damaged items.
- Learn how to operate the unit and how to use the controls properly.
- **Do not** let anyone operate the unit without proper training. This appliance is **not** intended for use by very young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
- Keep your unit in proper working condition and do not allow unauthorized modifications to the unit.

## QUALIFIED SERVICE PERSONNEL

### WARNING:

Only trained and certified electrical, plumbing and refrigeration technicians should service this unit. **ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.**

## SAFETY PRECAUTIONS

This unit has been specifically designed to provide protection against personal injury. To ensure continued protection observe the following:



### **WARNING:**

Disconnect power to the unit before servicing following all lock out/tag out procedures established by the user. Verify all of the power is off to the unit before any work is performed.

Failure to disconnect the power could result in serious injury, death or equipment damage.



### **CAUTION:**

Always be sure to keep area around the unit clean and free of clutter. Failure to keep this area clean may result in injury or equipment damage.

## SHIPPING AND STORAGE



### **CAUTION:**

Before shipping, storing, or relocating the unit, the unit must be sanitized and all sanitizing solution must be drained from the system. A freezing ambient environment will cause residual sanitizing solution or water remaining inside the unit to freeze resulting in damage to internal components.

## MOUNTING IN OR ON A COUNTER



### **WARNING:**

When installing the unit in or on a counter top, the counter must be able to support a weight in excess of **430 lbs.** to insure adequate support for the unit. **FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.**

**NOTE: Many units incorporate the use of additional equipment such as icemakers. When any addition equipment is used you must check with the equipment manufacturer to determine the additional weight the counter will need to support to ensure a safe installation.**

## CO<sub>2</sub> (CARBON DIOXIDE) WARNING



### **DANGER:**

CO<sub>2</sub> displaces oxygen. Strict attention **MUST** be observed in the prevention of CO<sub>2</sub> gas leaks in the entire CO<sub>2</sub> and soft drink system. If a CO<sub>2</sub> gas leak is suspected, particularly in a small area, **IMMEDIATELY** ventilate the contaminated area before attempting to repair the leak. Personnel exposed to high concentrations of CO<sub>2</sub> gas experience tremors which are followed rapidly by loss of consciousness and **DEATH**.

# INSTALLATION

## WARNING:

It is the responsibility of the installer to ensure that the water supply to the dispensing equipment is provided with protection back flow by an air gap as defined in ANSI A 112.1.2-1979; or an approved vacuum breaker or other such method as proved effective by test and must comply with all federal, state and local codes.

**Failure to comply could result in serious injury, death or damage to the equipment.**

Water pipe connections and fixtures directly connected to a potable water supply shall be sized, installed and maintained according to Federal, State and Local laws.

## INSTALLATION REQUIREMENTS

### Requirements Summary

<b>Weight</b>	Front or rear counter must be level and able to support 400 lbs
<b>Environment</b>	Indoor Installation only
<b>Temperature</b>	40° To 110° F Ambient Temperature
<b>Clearance</b>	18-Inches above 6-Inches on Sides and Rear
<b>CO2:</b>	75 Psi (5.25 Bar) At Unit With Internal Carbonator
<b>Concentrate:</b>	60 Psi
<b>Water</b>	50 Psi Maximum
<b>Electrical:</b>	See Nameplate On Unit For Electrical Requirements

## ELECTRICAL REQUIREMENTS

Before connecting electrical power to the unit refer to nameplate to verify power requirements

### DANGER:

To avoid possible serious injury or death the ELCB (earth leakage circuit breaker) must be installed in electrical circuit of all 50 Hz units.

### WARNING:

To avoid possible electrical shock the unit must be electrically grounded using the green grounding screw provided inside the electrical contractor box.

### CAUTION:

The wiring must be properly grounded and connected through a 10-amp disconnect switch (slow-blow fuse or equivalent HVAC/R circuit breaker). ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL CODES. MAKE SURE UNIT IS PROPERLY GROUNDED

# INSTALLATION PROCEDURE

## COUNTER-TOP INSTALLATION

**NOTE: Optional 4-inch legs (p/n 3184) will elevate the unit 4 inches above counter (order 4 legs).**

1. Place the unit on a level counter capable of supporting at least 400 pounds.
2. Remove drip tray and front access panel.
3. Turn power switch off then remove screw located next to the power switch and the screw at top of front panel. Next, remove front panel, disconnect wires to valve key lock switch, and peel back magnetic decals from the top. Lift off top center section.
4. Pull water, concentrate, and CO<sub>2</sub> lines through counter or wall. To comply with NSF International requirements the unit must be sealed to the counter top and all access holes in the unit base must be sealed, or the unit can be installed using the optional 4-inch legs (P/N 3184). Caulk/seal the unit to the counter using Dow Corning RTV 731 or equivalent approved sealant.
5. Pull plastic "wire tie" to remove hitch pin from condenser fan motor assembly (this pin is only needed during shipping).



Figure 1.

6. Fill the water bath with clean water until it comes out the overflow tube. Make sure the overflow tube is not blocked or plugged. Use low-mineral tap water, not distilled or deionized water.

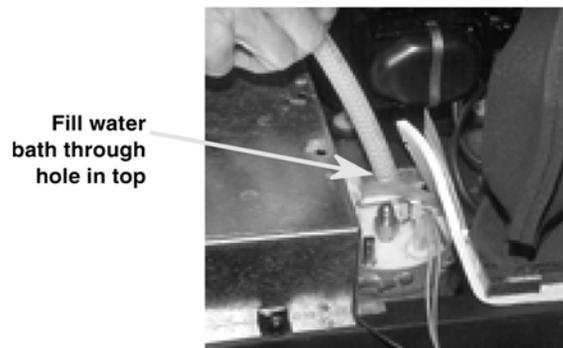


Figure 2.

**NOTE: Water bath must be filled with water before the unit will run.**

### GLOBAL ICE BANK CONTROL (GIBO) THEORY OF OPERATION

Once electrical power is supplied to the Unit, the agitator motor will start. There will be a three-minute time delay before the refrigeration compressor and the condenser fan motor will start. This three-minute time delay will take place each time electrical power to the Unit is interrupted.

The Unit will continue to operate until ice covers all three stainless-steel pins on the ice bank control probe. The ice bank control module senses this by measuring the difference in electrical resistance between the water and the ice. When the ice on the

evaporator coil becomes thick enough, it covers the three stainless-steel pins on the ice bank control probe. The control module senses there is enough ice and turns the refrigeration compressor and the condenser fan motor off.

The Unit remains turned off until the ice bank control three stainless-steel pins are free of ice. Once this happens, the ice bank control module starts the refrigeration compressor and the condenser fan motor.

**NOTE: Make sure that the electrical power circuit breaker is switched off or the fuse removed. Before connecting electrical power to the unit, refer to nameplate to verify the power requirements.**

- A. Remove the following:
  - front merchandiser by removing two screws on the top and lifting up
  - key switch wires
  - hood by removing two screws on the top and lifting up and forward.
- B. Remove second valve from the left to facilitate routing of the new cord.
- C. First route the new cord up behind the valve panel and through the cutout in the pump deck. Use the already attached wire tie/fastener on the deck to secure the cord.
- D. Connect cord to the receptacle on the refrigeration deck.
- E. Turn the circuit breaker on and then the units power switch. Check to see that the agitator motor has started. After about three minutes the compressor should start. If the agitator or compressor do not start call Technical Services.

## CONNECT CONCENTRATE AND WATER LINES

1. Route concentrate and plain water lines from the back side of the unit and under the unit to the front. Connect them to the appropriate inlet connections.

**NOTE: If water supply pressure to the unit is less than 40 psi, a water pressure booster is required. If water supply pressure to the unit is more than 50 psi, a water pressure regulator must be installed in the supply line.**

**NOTE: A water shutoff valve and water filter in the water supply line are recommended.**

2. Make the connection behind the splash panel to the marked 3/8 water tubes.
3. Connect optional drip tray drain hose (if used). Be sure the knock-out in the drip pan has been removed if drain hose is used.
4. Bleed each valve into a bucket until water comes out.
5. Be sure that all concentrate sources are connected and on. Bleed each valve into a bucket until concentrate comes out.
6. Reinstall drip tray and position water bath overflow hose in drip tray indent.

7. Check the system for gas leaks by pressurizing the system and then turning off the cylinder valve. Wait a couple of minutes and check the cylinder gauge to see if the pressure has dropped.
8. Check the system for water and concentrate leaks.

## ADJUST WATER-TO-CONCENTRATE RATIO

1. Remove valve front cover and install concentrate diversion assembly in place of nozzle.

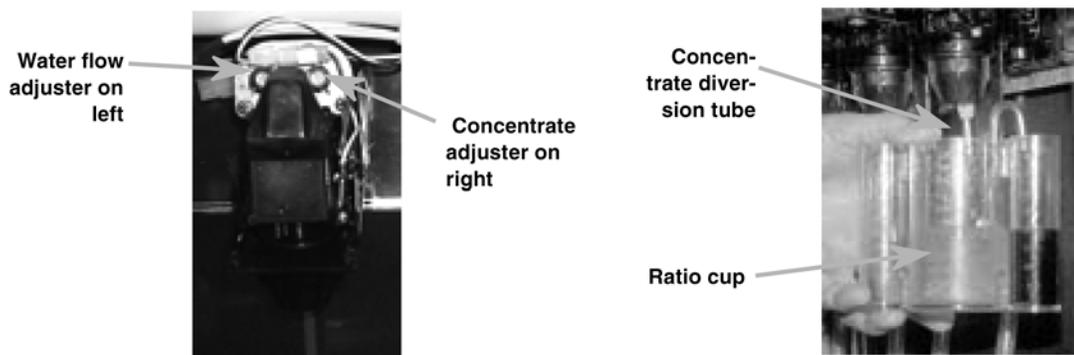


Figure 3.

2. Adjust carbonated water flow to the desired rate (such as 2.50 oz./sec.). Turn the adjuster 1/4 of a turn at a time and recheck the flow. To increase flow turn clockwise.
3. Adjust the concentrate-to-water ratio of each valve using the concentrate adjuster on the left side of each valve. Hold cup under valve and dispense beverage for a specific time (such as 4 seconds).

## ADJUSTING FLOW RATES

Flow rates of the water and concentrate are adjusted based on the desired ratio. For example: if the desired ratio is 5:1, then the flow rate of the water is 5 times that of the concentrate.

If the desired finished drink flow rate is 3.0 ounces per second, then the water flow rate is 2.5 oz./sec. and the concentrate flow rate is 0.5 oz./sec. (The water at 2.5 oz./sec. is five times the 0.5 oz./sec. concentrate flow rate.)

Flow Rates oz./sec. Based on 5:1 Ratio		
Finished Drink oz./sec.	Water oz./sec.	Concentrate oz./sec.
1.5	1.25	.25
2.0	1.67	.33
2.5	2.08	.42
3.0	2.5	.50
3.5	2.92	.58
4.0	3.33	.67
4.5	3.75	.75

# OPERATIONS

## STARTING AND STOPPING THE UNIT



Figure 4.

1. Push power ON/OFF switch to **ON** to power on the unit.
2. Insert key into key lock and turn to the **ON** to activate valves.

## DISPENSING PRODUCT

To dispense beverage press a cup or glass against the lever or push the button on the valve cover.

## REPLENISHING CONCENTRATE SUPPLY

### Bag-In-Box System:

1. Disconnect the concentrate tube from the empty bag-in-box and remove the empty box.
2. Rinse the disconnects in warm water to remove any concentrate residue.
3. Install a full bag-in-box and connect the concentrate tube.

## ADJUSTMENTS

### WATER-TO-CONCENTRATE RATIO ADJUSTMENT

The ratio adjustment should only be done by a qualified service person.

## CLEANING & CHECKS

### Daily Cleaning

1. Remove nozzle assembly and rinse with warm (not hot) water. If possible, soak nozzle assembly over night in carbonated water then rinse with warm water.

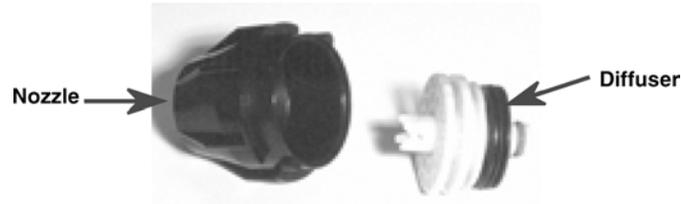


Figure 5.

2. Wash external surfaces with mild soap solution, rinse with clean water, and wipe dry. Remove the drip tray, wash with mild soap solution, rinse and dry.

**NOTE: Do not use abrasive or harsh cleaners on the unit.**

### Daily Checks

1. Check CO<sub>2</sub> supply.
2. Check concentrate supply.

## SANITIZING CONCENTRATE SYSTEMS

The concentrate systems should be sanitized at least every 120-days and before or after storage. Use a non-scented liquid household bleach containing a 5.25% sodium hypochlorite concentration per the following procedure:

**NOTE: Only qualified Service Personnel should perform sanitizing procedure on the post-mix**

1. Rinse bag-in-box connectors (concentrate bag-in-box systems) in warm potable water.

### STEP 1. Wash Concentrate Systems

1. Using a five-gallon container (bag-in-box system), prepare a full tank or container of liquid dishwasher detergent by using 70°F (21°C) to 100°F (38°C) potable water and 0.5 oz. (15 ml) of liquid dishwasher detergent to one gallon of potable water. Stir detergent solution to thoroughly mix the solution.
2. Bag-in Box Concentrate Systems.
  - A. Install bag valves, cut from empty bag-in-box concentrate containers, on ends of concentrate containers concentrate outlet tubes connectors.
  - B. Place all concentrate outlet tubes, with bag valves on their ends, in container containing detergent solution.
3. Flush the concentrate system and dispensing valve as follows:
  - A. Place waste container under applicable dispensing valve.
  - B. Activate the dispensing valve for one minute to purge all concentrate and flush out the concentrate system.
4. Repeat the process for each concentrate circuits.
5. Remove detergent solution source from the concentrate system.

### STEP 2. Flush Concentrate Systems

Fill five-gallon container with potable water, then place all bag-in-box concentrate containers concentrate outlet tubes in container containing potable water.

1. Flush detergent solution out of the concentrate system and dispensing valve as follows:
  - A. Place waste container under applicable dispensing valve.

- B. Activate the dispensing valve for one minute to purge all detergent solution and flush out the concentrate system.
2. Connect potable water source to the remaining concentrate systems and flush detergent solution out of the concentrate systems as instructed in step 9 preceding.
3. Remove potable water source from the concentrate system.

### STEP 3. Sanitize Concentrate Systems

1. Using five-gallon container (bag-in-box system), prepare sanitizing solution using 70°F (21°C) to 100°F (38°C) potable water and 0.5 oz. (15 ml) of non-scented household liquid bleach that contains a 5.25% sodium hypochlorite concentration to one gallon of potable water. This mixture must not exceed 200 PPM of chlorine. Stir sanitizing solution to thoroughly mix.
2. Bag-in-Box Concentrate System.  
Place all bag-in-box concentrate containers concentrate outlet tubes in container containing sanitizing solution.
3. Sanitize the concentrate system and dispensing valve as follows:
  - A. Place waste container under applicable dispensing valve.
  - B. Activate the dispensing valve for one minute to purge all water from and install sanitizing solution in the concentrate system and dispensing valve.
  - C. Continue to activate the dispensing valve in cycles (“ON” for 15-seconds, “OFF”, then “ON” for 15-seconds). Repeat “ON” and “OFF” cycles for 15-cycles.
4. Repeat step 3 to flush water out of and install sanitizing solution in the remaining concentrate systems and dispensing valves.
5. Remove sanitizing solution source from the concentrate system.
6. Allow sanitizing solution to remain in the concentrate systems for not less than 10 or no more than 15-minutes.

### STEP 4. Water Flush Concentrate Systems

#### **WARNING:**

Flush sanitizing solution from the concentrate systems as instructed. Residual sanitizing solution left in the concentrate systems could create a health hazard.

1. Bag-in-Box Concentrate System.
  - A. Place all bag-in-box concentrate containers concentrate outlet tubes in container containing potable water.
2. Flush sanitizing solution from the concentrate system and the dispensing valve as follows:
  - A. Place waste container under applicable dispensing valve.
  - B. Activate the dispensing valve for one minute to purge all sanitizing solution out of the concentrate system and the dispensing valve.
3. Repeat this process for each concentrate circuit.
4. Remove potable water source from the concentrate system.

### STEP 5. Purge Water out of Concentrate Systems (Restore Operation)

1. Bag-in-Box Concentrate System.
  - A. Remove all bag valves from bag-in-box concentrate containers outlet tubes connectors.
  - B. Connect bag-in-box concentrate containers into the concentrate systems.
2. Place waste container under dispensing valves. Dispense from all dispensing valves to permit concentrate to purge all potable water from the concentrate systems and the dispensing valves. Continue to dispense from the dispensing valves until only concentrate is dispensed from the concentrate systems and valves.
3. Dispose of waste sanitizing solution in a sanitary sewer, not in a storm drain, then thoroughly rinse the inside and the outside of the container that was used for sanitizing solution to remove all sanitizing solution residue.

# REFERENCE MATERIAL

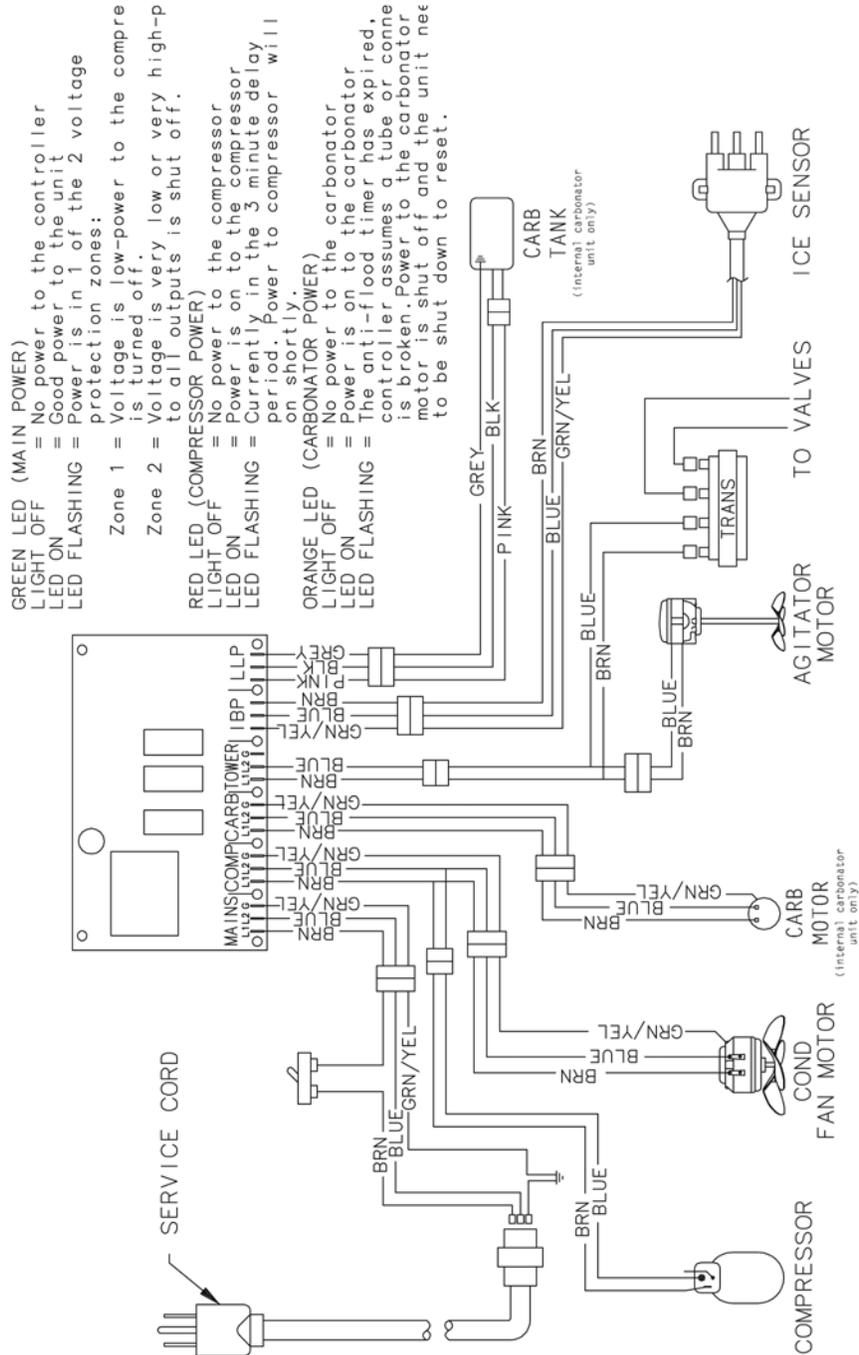


Figure 6. Wiring Diagram

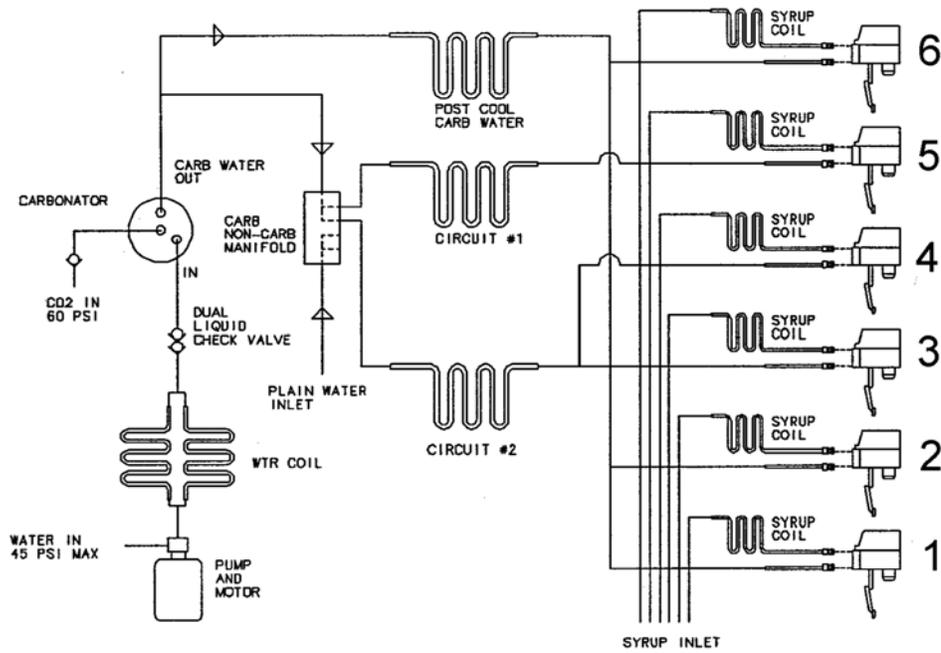


Figure 7. Plumbing Diagrams - Internal Carbonator

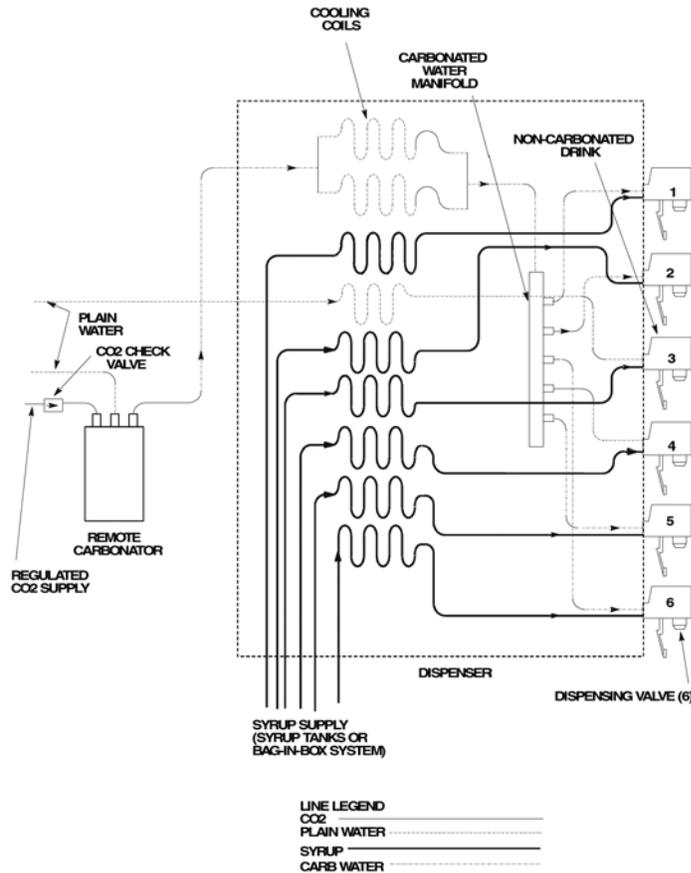


Figure 8. Plumbing Diagrams - External Carbonator

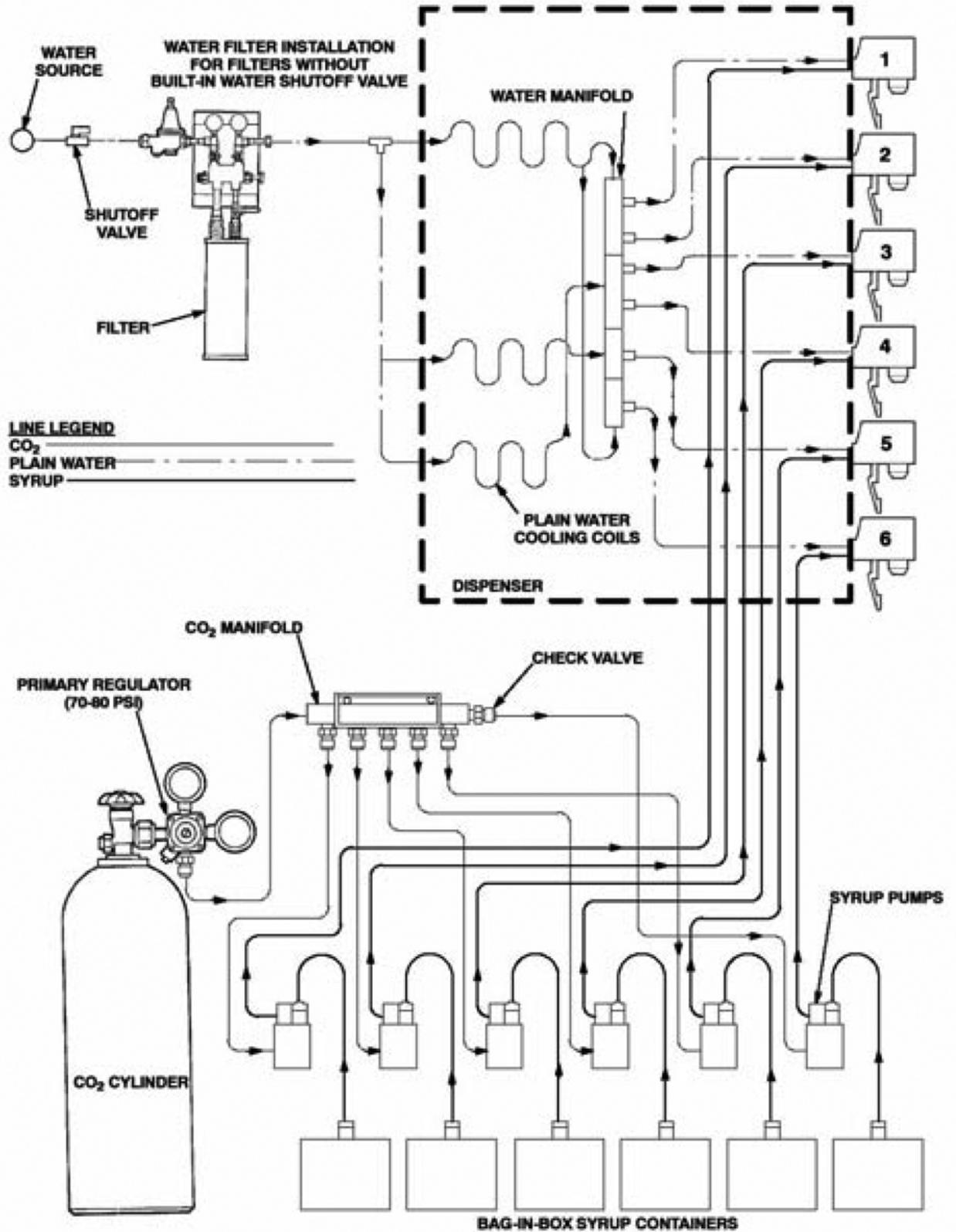


Figure 9.



# TROUBLESHOOTING

Trouble	Probable Cause	Remedy
<b>Troubleshooting Dispensing System</b>		
<b>WATER-TO-CONCENTRATE "RATIO" TOO LOW OR TOO HIGH.</b>	<ul style="list-style-type: none"> <li>• Dispensing valve concentrate flow regulator not properly adjusted.</li> <li>• CO<sub>2</sub> gas pressure to concentrate pumps insufficient to operate pumps.</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust Water-to-Concentrate "Ratio" as instructed.</li> <li>• Adjust concentrate pumps CO<sub>2</sub> regulator as instructed.</li> </ul>
<b>ADJUSTMENT OF DISPENSING VALVE CONCENTRATE FLOW REGULATOR DOES NOT INCREASE TO DESIRED WATER-TO-CONCENTRATE "RATIO".</b>	<ul style="list-style-type: none"> <li>• No concentrate supply.</li> <li>• Concentrate supply container not securely connected into concentrate system.</li> <li>• Concentrate pumps CO<sub>2</sub> regulator out of adjustment.</li> <li>• Dispensing valve syrup flow regulator, syrup tank quick disconnect, or syrup line restricted.</li> <li>• Improper Baume of concentrate.</li> <li>• Dirty or inoperative concentrate flow regulator.</li> <li>• Tapered plastic washer inside tube swivel nut connection distorted from being over tightened restricting concentrate flow.</li> </ul>	<ul style="list-style-type: none"> <li>• Replenish concentrate supply as instructed.</li> <li>• Securely connect concentrate supply container into concentrate system.</li> <li>• Adjust concentrate pumps CO<sub>2</sub> regulator as instructed.</li> <li>• Sanitize syrup system as instructed.</li> <li>• Replace concentrate supply.</li> <li>• Disassemble and clean dispensing valve concentrate flow regulator.</li> <li>• Replace plastic washer. Make sure it seats properly.</li> </ul>
<b>ADJUSTMENT OF DISPENSING VALVE CONCENTRATE REGULATOR DOES NOT DECREASE TO DESIRED WATER-TO-CONCENTRATE "RATIO".</b>	<ul style="list-style-type: none"> <li>• Dirty or inoperative concentrate flow regulator.</li> </ul>	<ul style="list-style-type: none"> <li>• Disassemble and clean dispensing valve concentrate flow regulator.</li> </ul>
<b>NO PRODUCT DISPENSED.</b>	<ul style="list-style-type: none"> <li>• Dispensing valves keyed lock-out switch in "OFF" position.</li> <li>• No electrical power to Unit.</li> <li>• Disconnected dispensing valve power cord.</li> <li>• Disconnected or broken wiring to dispensing valves.</li> <li>• Inoperative transformer or dispensing valve solenoids.</li> </ul>	<ul style="list-style-type: none"> <li>• Place keyed lock-out switch in "ON" position.</li> <li>• Plug in Unit power cord or check for blown fuse or tripped circuit breaker.</li> <li>• Connect dispensing valves power cord.</li> <li>• Connect or replace wiring.</li> <li>• Replace inoperative part.</li> </ul>
<b>ONLY CONCENTRATE DISPENSED.</b>	<ul style="list-style-type: none"> <li>• Water inlet supply line shutoff valve closed.</li> </ul>	<ul style="list-style-type: none"> <li>• Open water inlet supply line shutoff valve.</li> </ul>



**Troubleshooting Refrigeration System**

<b>COMPRESSOR DOES NOT OPERATE.</b>	<ul style="list-style-type: none"> <li>• Ice bank sufficient.</li> <li>• Unit power cord unplugged or control board power switch in "OFF" position.</li> <li>• No power source (blown fuse or tripped circuit breaker).</li> <li>• Low voltage at compressor terminals.</li> <li>• Loose, disconnected or broken wiring.</li> <li>• Overload protector cut out; over heated compressor. Condenser fan motor not operating as required.</li> <li>• Inoperative overload protector or start relay.</li> <li>• Inoperative ice bank control.</li> <li>• Inoperative compressor.</li> </ul>	<ul style="list-style-type: none"> <li>• Refrigeration not called for.</li> <li>• Plug in power cord or place switch in "ON" position.</li> <li>• Replace fuse or reset circuit breaker (note: Fuse or circuit breaker are not part of unit).</li> <li>• Voltage must be at least 103 volts at the compressor terminals when compressor is trying to start.</li> <li>• Tighten connections or replace broken wiring.</li> <li>• Compressor will cool enough to restart. Do not overdraw cooling capacity of unit. Refer to "CONDENSER FAN MOTOR NOT OPERATING" in this section.</li> <li>• Replace inoperative part as</li> <li>• Replace ice bank control.</li> <li>• Replace compressor.</li> </ul>
<b>COMPRESSOR WILL NOT STOP AFTER SUFFICIENT ICE BANK IS FORMED.</b>	<ul style="list-style-type: none"> <li>• Inoperative thermistor.</li> <li>• Damaged ice bank control wire.</li> <li>• Inoperative control board.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace thermistor.</li> <li>• Repair ice bank control.</li> <li>• Replace control board.</li> </ul>
<b>COMPRESSOR OPERATED CONTINUOUSLY BUT DOES NOT FORM SUFFICIENT ICE BANK.</b>	<ul style="list-style-type: none"> <li>• Cooling capacity is exceeded by overdrawing.</li> <li>• Unit located in excessively hot area or air circulation through condenser is restricted.</li> <li>• Refrigeration system leak.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce amount of drinks drawn per given time.</li> <li>• Relocate unit or determine and correct condenser coil restrictions.</li> <li>• Repair refrigeration system.</li> </ul>

**NOTE: The ice bank freezes from the bottom of the evaporator upward. A refrigerant leaks or insufficient charge might show an ice bank at bottom and not at the top of evaporator.**

**NOTE: If overload protector cuts our compressor, condenser fan motor will continue to operate, otherwise, troubleshooting condenser fan motor problems are the same as "COMPRESSOR DOES NOT OPERATE" paragraph plus the preceding.**

<b>CONDENSER FAN MOTOR NOT OPERATING.</b>	<ul style="list-style-type: none"> <li>• Jumper cord loose or disconnected from motor or terminal block. Broken wire in cord.</li> <li>• Fan blade obstructed.</li> <li>• Inoperative condenser fan motor.</li> </ul>	<ul style="list-style-type: none"> <li>• Tighten connections or replace cord.</li> <li>• Remove obstruction.</li> <li>• Replace condenser fan motor.</li> </ul>
<b>AGITATOR MOTOR NOT OPERATING.</b>	<ul style="list-style-type: none"> <li>• Unit power cord or refrigeration system power cord unplugged.</li> </ul>	<ul style="list-style-type: none"> <li>• Plug in power cord.</li> </ul>



- 
- No power source. Blown fuse or. tripped circuit breaker
  - Agitator motor propeller obstructed.
  - Low voltage at compressor terminals.
  - Loose, disconnected, or broken wiring.
  - Inoperative agitator motor.
  - Replace fuse or reset circuit breaker (note: Fuse or circuit breaker are not part of unit).
  - Remove obstruction.
  - Voltage must be at least 103 volts at the compressor terminals when compressor is trying to start.
  - Tighten connections or replace broken wiring.
  - Replace agitator motor as instructed.
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