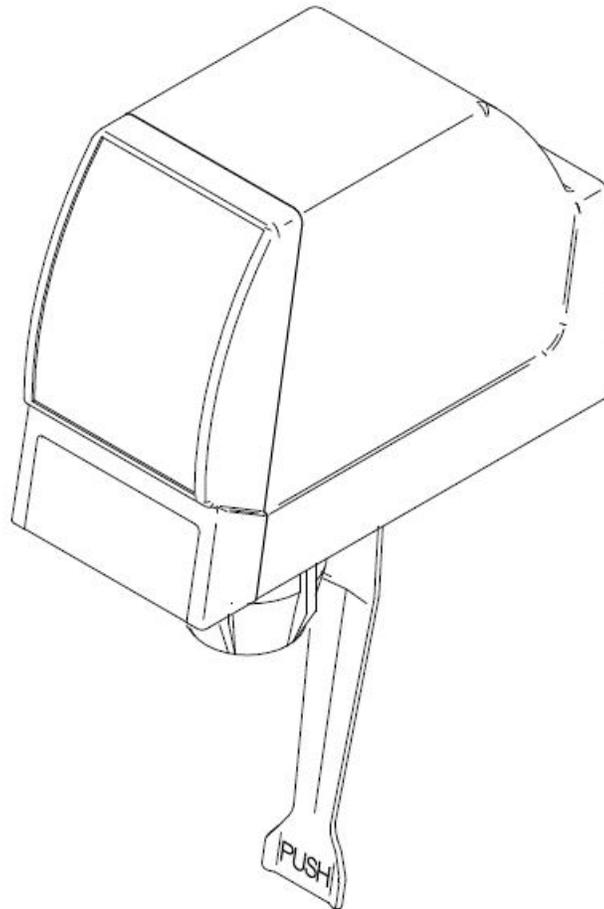




SFV-1™ VALVE

Service Manual



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Revision: E

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The products, technical information, and instructions contained in this manual are subject to change without notice. These instructions are not intended to cover all details or variations of the equipment, nor to provide for every possible contingency in the installation, operation or maintenance of this equipment. This manual assumes that the person(s) working on the equipment have been trained and are skilled in working with electrical, plumbing, pneumatic, and mechanical equipment. It is assumed that appropriate safety precautions are taken and that all local safety and construction requirements are being met, in addition to the information contained in this manual.

This Product is warranted only as provided in Cornelius' Commercial Warranty applicable to this Product and is subject to all of the restrictions and limitations contained in the Commercial Warranty.

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Contact Information:

To inquire about current revisions of this and other documentation or for assistance with any Cornelius product contact:

**www.cornelius.com
800-238-3600**

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This document contains the original instructions for the unit described.

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SAFETY INSTRUCTION

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

Recognize Safety Alerts



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.

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.

CO₂ (CARBON DIOXIDE) WARNING

DANGER:

CO₂ displaces oxygen. Strict attention **MUST** be observed in the prevention of CO₂ gas leaks in the entire CO₂ and soft drink system. If a CO₂ 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 CO₂ gas experience tremors which are followed rapidly by loss of consciousness and **DEATH**.

INTRODUCTION

PREVIEW QUESTIONS

Check your current knowledge by taking a few minutes to answer the following questions:

1. What is the flow capacity of a SFV-1™ valve?

2. Which syrup has the greatest pressure drop, diet or sugar?

3. Can you program “top-off” on a portion control valve?

KEY THINGS TO KNOW / DO

- For quality drinks — keep the nozzles and the water/syrup system clean; and have the correct ratio, temperature, and carbonation!
- Set the water/syrup ratio accurately — and leave it alone!
- To set the ratio accurately, **set the water flow first**, then the syrup!
- Be sure to cool below 40°F the syrup and water before setting the ratio.

OVERVIEW

PRODUCT DESCRIPTION

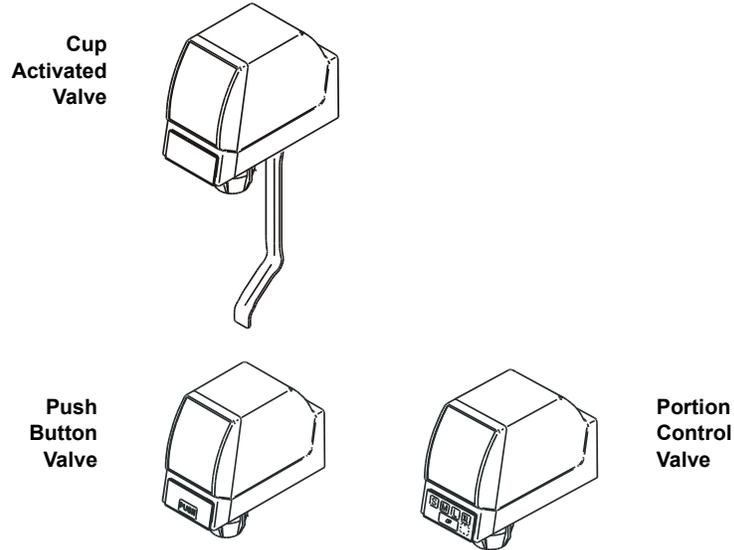
The SFV-1™ valve provides accurate flow capability and dependability. The SFV-1™ valves are capable of flow rates of 1 ½ to 3 ounces per second.

NOTE: The flow rate is also dependent on the capacity of the dispensing, cooling, and carbonation systems. This valve will not make up for a slow system flow rater or inadequate supplies of cooled water and syrup. The following is a list of Cornelius units that are suitable for use with this valve:

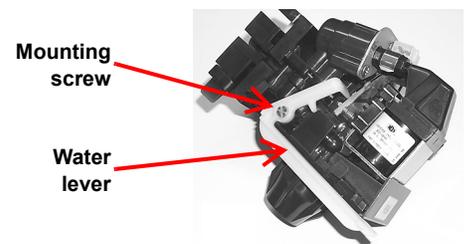
1.5 to 3.0 oz./sec.
Vanguard
Value Line 2323 (10 circuit cold plate)
Premium 2323 (12 circuit cold plate)
Vantage
1522
1722
ED 150
ED 200
ED 250
ED 300
DF 150
DF 200
DF250
DF300
IDC 215
IDC 255

THERE ARE THREE VARIETIES OF SFV-1™ VALVES:

- The cup activated valve dispenses by means of a lever engaged by the cup.
- A push button valve has a press and hold button on the front cover of the valve.
- A portion control valve has four programmable drink size buttons that provide timed deliveries and a manual dispensing button.



- A. A side water lever kit can be added to a valve allowing for dispensing of water without syrup or concentrate. The side water lever can be added to either a carbonated drink valve or a non carbonated drink valve.
- B. An illuminated valve cover kit can be installed on the cup activated version. The module provides front decal illumination and selectable downward lighting.



Post-mix valves control:

- The ON–OFF of syrup and water,
- The flow rates of syrup and water,
- The mixing of the two ingredients as they pour into the cup, and
- In some instances - dispensed portion.

SYSTEM DETAILS

WATER

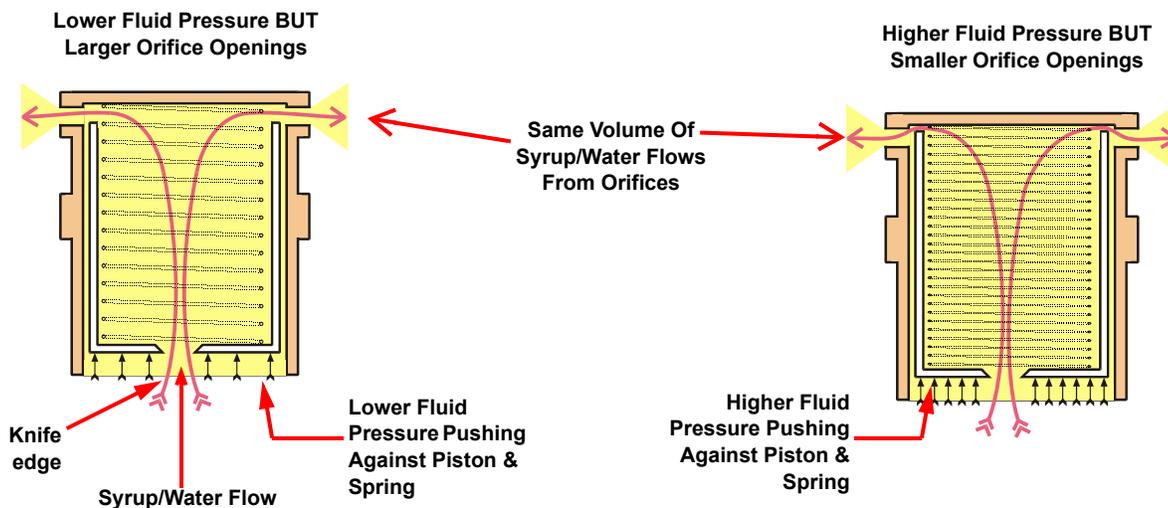
WATER QUALITY

Water quality issues have an effect on dispensing valves. Chloramine, a combination of chlorine and ammonia, is responsible for some degradation of rubber components. Chloramine is used in many U. S. water supplies. Its effects can be minimized by installing and maintaining a water filtration system.

WATER FLOW

The size of the orifice in the piston varies depending on whether the piston is used for syrup or water.

In operation the liquid flows through the knife-edged orifice in the bottom of the piston and then out the orifices in the sleeve. The outlet orifice size in the sleeve is regulated by the position of the piston. In the illustration, the piston is restricting approximately 1/2 of the outlet orifices.



The position of the piston inside the sleeve is determined by the upward pressure of the liquid against the base of the piston and the downward pressure of the spring inside the piston (not shown here). The pressure of the spring is regulated by the adjusting screw.

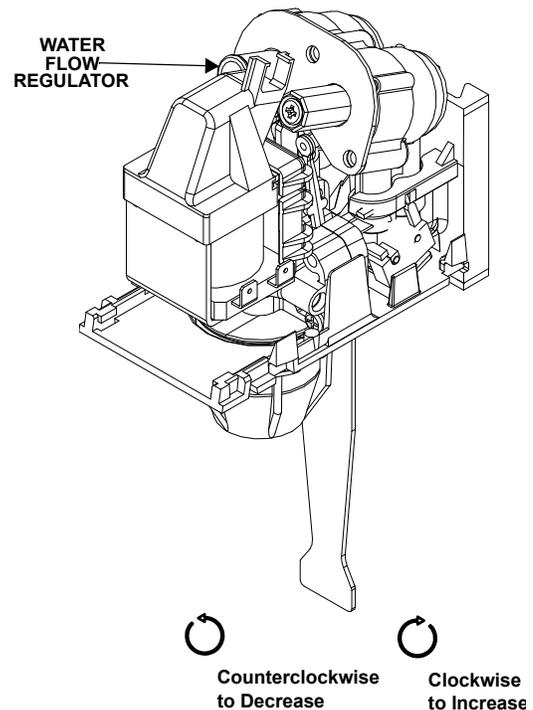
If the pressure of the liquid increases, the flow rate through the knife-edged orifice will increase. The piston is moved upward closing off more of the outlet orifices. The same flow rate is thereby maintained.

WATER FLOW RATE

DISPENSING VALVE WITH ADJUSTABLE WATER FLOW REGULATOR

Turn the water flow regulator adjusting screw counterclockwise to decrease the water flow rate. Turn the adjusting screw clockwise to increase the water flow rate. Adjustments should be no more than 1/4 turn at a time.

Note: Adjusting screw stops are built into the valve to prevent leakage when the screws are adjusted clockwise too much. Stop adjusting clockwise when turning resistance increases. Turn the screw counterclockwise 1-1/2 turns after the stop are contacted.



ADJUSTING FLOW RATES

Flow rates of the water and syrup 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 syrup.

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

NOTE: Always adjust water within its range.

Water Flow Rates At Selected Ratios		
Water To Syrup Ratio	Water at 1.5 oz./sec. Total Flow	Water at 3.0 oz./sec. Total Flow
5 to 1	1.25 oz./sec.	2.50 oz./sec.
5.5 to 1	1.27 oz./sec.	2.54 oz./sec.

CALCULATING FLOW RATES

The most frequent ratio is 5:1. The charts above list the breakdown for many ratios and flow rates. It is useful to be able to calculate flow rates when a chart is not available.

An example of calculating the water and syrup flow rates given the finished drink flow rate and the water to syrup ratio:

Given:

1. Finished Drink Flow Rate = 3.0 oz./sec.
2. Water to Syrup Ratio = 5 to 1

To calculate Water Flow Rate:

1. Calculate the Total Portions = Water Portion + Syrup Portion (example $5 + 1 = 6$)
2. Calculate Syrup Flow Rate = Finished Drink Flow Rate \div Total Portions (example $3.0 \text{ oz./sec} \div 6 = .5 \text{ oz./sec}$)
3. Calculate Water Flow Rate = Finished Drink Flow Rate – Syrup Flow Rate (example $3.0 \text{ oz./sec} - .5 \text{ oz./sec} = 2.5 \text{ oz./sec}$)

Prove the calculation is correct by adding water flow rate of 2.5 oz./sec + syrup flow rate of .5 oz./sec = finished drink flow rate of 3.0 oz./sec.

Water flowing at 2.5 oz./sec and syrup flowing at .5 oz./sec achieves a ratio of 5:1 and 3.0 oz./sec. flow rate.

SYRUP/CONCENTRATE

Syrup should always be pre-cooled before setting the ratio. Syrup takes a path through the valve parallel to the water path. It is introduced in the block, travels through a syrup flow control, banjo, valve head and out the nozzle. Note, concentrate is not cooled.

High sugar syrups are more viscous (thicker) than diet syrups and consequently have more pressure drop within a system. This pressure drop results in less flow at the valve and therefore a slower fill time. Increasing the pump pressure will help overcome the pressure drop caused by high sugar syrups.

SETTING RATIOS

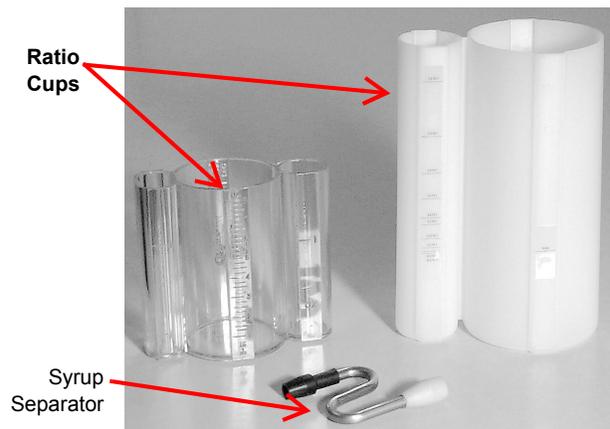
If the ratio varies and must be adjusted often, it is probably the result of a restricted syrup system. It is then time to clean and sanitize the syrup tubing and cooling coils and check for other problems such as syrup pumps, etc.

NOTE: Try raising the pressure on the pump before cleaning.

Set the water flow rate first, then adjust the syrup to the desired ratio. This gives the most accurate valve flow setting possible. Measure the ratio and adjust the syrup flow, if necessary. This will result in uniform flow, better carbonation retention, and improved drink quality.

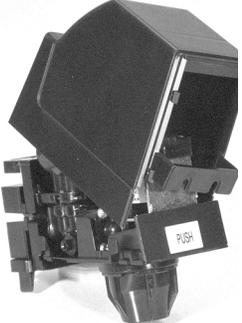
When using a ratio cup always take these precautions to ensure accuracy:

- After installing the separator tube, open the valve to fill the syrup tube before starting the ratio test.
- Clean the cup thoroughly between tests so there is no carry-over from one test to the next.
- Fill the cup to approximately 3/4 full and use approximately the same quantity for each test to ensure accurate settings.
- Take another sample to verify the settings.

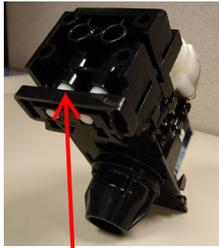


MECHANICAL

SFV-1™ VALVE DISASSEMBLY

<p>1. Sequence for disassembly (refer to SFV-1™ Post-mix Dispensing Valve Illustrated Parts List) is as follows:</p>	
<p>2. Remove front cover by lifting.</p>	
<p>3. Remove valve cover.</p>	
<p>4. Unplug wiring harness.</p>	 <p>Wiring Harness</p>

5. Remove valve from mounting block by pushing locking tab to left and push down on top plate of block.



Locking tab

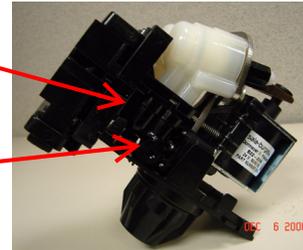


Locking tab

6. Remove water screw and lever (if it is installed on the valve).

Mounting screw

Water lever



7. Remove nozzle – turn left ¼ turn.



8. Remove diffuser assembly.

Note: The diffuser must be cleaned daily. Do not use bleach, do not use detergent, do not put in dishwasher. Use lukewarm water or soak in carbonated water.



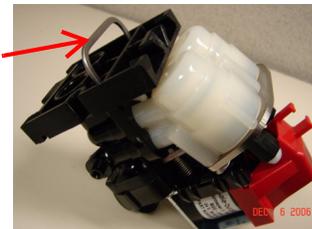
9. Remove bottom plate by disengaging side tabs.

Tabs

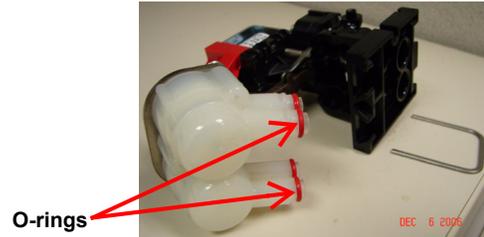


10. Remove U-shaped retainer wire from back of valve.

Retainer wire



11. Grasp flow control module assembly and pull up.
 Note: O-rings on bottom of inlets and outlets.



12. To disassemble the flow control: Remove screws and pull retainer forward. Remove top flow control sub assemblies exposing flow controls.

NOTE: Top Flow control is an assembly and cannot be disassembled.

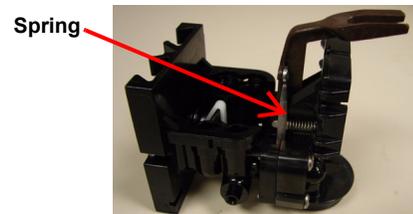


13. Pop off solenoid cover. Remove solenoid assembly from valve body by prying with screwdriver.

Note: Check plunger for corrosion and dirt – replace as necessary.



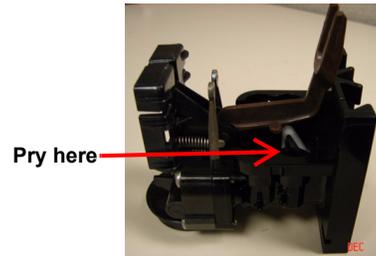
14. Carefully remove banjo lever springs.



15. Then remove 5 screws that secure the valve head to the valve body.



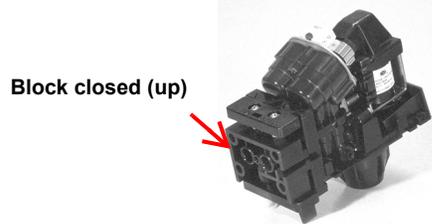
16. To remove the dispensing lever return spring pry the end of the spring and pull up. This spring stops the lever from vibrating.



MOUNTING BLOCK DISASSEMBLY

To disassemble mounting block:

<ol style="list-style-type: none"> 1. Turn off water and syrup supplies. 2. Remove 2 screws from top plate and pull spools out from the bottom of the mounting plate exposing spools and O-rings. Note: When replacing mounting block use replacement O-rings for the inlet fittings. 	
<ol style="list-style-type: none"> 3. When installing a new block, make sure it is locked in the open position.. 	



CONTROLS AND ELECTRICAL

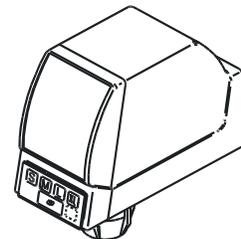
All SFV-1™ valves have a 24 volt solenoid that should be powered by an 80 kVA rated transformer. Voltage at the coil with the solenoid energized should be 22 and 27 VAC.

SFV-1™ PORTION CONTROL VALVE

The SFV-1™ Portion Control Valves are push and release that dispense for a programmed duration. There are four settings: small, medium, large, and extra-large. There is also a Cancel/Pour rectangular button with red and green arrows. If this button is pressed during dispensing, the flow stops. If the valve is not dispensing and the button is pressed, the valve dispenses as long as the button is held.

The portion controls are factory programmed to the following default settings:

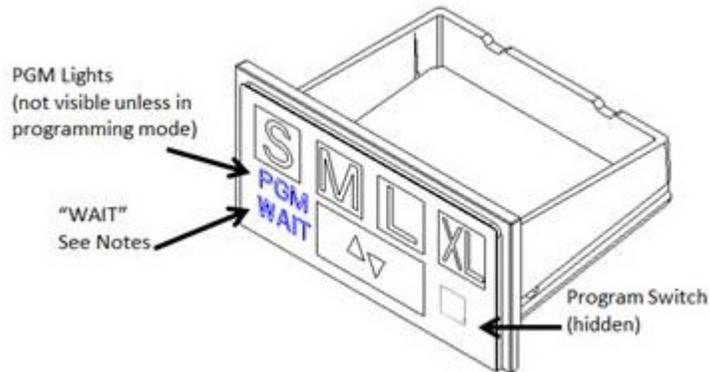
Portion Size	Pour Time
S	2 sec.
M	3 sec.
L	4 sec.
XL	6 sec.



PORTION CONTROL VALVE PROGRAMMING

To set the amount of beverage dispensed, follow this procedure:

1. Press the hidden program switch until the PGM light turns on. (This light shows only when the programming mode is turned on.)
2. Put desired amount of ice in cup. Press and hold a portion button until the desired level in the appropriate sized cup is reached. Release the button.
3. Continue with other portion buttons that need programming. Portion buttons may be reprogrammed as many times as necessary. Only the last time values entered for each button will be saved when exiting the programming mode.
4. Press the program switch until the PGM light turns off.
5. Read 3518-200OPR for additional programming modes.

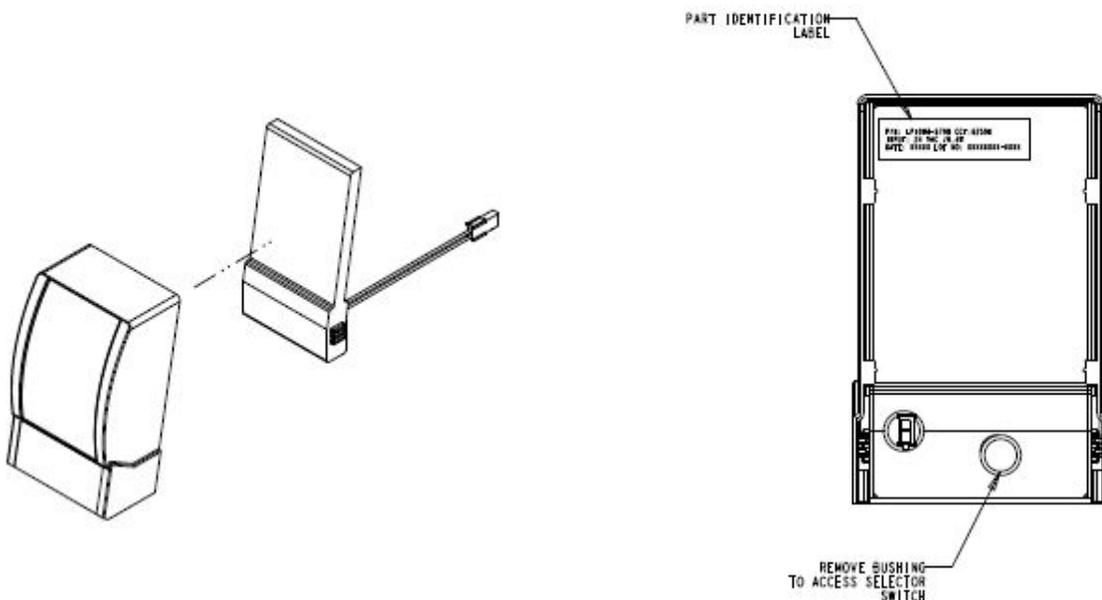


NOTE: This Portion Control valve include an additional top-off and incremental programming mode functions. Please refer to PN 3518-200OPR for additional informations.

NOTE: Portion controls will not operate below 22 volts. This is known as the "brown-out feature".

SFV-1™ ILLUMINATED VALVE

Turn ON/OFF the downward lighting by removing the access bushing on the back of the module-and switching the position of the selector switch.



INSTALLATION

CAUTION: Only trained and certified technicians should service this unit. ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES.

INSTALLATION REQUIREMENTS

REQUIREMENTS SUMMARY

The beverage dispenser that the SFV-1™ valve(s) will be installed on should be capable of supplying an adequate flow of water (for the beverage and for cooling) and syrup.

environment: indoor installation only

temperature: 50 to 110°F ambient temperature

syrup BIB: 30 to 80 psi

carbonated water: 65 to 120 psi

plain water: 30 to 120 psi

electrical: 24 volts AC (22-27 volts), 80 VA, 50/60 Hz

ELECTRICAL REQUIREMENTS

Before connecting electrical power to the beverage dispenser refer to nameplate to see if it requires 50 or 60 Hz power.

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

CAUTION: 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 15-amp disconnect switch (slow-blow fuse or equivalent HACR circuit breaker). ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL CODES. MAKE SURE UNIT IS PROPERLY GROUNDED.

INSTALLATION & START-UP

SFV-1™ AND VALVE INSTALLATION PROCEDURE

1. Shut off syrup, unplug carbonator, shut off CO₂ and water supply to the unit.
2. Release pressure in lines by activating valves and lifting relief valve of carbonator
3. Detach current valves:
 - Remove front cover by lifting.
 - Remove valve cover.
 - Unplug wiring harness.
 - Remove valve.

INSTALLATION CHECKLIST

1. Voltage and proper grounding.
2. Valve properly secured (latched) to block.
3. CO₂ pressure to carbonator.
4. Water flow rate.
5. Syrup delivery pressure.
6. Finished product temperature less than 40°F.
7. Water to syrup ratio.
8. Portion size / top-off.
9. Water, syrup, CO₂ leaks.
10. Cover secured to valve.
11. Valves flavor correctly marked.

RETROFITTING

SFV-1™ valves will retrofit any valve with an identical mounting block screw pattern.

NOTE: Replacement of mounting block inlet fitting O-rings (refer to Illustrated Parts List for part number) is required when retrofitting valves.

MOUNTING BLOCK REMOVAL

To remove valve mounting block from the front panel, take out and save 4 screws.

IMPORTANT: Before installing block replace O-rings on each outlet fitting. Lubricate with Dow 200 or equivalent silicone lubricant. Do not use petroleum jelly.

SERVICE

CAUTION: Only trained and certified technicians should service this unit. ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES.

PREVENTATIVE MAINTENANCE

PREVENTATIVE MAINTENANCE PROCEDURES

Preventative Maintenance Procedure	
Procedure	Frequency
1. Check valve operation (does it dispense properly)	6 months
2. Replace worn or missing parts	6 months
3. Clean valves	6 months
4. Check voltage (22 to 27 VAC with the valve activated)	6 months
5. Check product temperature (less than 40°F)	6 months
6. Check water flow rate (use syrup bypass tube and ratio cup)	6 months
7. Check ratio	6 months
8. Check portion size / top-off	6 months
9. Check for leaks	6 months

NOTE: These procedures should be performed every six months OR after a service call.

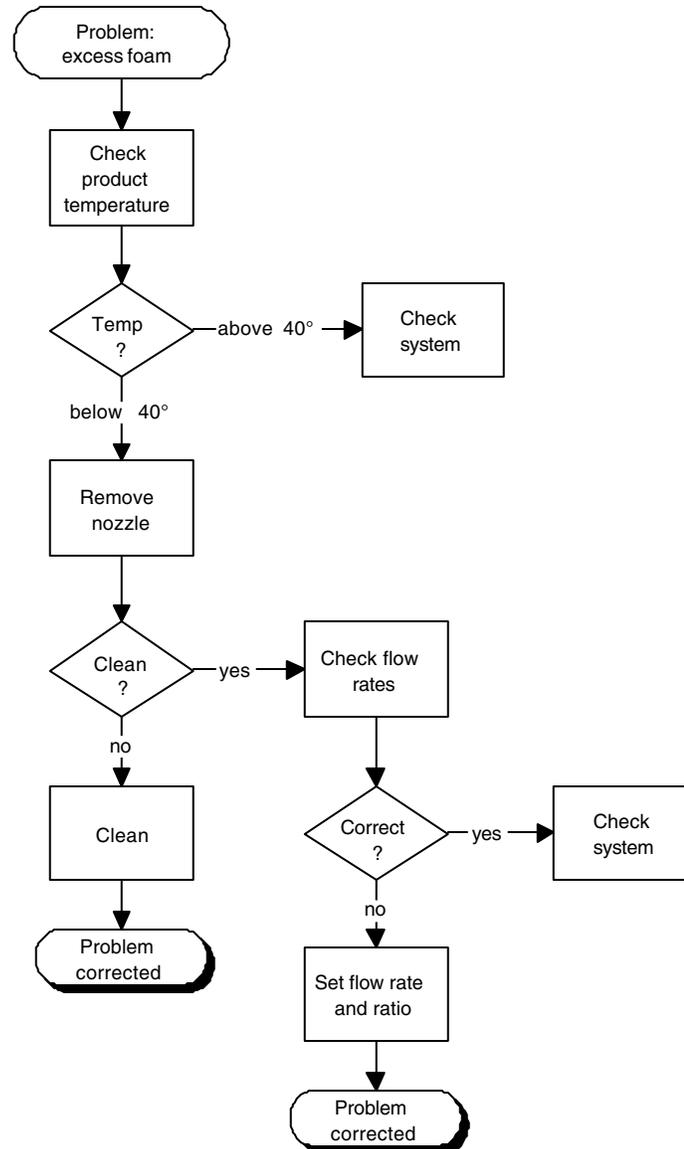
CLEANING VALVE

1. Remove the valve nozzle and the syrup diffuser.
2. Wash the nozzle and diffuser in water. Soak in carbonated water overnight if possible. Use a soft brush as needed to remove any accumulated syrup deposits.
3. Remove cover and bottom plate and clean with a soft cloth and warm soapy water.
4. Wipe the valve surface with a clean soft cloth.

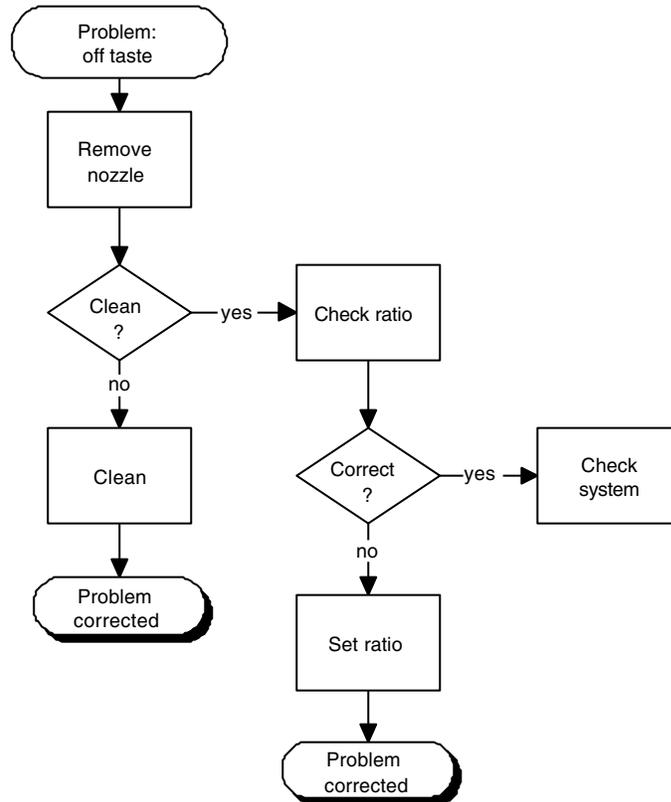
CAUTION: Do not soak valve components in chlorine or chlorinated solutions.

TROUBLESHOOTING

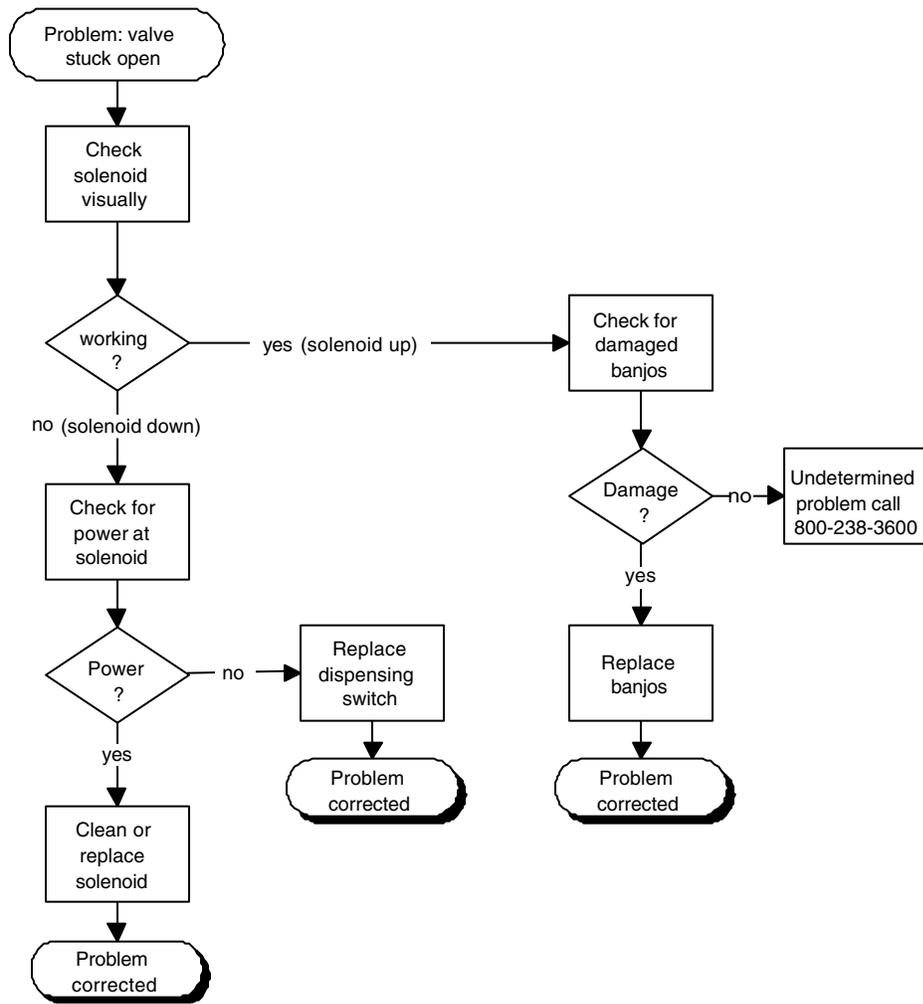
Excess Foam



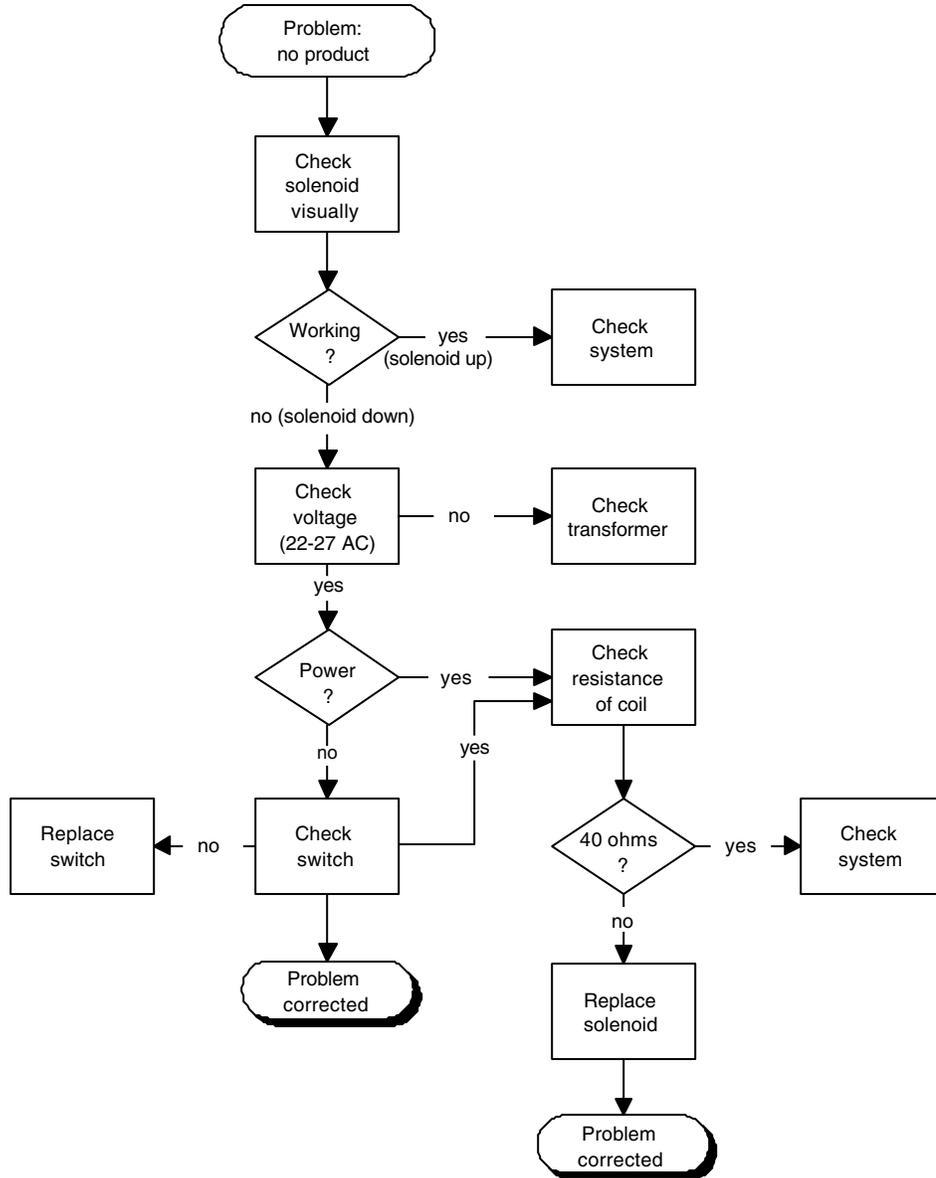
Off Taste



Valve Stuck Open



No Product



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