



JUICE GAS PUMP 166-200-XX (GREEN LABEL)

Installation and Operation Manual

The SHURflo model #166-200-09 (Standard Juice pump) is for concentrates that contain soft solids classed as "round" (up to .025 in. dia.[.6mm]) or for concentrates that are of higher viscosity than soda syrups.

Model #166-200-10 (Particulate Juice pump) is designed to transfer concentrates that contain, pulp classed as long/string, seed particles, or soft solids up to ¼" [6mm] cube. It is also recommend for concentrates that are extremely viscous. The pumps valve cartridges minimize the collection of particulates and promotes thorough flushing during sanitization.

Both models of the Juice pump are compatible with concentrates that are highly acidic (low pH value), and are identified by black inlet and outlet fittings.

Juice concentrates are generally supplied in flexible plastic bags, packaged inside cardboard boxes (Bag-In-Box). Juice concentrates generally require more frequent sanitization. The manufacturer of the concentrate should specify the interval for sanitizing; however, other factors such as system configuration, and/or temperature may affect concentrate life. (see page: 4)

The Juice pump pressurizes the concentrate to match the pressure of the gas supply. The pump can be operated on regulated CO₂, nitrogen, or clean compressed air. The compressed gas is used to operate the pump and does not come in contact with the concentrate. The pump operates when concentrate is needed, which is termed as its "automatic demand" feature. When the post-mix dispenser valve is opened, the pump reacts to the drop in pressure by operating to maintain pressure in the line. When the dispensing valve is closed, the input gas and output concentrate pressures equalize and the pump stops. As the B-I-B empties, the pump draws a vacuum collapsing the bag evacuating it of concentrate. The pump automatically shuts off once vacuum above 20 in/Hg. [508 mm/Hg.] is obtained. When a new B-I-B is connected the vacuum drops, the pump automatically resumes pumping.

PUMPING CAPABILITY

Due to diversity of both the installations and equipment used within beverage systems, it is difficult to calculate/predict total pumping distance. The ability to deliver fluid is limited by the dynamics of the fluid (flow) and pump displacement at pressure. Consider all the following factors when estimating pressure drop within a beverage system.

- Fluid viscosity (Centipose/cP.) @ temperature.
- Inside diameter of the inlet/outlet tubing, fittings, etc.
- Horizontal distance of the outlet tubing.
- Total syrup flow rate of valve(s) supplied by a given pump.
- The pressure drop per foot within vertical tubing runs is significant. To estimate the losses use the appropriate distance given by Max. Horz. Dist. Chart (page: 2). Take 1% of that distance [3% if meters]. Multiply the vertical distance by that number. Subtract the product from the original Max. Horz. distance. The result is the total tubing run (includes vertical) that should be attempted for that flow rate, tubing I.D., and viscosity.

Example: The facility requires a total tubing run of 196 ft.[60M]; included that run is a 14 ft.[4.26M] vertical. The product is 100% Grape juice dispensed by one fast flow valve (.5 oz/sec.[14.8 cc/sec]) The distance chart indicates 248 ft. [76 M] (50-100 cP @ .5 oz/sec) with 3/8" I.D.[10mm] tubing.

1% of 248 is 2.48, which is then multiplied by 14 ft, equaling approximately 35 ft. Subtracted that product from the 248 ft. (248-35 = 213). 213 ft. is the total tubing run that can be achieved including the 14 ft. vertical.

To calculate the vertical losses for distances measured in meters, take 3% of the distance given [76 M] = 2.28. Multiply by the vertical meters (2.28 x 4.26 = 9.7). Subtract that product (76-9.7 = 66.3). 66.3 meters is the total tubing run that can be achieved including the 4.26 M vertical.

NOTE: Had the example above resulted in a value that was equal to, or less than the necessary total tubing run, consider a larger I.D. tubing or installation of a pump(s) in series using a vacuum regulator.

MAXIMUM HORIZONTAL DISTANCE by VISCOSITY (cP)

THE FOLLOWING TABLES ARE TO BE USED AS A GUIDELINE ONLY

*20-50 (cP)
50% Apple 5:1
100% Apple 4:1
Fruit Punch 5:1
Lemonade 5:1
Pink Lemonade 5:1
Lemon lime Soda 5:1
Typ. Heavy Soda Bev. 5:1

FLOW RATE		1/4" [6mm] I.D. TUBING		3/8" [10mm] I.D. TUBING	
.OZ /SEC.	CC /SEC.	FEET	METER	FEET	METER
.25	7.4	272	83	500	152
.5	14.8	150	42	450	137
.75	22.2	101	31	303	92
1.0	29.6	50	15	153	47
1.25	37.0	--	--	110	34
1.5	44.4	--	--	62	19

* For further viscosity charts in this range refer to Standard Gas Pump Manual # 911-293

50-100 (cP)
50% Grape 5:1
100% Grape 5:1
Grapefruit 5:1
Cranberry 5:1
Pineapple 5:1

FLOW RATE		3/8" [10mm] I.D. TUBING		1/2" [13mm] I.D. TUBING	
.OZ /SEC.	CC /SEC.	FEET	METER	FEET	METER
.25	7.4	296	90	394	120
.5	14.8	248	76	347	106
.75	22.2	205	63	298	91
1.0	29.6	150	47	251	77
1.25	37.0	78	24	206	63
1.5	44.4	54	16	153	47
1.75	51.8	--	--	112	34
2.0	59.2	--	--	59	18

100-500 (cP)
50% O.J. 5:1
100% O.J. 4:1
100% O.J. 3.5:1
Margarita 4:1
Tomato 1.5:1

FLOW RATE		3/8" [10mm] I.D. TUBING		1/2" [13mm] I.D. TUBING	
.OZ /SEC.	CC /SEC.	FEET	METER	FEET	METER
.25	7.4	122	37	246	75
.5	14.8	104	32	198	60
.75	22.2	77	23	153	47
1.0	29.6	56	17	105	32
1.25	37.0	29	9	50	15
1.5	44.4	13	4	27	8

500-1000 (cP)
O.J. (Natural) 3:1
Tomato 2:1
Bloody Mary 2:1
Canadian Caesar 2:1

FLOW RATE		3/8" [10mm] I.D. TUBING		1/2" [13mm] I.D. TUBING	
.OZ /SEC.	CC /SEC.	FEET	METER	FEET	METER
.25	7.4	56	17	123	37
.5	14.8	32	9.7	100	30
.75	22.2	17	5.2	78	24
1.0	29.6	7	2	52	16
1.25	37.0	--	--	27	8

1000-3500 (cP)
O.J. (Natural) 5:1
Caesar 2:1

FLOW RATE		3/8" [10mm] I.D. TUBING		1/2" [13mm] I.D. TUBING	
.OZ /SEC.	CC /SEC.	FEET	METER	FEET	METER
.25	7.4	49	15	96	29
.5	14.8	27	8	58	18
.75	22.2	13	4	32	10
1.0	29.6	--	--	18	6

- Values in **Bold** create an inlet vacuum of 16" Hg. or higher at flow rates shown. Inlet tubing used was 3/8" I.D. [10mm] with a total length of 5 ft, with 3 ft. of vertical lift. Conditions of this kind should use 1/2" [13mm] I.D. vacuum tubing with minimal vertical lift. Fittings such as Liquibox Q.C.D.™ III connector and bag fitting are less restrictive and utilize a larger barb fitting/tubing which can minimize inlet vacuum.
- Product viscosity and solids content will vary, depending upon the manufacture and type of concentrate.
- The tables above are the results of test conducted with 70 psi. [4.8 bar] (to the pump), with a minimum of 20 psi. [1.4 bar] at the dispenser valve (to maintain brix). Ambient temperature was 70°F [20°C].

INSTALLATION GUIDELINES

- The outlet port/fitting of the pump is mounted vertical, up.
- The pump should be mounted above the B-I-B or at least at the same level. Pumps placed lower than the B-I-B's will increase the ability to entrap air in the B-I-B.
- Use 3/8" or 1/2" I.D. [10 or 13mm] heavy wall (1/8" [3 mm]) clear, NSF listed vacuum tubing from the B-I-B to the pump **inlet**.
 - a) With low viscosity (*thin*) products (40 cP or less); the **maximum** length of inlet tubing is 5 ft. [1.5M] with **NO MORE** than a 3 ft. [.7M] vertical lift.
 - b) High viscosity (*thick*) products (over 500 cP); may require 1/2" I.D. [13mm] tubing with minimal vertical lift. In some instances no vertical lift can be achieved, the pump may need to be placed within one foot from the B-I-B, and slightly above the center of the B-I-B.

NOTE: High inlet vacuum and/or restrictions can evacuate air suspended in some concentrates causing low brix or premature operation of the vacuum shut-off.

- Use high pressure, NSF listed, braided tubing from the pump **outlet** to the dispenser equipment. Use 3/8" I.D. [10mm] or 1/2" I.D. [13mm] tubing as necessary.
- Tie-wrap all tubing securely to prevent kinks or sags that inhibit performance or cause damage to the pump fittings.
- Use **new** 1/4" [6mm], high pressure braided tubing from the secondary CO₂/air regulator to the pump.

NOTE: **NEVER** connect a transfer tank "system" in series with a B-I-B system. Concentrate/contaminants in old components may work their way through the air supply causing premature failure of the gas pump. The gas used to drive the pump **MUST** be clean and contain no contaminants (syrup, oil, rust, water, etc.). Air compressors may be used with proper particle filters and moisture separators. Air storage tanks should be drained weekly. Pumps subjected to contaminated air **are not** covered by warranty.

CAUTION: Pumps driven with CO₂ are to be operated in well-ventilated areas. If used in a confined area (basement, closet, cooler box, etc.), exhaust fans capable of changing the room air on a continuous basis should be used.

START-UP PROCEDURE

1. Confirm that all tubing connections are properly clamped, fittings are locked, and tubing is not kinked.
2. Connect the bag connector onto the B-I-B fitting. Open the dispenser valve (syrup side)
3. Adjust gas regulator to about 20 psi.[1.4 bar] allowing the pump to stroke slowly. Once the pump is primed the regulator can be adjusted up. With high viscosity (thick) products (over 500 cP), the pump should be primed with a **minimum** of gas pressure. This prevents the shut-off feature from interrupting pump operation due to high inlet vacuum during priming.
4. Continue to operate the dispenser valve until **all** the air trapped within the tubing has been purged.
5. Once the air has been purged, adjust the CO₂ regulator to the pressure necessary to maintain the desired brix. The most efficient gas usage occurs at 40 psi. [2.8 bar]. **Maximum** gas pressure to the pump is 70 psi. [4.8 bar]; minimum 20 psi. [1.4 bar].

NOTE: To prevent air from entering the system always leave the bag connector connected to the empty B-I-B until a new B-I-B can be installed. Air entered into the system, via air in the bags or vacuum leaks, may cause brix fluctuation, foaming, spitting, non-operation of the vacuum shut-off, or the pump to run while the dispenser is closed. Symptoms of this kind can lead to a misdiagnosis of the pump as the problem.

PUMP SANITIZING

The SHURflo Juice pump is only one piece of a beverage dispensing system. Therefore, frequent sanitization of the pump and **ALL** equipment in the system is required. ***Sanitization is dependent on the concentrate type and its' manufacturers requirements.*** Factors which also affect the frequency of this procedure are, temperature, facility conditions, installation, and equipment. Consult other equipment manufacturer's instructions for their sanitizing requirements. Perform the following procedure to assure compliance with NSF listed sanitizing requirements for the SHURflo Juice pump (*only*). Ref.: SHURflo Service Bulletin #1025

MATERIALS REQUIRED:

- Common household bleach (Sodium Hypochlorite; 5.25%) or equivalent.
- Common household ***non-sudsing*** liquid detergent, suitable for use in a automatic dish washing machine.
- An adapter is needed to hold the bag connector on the syrup inlet (suction) line open. A fitting cut from an empty B-I-B will serve as the adapter.
- A 6 ft. [2 M] length of 1/4" [6 mm] tubing with a SHURflo output fitting. (To serve as the bypass hose)
- Two five gallon buckets [19L]
- Measuring cup

SANITIZING PROCEDURE

1. Turn OFF CO₂ pressure to the pump. Open the dispenser valve to drop the line (outlet) pressure.
 - a) Remove the liquid outlet fitting from the pump. Install the bypass tube fitting in the outlet port of the pump and screw in place.
 - b) Immerse the bag connector and inlet suction tubing in 2 gallons [7.5L] of warm water (120-180°F [48-82°C]).
2. Turn ON CO₂ to the pump (approx. 20 psi. [1.4 bar]), and pump the 2 gallons of warm water through the pump to flush out concentrate residue. Turn OFF CO₂ pressure to the pump.
3. Prepare 1 gallon [3.8 L] of detergent solution in a clean container. Mix at the ratio of 1 oz. [30 cc] of detergent per each gallon of warm water.
 - a) Place the bag connector in the detergent solution
 - b) Pump approximately 3/4 gallon [2.8 L] of detergent solution through the pump.
 - c) Turn OFF CO₂ pressure to the pump. Allow the detergent solution to remain in the pump for a contact time of two minutes.
 - d) Turn the pump upside down and operate the pump until the remaining detergent solution is pumped out. Turn OFF CO₂ pressure.
4. Repeat steps; 1b) and 2 (i.e.: flush with 2 gallons of warm water.)
5. Prepare 1 gallon [3.8 L] of sanitizing solution (Hypochlorite) in a clean container. Mix at the ratio 1/4 oz [7.5 cc] of bleach per each gallon of water to obtain a mixture of 100 ppm.
 - a) Place the bag connector in sanitizing solution container.
 - b) Pump approximately 3/4 gallon of sanitizing solution through the pump.
 - c) Turn OFF CO₂ pressure to the pump. Allow the sanitizing solution to remain in the pump for a contact time of two minutes.
 - d) Turn the pump upside down and operate the pump until the remaining sanitizing solution is pumped out. Turn OFF CO₂ pressure.
6. **PRODUCT PURGE:** Connect bag connector to the concentrate B-I-B. Operate the pump until a steady stream of concentrate flows through the bypass tubing. Pump approximately 10 oz. [300 cc] of concentrate through the pump. Turn OFF CO₂ pressure.
7. Disconnect the bypass tubing and reinstall the concentrate line to the dispenser. Reset pump to the original CO₂ pressure. Test the dispensing valve for proper operation. Sample the dispensed drink for proper brix and to assure that there is no off-taste. If an off-taste is detected additional concentrate purging may be necessary.

WINTERIZING

If the pump is subjected to temperatures of 32° F [0°C] or lower, the system must be drained of all liquid to prevent damage due to freezing. It is suggested that when taking a pump out of service, the pump and lines, etc. must be sanitized and purged of all fluid. Operating the pump at low pressure, simply allow air to enter through the bag connector after the sanitizing procedure has been performed. Opening the outlet valve will help in purging the lines of sanitizing solution. Refer to SHURflo Service Bulletin #1025 for complete winterizing procedure.

CAUTION: Purge with a maximum of 20 psi. [1.4 bar], for approximately 3-5 seconds. The product outlet fitting at the pump may also need to be removed and purged of any remaining solution. Refer to the equipment manufacturer's recommendation on purging lines and dispenser equipment. If there is any chance the solution may drain back to the pump leave the fitting out of the port.

RETURN POLICY

Whenever a Juice pump is removed from service, it *MUST* be sanitized / flushed to prevent contamination and possible health hazards. Pumps that have not received periodic sanitization will be deemed as non-returnable. For pumps that do not operate, warm water from a faucet can/*must* be flushed through the inlet port as soon as it is removed from service. All Pumps returned to SHURflo that have not been properly sanitized and/or flushed will be dispositioned as a "scrapped pump" and will not be considered for testing, repair, or warranty replacement.

JUICE GAS PUMP LIMITED WARRANTY

SHURflo warrants Juice Gas Pumps to be free from material and workmanship defects (under normal use and service) for a period of three (3) year from the date of manufacture.

The limited warranty will not apply to pumps that were improperly installed, misapplied, or not suitable with components of other manufactures. The limited warranty will not apply to pumps subjected to fluids that are incompatible with pump materials, or pumps operated by a contaminated air supply. SHURflo will not warrant any pump that is physically damaged or modified outside the SHURflo factory.

All Juice pumps ***MUST*** be flushed of juice concentrate when removed from service. Pumps which are returned to SHURflo which have not been flushed will not be considered for testing, rework, or warranty replacement and will be dispositioned as a "scrapped pump".

All SHURflo gas pumps are to be returned to the authorized distributor where they were purchased. SHURflo's obligation under this warranty policy is limited to the repair or replacement. Pumps found not defective (under the terms of this limited warranty) are subject to charges to be paid by the returnee for the testing and packaging of "tested good" units.

No credit or labor allowances will be given to the returnee for pumps returned as defective. Warranty replacements will be shipped on a freight allowed basis. SHURflo reserves the right to choose the method of transportation.

This limited warranty is in lieu of all other warranties, expressed or implied, and no other person is authorized to give any other warranty or assume obligation or liability on SHURflo's behalf. SHURflo shall not be liable for any labor, damage or other expense, nor shall SHURflo be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product or part. This limited warranty covers beverage products distributed within the United States of America. Other world market areas should consult with the distributor for any deviation from this document.

TECHNICAL SPECIFICATION

DESIGN:	Twin Chamber Double Diaphragm
MATERIALS OF CONSTRUCTION:	Polypropylene, EDPM, Santoprene, 316 Stainless Steel, FDA Sanctioned , NSF listed
POWER SOURCE:	Dry CO ₂ , Nitrogen, or filtered compressed air
OPERATING PRESSURE:	70 psi. [4.7 bar] MAX. / 20 psi. [1.4 bar] MIN.
DISPLACEMENT:	2.5 oz. per cycle [74 cc]
MAXIMUM STROKE RATE:	One cycle p/sec intermittent duty.
VALVE PASSAGE:	(-09) soft solids classed as "round" (up to .025 in. dia.[.6mm]) (-10) 1/4" [6mm] cube max. soft particulates,.
SOLD OUT:	Automatic - No reset required Activated at 20 in/Hg. [508 mm/Hg.]
TEMPERATURE LIMITS:	34° — 120°F [1.1°— 49°C]
WEIGHT:	2 lbs. [.9 kg]
CO₂ / AIR FITTING:	Standard plastic 1/4" [6mm] 90° Optional "T" or 90° plastic or brass All with internal check valve
INLET/OUTLET FITTINGS (STD.):	3/8" [13mm] Barb, Plastic, 90° (black Polypropylene)
AVAILABLE FITTINGS:	1/4" [6mm], 3/8" [10mm], and 1/2" [13mm] barb, Plastic or Stainless Steel; Straight or 90° configurations



★ ISO Certified Facility



SHURflo reserves the right to update specifications, prices, or make substitutions.

SHURflo ★

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