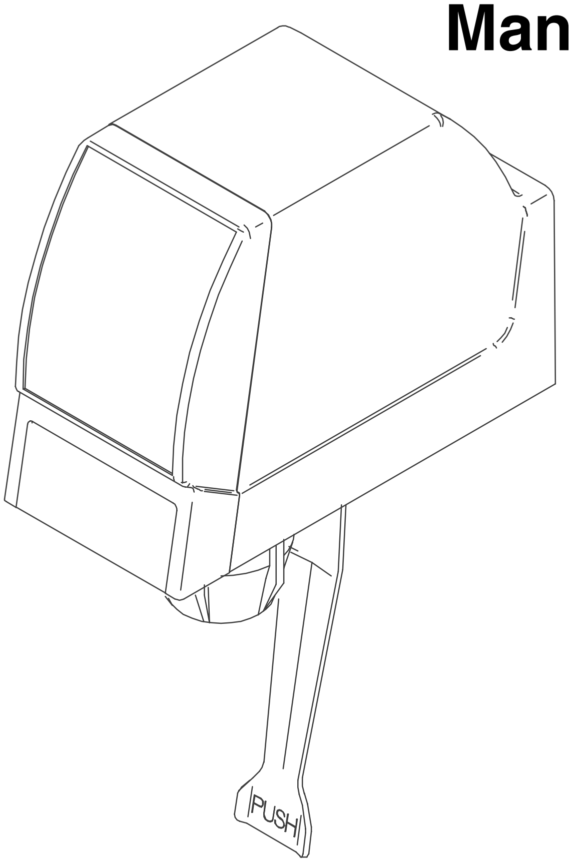
UF-1 Valve

Guide to Installation, Operation
&
Many Helpful Hints



TD235
2/5/2005

Table Of Contents

IMI Cornelius Inc.

www.cornelius.com

Important – Read Me!

The UF-1 valve is capable of finished drink flow rates of up to 4.5 Oz/Sec. This can cause some difficulty if you are attempting to install the valve on a piece of equipment or a system that is not capable of those flow rates.

Just because the valve is capable of the higher flow rate, it does not mean that the system or dispenser can meet those needs.

Compare this to putting a 300 MPH speedometer on your car – that doesn't mean that you car can go that fast.

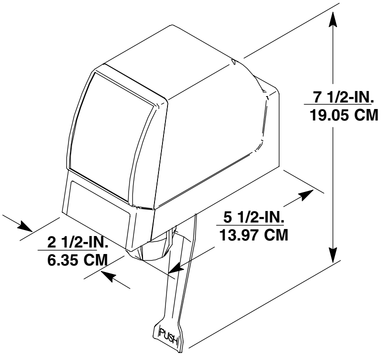
Review the following information to ensure that the installation of the UF-1 valve will provide the performance that you desire. There are many considerations so be sure to review all the various parameters.

It is <u>Not</u> recommended that the Ultra Flow (4.5 oz/sec) UF-1 valve be used on any counter top dispenser with the exception of Vanguard 245.

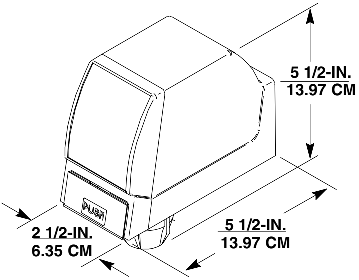
The UF-1 valve will provide satisfactory performance only if the system supplying it is up to the task.

Physical Characteristics

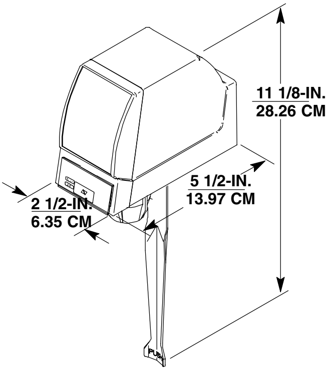
LEVER ACTUATED



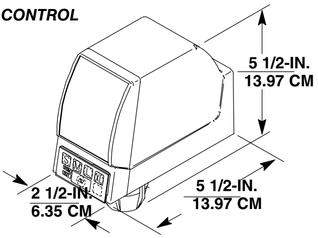
SELF-SERVE



OPTIFILL ™



PORTION CONTROL



Installation Considerations

<u>Number of UF-1 Valves Side-By-Side</u>
<u>18 Inch Towers</u>

An 18 inch wide tower <u>IS NOT</u> capable of accepting six UF-1 Valves. If you are converting from SF-1 to UF-1, and there were six SF-1 valves on the 18 inch wide tower, you will only be able to fit five UF-1 valves within the same width.

To complete this conversion, you must change the valve mounting panel to the five valve configuration. Valve mounting panels are available by calling the 800 number listed on page 30. Be SURE to have the model and serial number of the tower when you call.

Cup Rests

See OptiFill™ Section on page 9.

Valve Requirements

The UF-1 valve requirements are as follows:

Flow Rates;

Water/Carb Water	1.25 to 3.74 Oz/Sec
Syrup	.25 to .75 Oz/Sec

Operating Pressures at the Valve Inlet;

Non-Carb Water (1.5 - 3.0 Oz/Sec)	30 PSI to 110 PSI
Non-Carb Water (3.0 - 4.5 Oz/Sec)	50 PSI to 110 PSI
Carb Water	80 PSI to 110 PSI
Syrup – Sugar	20 PSI to 70 PSI
Syrup – Diet	8 PSI to 20 PSI*

*NOTE: Diet syrup pressure may be higher when B-I-B pumps are being used.

Electrical;

Voltage	24 VAC
Transformer	80 VA or greater

CO2 Requirements;

The UF-1 valve does not require CO_2 for it's operation. CO_2 is used for the carbonation of water and often used for the propulsion of syrup, either with tanks or B-I-B pumps.

Finished Drink Breakdown

Flow Rates oz/sec Based on 5:1 Ratio		
Finished Drink oz/sec	**Water oz/sec**	**Syrup 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

To calculate other flow rates, divide the desired finished drink flow rate (FDFR) by 6 to determine the syrup flow rate (SFR). Multiply the syrup flow rate by 5 to obtain the water flow rate (WFR)

$$\frac{FDFR}{6} = SFR$$

$$SFR \times 5 = WFR$$

OPTIFILL™ VALVES

The OptiFill™ valve is a form of portion control with unique features. Most important among it's features are:

1. OptiFill™ will fill any size cup to FULL regardless of the amount of ice in the cup or the size of the cup.

2. Will automatically top-off the cup to compensate for foam as with diet drinks.

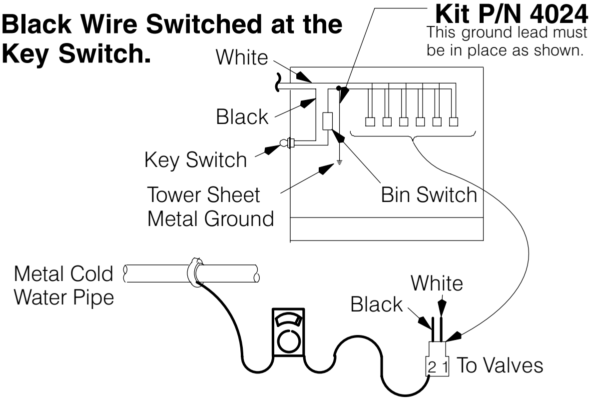
3. No buttons to push, just set the cup in place and it fills to the rim.

Important Grounding Notice

NOTE: The following instructions Do Not apply to units with the **White** wire switched (connected to the Key Switch). All units must be connected to a properly earth grounded outlet. Do Not use ungrounded outlets.
The following information applies only to units that have the **Black** wire switched through the key switch.

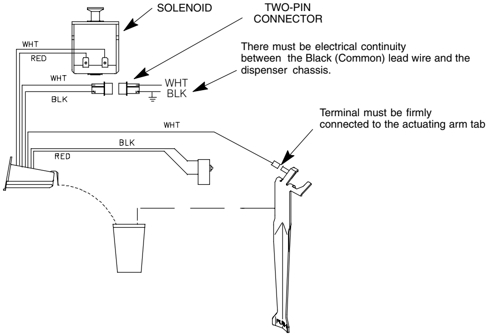
Units with Black Wire Switched

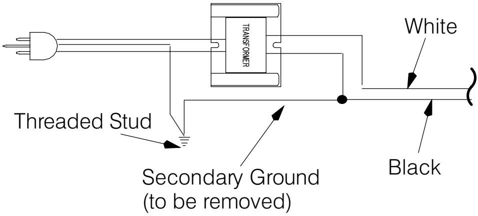
The OptiFill™ control makes a low voltage electrical connection to the dispensing beverage, therefore, it is important that the dispensing chassis is Earth-Grounded for safety. Use an Ohmmeter to measure electrical continuity from the 24 Volt connector (as shown) to the nearest cold water metal pipe (such as the water supply to the carbonator). If the chassis is not grounded, connect a wire from the chassis to an acceptable Earth-Ground (such as a cold water copper pipe) or other electrical equipment that is Earth-Grounded.



The 24 VAC common wire is attached to pin #2 of each valve power connector (the black wire on Cornelius equipment). If this wire is not connected to the dispenser chassis, you may use the power wire chassis grounding kit (P/N 4024) and follow the installation instructions supplied with the kit. *The use of a Cornelius Earth–Grounded Power Supply P/N 163408-010 (manufactured after 02/01/96) is specifically recommended for OptiFill™ installations.*

OptiFill™ Wiring Diagram





OptiFill™ Cup Rests

When operating the OptiFill™ valve the cup must be tilted slightly toward the valve actuating lever. This will ensure that the liquid will contact the lever at the earliest possible moment and shut the valve off. Therefore, slanted cup rests are to be used with the OptiFill™ valve. Equipment ordered with OptiFill™ valves installed will be equipped with the correct cup rest. If you are installing the OptiFill™ valve on existing equipment a slanted cup rest must be installed.

Listed below are the most common cup rests and the equipment they can be used on. If your dispenser is not shown or if you have any questions call the nearest sales or service location for assistance and a custom quote.

Cup Rest P/N	Dispenser
163160-001	Ice/Drink 2020, 18.25
163160-003	Ice/Drink 2428, 22.5
163160-005	Ice/Drink 2628, 24.5
163160-002	Ice/Drink 3031, 28.6
163160-004	Ice/Drink 3633, 34.5

167785-001	6.75 x 22.6
167787-005	S.S. & Sabre 18″ Tower
163333-005	Recessed Tower
167787-004	23″ Univ Twr, 21.375 x 9.875
167436-000	2323 Univ Twr, 18.75 x 5.25
309204-000	2323, 19″ , Ext. 21.25 x 6.75
163330-009	CB1722 Ext. 18.125 x 5
9106	2323
9119	Recessed Twr. 1/2″
70878	2230 Bowed Front
70924	Ice/Drink 3030
163370-001	Ice/Drink 3031
167436-001	16″ Mini Twr. 18.75 x 5.25
309794-000	1522 Twr. 18-5/8 x 4-13/16
167787-008	1522 Twr. 18″ New Style
70962	Remcor Pro-150
71088	Remcor ED/DF 150
71094	Remcor ED/DF200-250
71093	Remcor ED/DF300
71098	Remcor ED300
70892	Remcor TJ150 8 Flavor
161337-000	Ice/Drink 3031 Taco Bell
70986	Remcor DB275
309796-000	Spirit
309793-000	Vanguard
309795-000	Venture
309209-000	Venture Extended

CARBONATOR CONSIDERATIONS

How Many & How Big

A single UF-1 valve with a finished drink flow rate of 4.5 Oz/Sec is flowing carbonated water at the rate of 3.75 Oz/Sec. How many carbonators are required to satisfy heavy multiple valve usage? Refer to the table on page 12 for an answer to this question.

Carbonation & Pressure

Common carbonator operating pressures are from 80 PSI to 110 PSI. The variation in pressure is to accommodate the incoming water temperature.

The temperature of the water determines the ability of the water to absorb the CO_2. The hotter the water the more difficult it is for the water to absorb the CO_2, therefore, higher pressures are needed to achieve the desired carbonation. Cooler water absorbs CO_2 more easily and consequently lower pressures can be used.

Ground water at 50°F is considered to be cool, while ground water at 90°F is considered hot. In some extreme conditions it is necessary to cool the water in order to be able to achieve the carbonation desired.

Carbonator Capacity Chart

	Pourable Ounces Before Empty			
No. of UF-1 Pouring @ 4.5 Oz/Sec	**One VA 13 Carbonator**	**Two VA 13 Carbonator**	**One L.R. Carbonator**	**Two L.R. Carbonator**
1	1384	2770	4961	9923
2	136*	273	490	980
3	105*	210*	377	754
4	94*	188*	338*	676

* Recommended that an additional carbonator be added or a larger capacity be used.

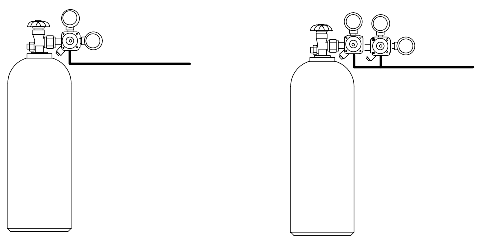
The pourable ounces shown are based on a continuous pour. As an extreme example – Four valves pouring at the rate of 4.5 Oz/Sec, with two Large Reserve carbonators, you must fill four 169 ounce cups before emptying the carbonator tanks.

In normal operation there is slight pause between pours to set a new cup in place. This will add to the pourable ounces slightly.

Why are they getting frosty?

The CO_2 is in liquid form in the tank and as it changes to a gas there is a cooling effect. At lower flow rates the cooling effect of the expanding gas is absorbed into the room and no frost appears on the regulator. With the increased flow rate the cooling effect is so great that the regulator body cannot absorb room heat fast enough to keep the frost from forming.

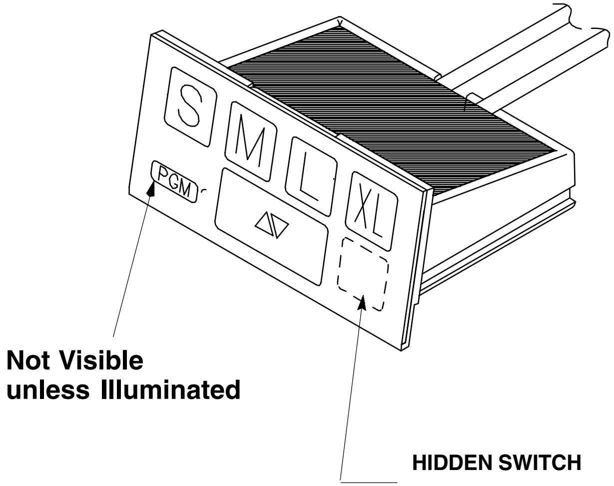
The only solution to this is to pour slower (fat chance) or to add additional regulators and manifold them together. A simple illustration of this is shown below.



Two or more regulators can be manifolded together. This will divide the flow of gas between the regulators and reduce the cooling effect in each regulator.

WARNING: If the frost is allowed to continue the regulator may freeze up and full cylinder pressure can be applied to the system. This can result in serious damage to system components.

Portion Control



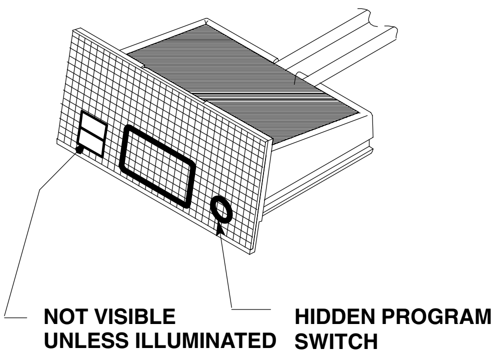
1. Press and hold the *Hidden Switch* for 3 seconds or until the PGM LED is illuminated.

2. Place a cup under the valve nozzle and press and hold the button that corresponds to the cup size until the desired level is reached.

3. Repeat step 2 until all portion sizes are programmed

4. To exit the program mode, press and hold the *Hidden Switch* until the LED goes out.
   Now all portions are set.

Top-Off



1. Press and hold the *Hidden Switch* for 3 seconds or until the LED is illuminated.

2. Place a cup under the valve and against the valve lever. The valve will begin to pour and when it shuts off the Top-Off delay begins to record and the LED will flash.

3. When the foam has settled to the desired level, press the large rectangular button in the center to restart the pour. When the pour stops the Top-Off delay is set.

4. Press the hidden switch to exit the program mode.

NICE STUFF TO KNOW

Finished Drink Breakdown

Flow Rates oz/sec Based on 5:1 Ratio		
Finished Drink oz/sec	**Water oz/sec**	**Syrup 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

To calculate other flow rates, divide the desired finished drink flow rate (FDFR) by 6 to determine the syrup flow rate (SFR). Multiply the syrup flow rate by 5 to obtain the water flow rate (WFR)

$$\frac{FDFR}{6} = SFR$$

$$SFR \times 5 = WFR$$

Finished Drinks per Gallon of Syrup

The following chart shows how many ounces of finished drink can be obtained from a gallon of syrup at various water to syrup ratios.

Ratio	Total Oz.
5.5:1	832
5.0:1	768
4.75:1	736
4.5:1	704
4.25:1	672
4.0:1	640

Finished Drink Temperature

Finished Drink Temperatures based on Water and Syrup Temperatures @ 5:1 Ratio

Syrup Temp.	Water Temperature					
	33°	**33.5°**	**34°**	**34.5°**	**35°**	**35.5°**
60°	37.56°	37.96°	38.28°	38.79°	39.18°	39.58°
65°	38.04°	38.78°	39.10°	39.61°	40.00°	40.04°
70°	39.2°	39.60°	40.00°	40.42°	40.83°	41.25°
75°	40.00°	40.42°	40.83°	41.25°	41.67°	42.08°
80°	40.83°	41.25°	41.67°	42.08°	42.50°	42.92°
85°	41.67°	42.08°	42.50°	42.92°	43.33°	43.75°
90°	42.50°	42.95°	43.33°	43.75°	44.17°	44.58°
Syrup Temp.	**Water Temperature**					
	36°	**36.5°**	**37°**	**37.5°**	**38°**	**38.5°**
60°	40.03°					
65°	40.85°					
70°	41.67°	42.08°	42.50°	42.92°	43.33°	43.75°
75°	42.50°	42.92°	43.33°	43.75°	44.17°	44.58°
80°	40.83°	43.75°	44.17°	44.58°	45.00°	45.42°
85°	41.67°	44.58°	45.00°	45.42°	45.83°	46.25°
90°	42.50°	45.42°	45.83°	46.25°	46.67°	47.08°

COOLING WITH ICE

Any device with a cold plate is using ice to cool the product (water and/or syrup) that flows through it. This cooling process is very fast and efficient but it consumes ice. To calculate the ice required to cool a specific volume of product use the formula below.

G = Gallons of Product
T = Temperature Differential (°F In minus °F Out)

$$\frac{G \times 8.51 * \times T}{144 * *} = PoundsIce$$

* 8.51 is the weight of one gallon of finished product.
** 144 is the BTU of heat absorbed by ice when it converts from solid to liquid.

For example:

10 – 12 ounce cups = 120 ounces or .9 gallons. For the sake of this example we will say that it is 1 gallon. One gallon (128 ounces) cooled from 70°F to 40°F (T =30°F) will use 1.77 pounds of ice.

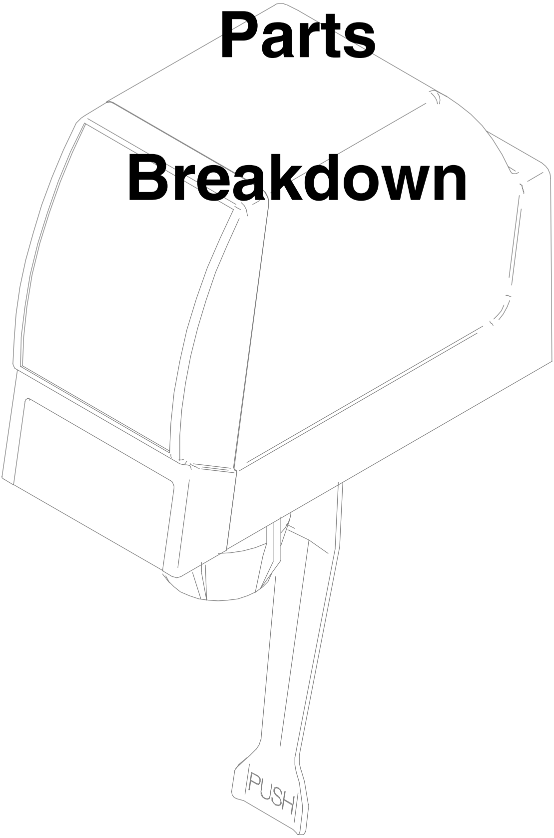
The table below shows the pounds of ice needed to cool various gallonages at differentials of 30°F, 40°F and 50°F. This can be used for estimation purposes.

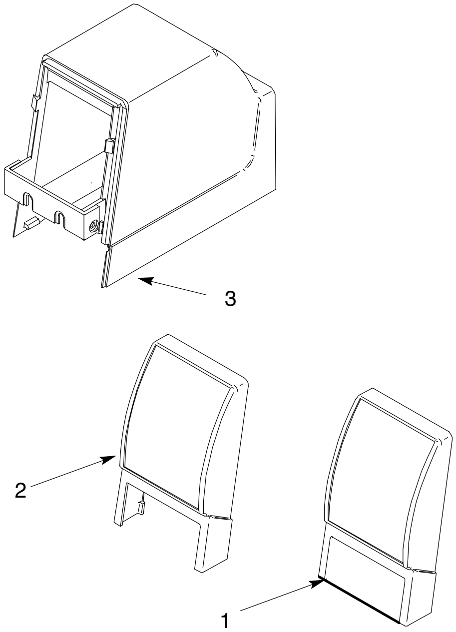
Gallons	T = 30	T = 40	T = 50
10	17.7	41.9	123.8
20	35.4	83.8	247.7
30	53.2	125.7	371.5
40	70.9	167.6	495.3
50	88.6	209.5	619.2
60	106.3	251.4	743.1
70	124.1	293.3	866.8
80	141.8	335.3	990.7
90	159.6	377.2	1114.5
100	177.2	419.1	1238.4

Illustrated

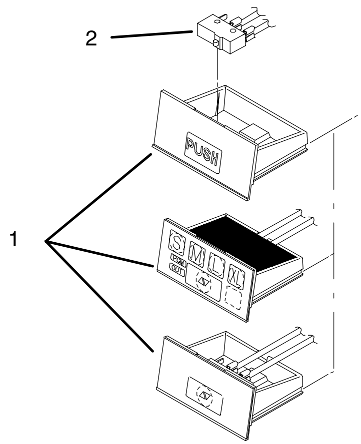
Parts

Breakdown

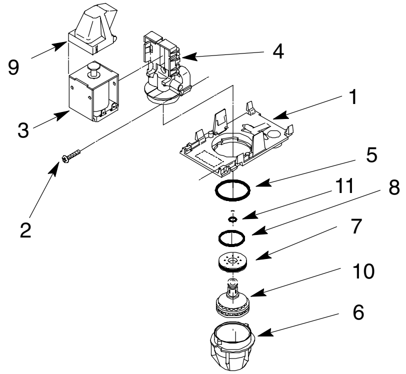




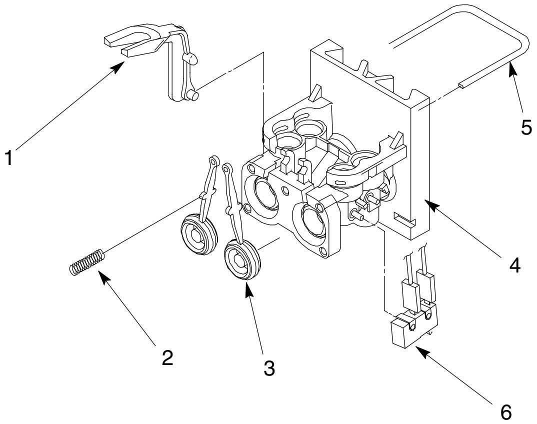
Item	Part No.	Description
1	1956	Cover Front, Electric
2	1951	Cover Front, Self-Serve, Portion Control.
3	1950	Cover



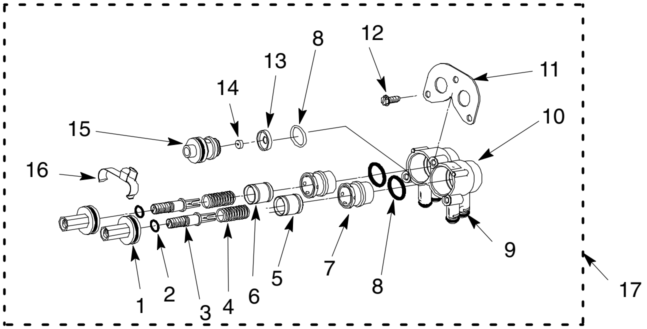
Item	Part No.	Description
1	2325	Module Ass'y, Self Serve
	3518	Module Ass'y, Portion Control
	4391	Module Ass'y, Auto-fill
2	1923	Switch, Self-Serve



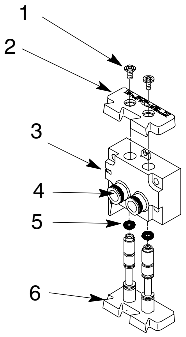
Item	Part No.	Description
1	1903	Plate Bottom
2	2318	Plastic Screw, Phil Rd Hd, No. 6-19 by 3/4" Long.
3	1918	Solenoid
4	1901	Valve Head
	1902	Valve Head, Opti-Fill™
5	183184	O-Ring 1.174 I.D. By .103 C.S.
6	1945	Nozzle
7	1913	Diffuser
8	311086	O-Ring, .926 I.D. By .070 C.S.
9	3438	Cover, Solenoid
10	1917	Inner Nozzle Ass'y
11	4073	O-Ring, .239 I.D. By .070 C.S.

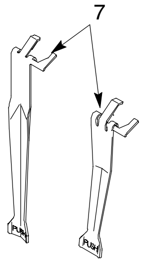


Item	Part No.	Description
1	1911	Actuator
2	1931	Spring
3	1947	Banjo Valve
4	1900	Body
5	1930	Retainer
6	5014	Switch



Item	Part No.	Description
1	1909	Top Flow Control
2	150309	O-Ring, .208 I.D. By .070 C.S.
3	1910	Adjusting Screw
4	1940	Spring
5	310480-011 1937	Piston, Syrup, 1.5oz/sec. Piston, Syrup, 4.5oz/sec.
6	310754-011 1936	Piston, Water, Adjustable Flow Regulator, 1.5oz/sec. Piston, Water, Adjustable Flow Regulator, 4.5oz/sec.
7	1934 4386	Cylinder Cylinder, Juice
8	317816	O-Ring, .676 I.D. By .070 C.S.
9	4073	O-Ring, .239 I.D. By .077 C.S.
10	1907	Body
11	560001452	Retainer
12	560001108	Thread Cutting Screw, Phil Pan Hd., No. 8-16 By 3/4-In. Long
13	319546-011	Cap Housing, Water Flow Washer.
14	311194 319547-011	Flow Washer, Water Flow Washer, 1.5oz/sec. Flow Washer, Water Flow Washer, 4.5oz/sec.
15	1949	Housing, Water Flow Washer.
16	2316	Clip, Plug Retainer
17	1954 1955	Low Flow Module High Flow Module





Item	Part No.	Description
1	151841	Thread Rolling Screw, Phil Rd. Hd., Stainless Steel
2	1905	Spool, Top
3	1906	Block, Mounting
4	312414	O-Ring, .426 I.D. By .070 C.S.
5	150309	O-Ring, .208 I.D. By .070 C.S.
6	2317	Spool, Bottom
7	4965	Lever
	4262	Lever, Opti-Fill™

BRIX CUPS AND BY-PASS TUBES

Part No.	Description
311100	Brix Cup, 5–5.5 to 1 Ratio
319540	By-Pass Tube Ass'y, UF-1 Valve

FLOW MODULES

Part No.	Description
1954	Module, High Flow Regulator (1.5-3.0oz/sec)
1955	Module, Ultra Flow Regulator (3.0-4.5oz/sec)
1957	Module, Standard Flow Washer (1.5oz/sec)
1958	Module, Fast Flow Washer (3.0oz/sec)

ADAPTOR FITTINGS

Part No.	Description
778408	Adaptor, .156 I.D. Tube, Straight (High Flow)
318674	Adaptor, .250 I.D. Tube, Straight (Ultra Flow)
318837	Adaptor, .250 I.D. Tube, 90° Elbow (Ultra Flow)
770522	Adaptor, .250 I.D. Tube, 45° Elbow (Ultra Flow)
4073	O-Ring, Red, For Adaptors
318762	Retainer, Clip
1081	Thread Cutting Screw, Hex Washer Hd., No. 8-16 By 1/2-In. Long

SELF-SERVE MODULE ASS'Y – (2325)

PLAIN WATER KIT – (3297)

NOZZLE KIT – (1922)

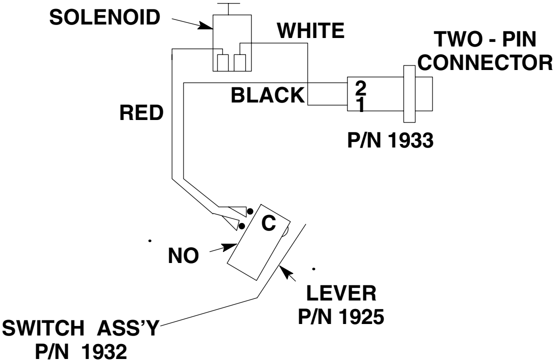
MOUNTING BLOCK ASS'Y – (1919)

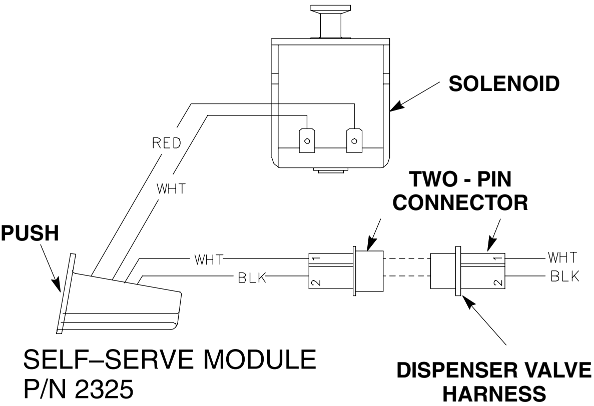
GROUND KIT (OPTIFILL™) – (4024)

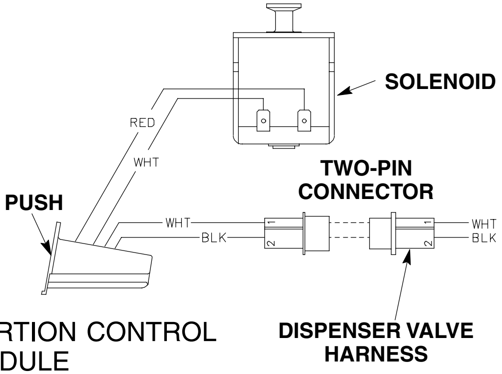
VALVE PARTS KIT – (811900)

Recommended Spare Parts

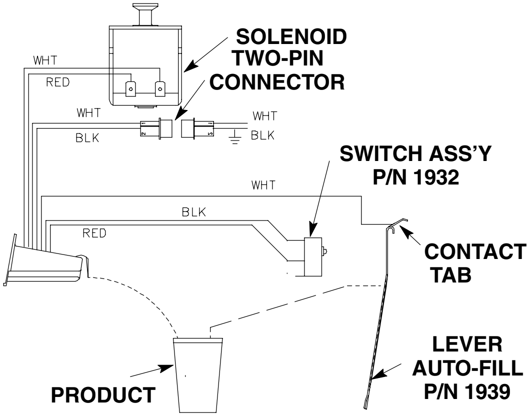
		Valves in Service		
Part No.	**Description**	**25**	**50**	**100**
1919	Mounting Block	1	2	4
1900	Body, rear	0	1	2
1947	Banjo Valve	2	4	6
1918	Solenoid	2	4	8
1901	Valve head	0	1	2
1902	Valve Head, OptiFill™	0	1	2
1925	Lever	1	1	1
4262	Lever, OptiFill™	1	1	1
1903	Bottom Plate	0	1	2
1956	Front Cover	0	1	2
1951	Front Cover, Self Serv	0	1	2
1950	Cover	1	1	2
2523	Module, Self Serve	1	2	2
3518	Module, Portion Control	1	2	3
4391	Module, OptiFill™	1	2	3
1954	Low Flow Module	1	1	2
1955	High Flow Module	1	1	2
3297	Water Lever Kit	2	4	8
1929	Retainer, Flow Control	1	2	4
4247	Low Flow Nozzle Kit	0	1	2
4248	High Flow Nozzle Kit	1	1	2
1934	Sleeve	1	4	8
1936	Piston, Water	2	4	8
1937	Piston, Syrup	2	4	8
1930	"U" Clip Retainer	1	2	4
1931	Banjo Valve Spring	2	4	8
1945	Outer Nozzle	1	3	8
1917	Inner Nozzle Stem	1	2	4
1933	Plug & Lead Wire Ass'y	4	8	12
317816-000	O-Ring 0.676 I.D.	4	8	16
183184-000	O-Ring 1.174 I.D.	2	4	8
150309-000	O-Ring 0.208	4	8	16
317015-000	O-Ring 0.239 I.D.	4	8	16
5014	Switch	2	4	8


SOLENOID
WHITE
TWO - PIN
CONNECTOR
BLACK
2
1
RED
P/N 1933
C
NO
LEVER
P/N 1925
SWITCH ASS'Y
P/N 1932


SOLENOID
RED
WHT
TWO - PIN
CONNECTOR
PUSH
WHT
BLK
1
2
1
2
WHT
BLK
SELF–SERVE MODULE
P/N 2325
DISPENSER VALVE
HARNESS



PORTION CONTROL
MODULE
P/N 3518



OptiFill™ MODULE
P/N 2328

When All Else Fails!

We hope this booklet has answered all your questions concerning the UF-1 valve and the installation and operation of it.

If you still have some questions, please call us at

1-800-238-3600