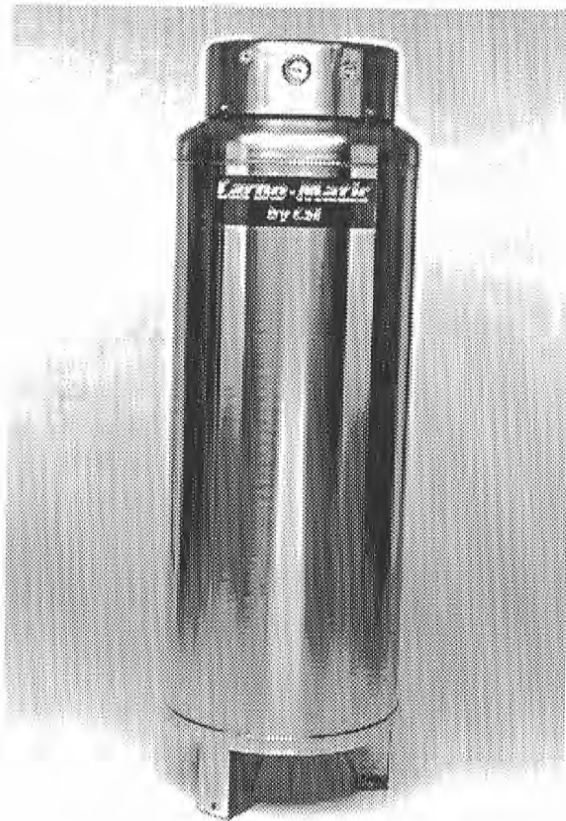


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# Service Manual



## Carbo-Matic

200/400/600 Models



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## INTRODUCTION

The Carbo-Matic is a "Carbon Dioxide Supply System" that has been designed to the special requirements of the restaurant beverage systems. The system is comprised of the storage tank, an outside filling station (simple or deluxe) and the connecting hoses. It is used to store liquid CO<sub>2</sub> and supply it as gas to the beverage equipment for carbonation.

### HOW TO USE THIS MANUAL

Routine service and maintenance on the Carbo-Matic 200, 400 and 600 can be accomplished with the knowledge gained by reading this manual. If additional information is needed contact:

MVE, Inc.  
3505 County Road 42 West  
Burnsville, MN 55306-3803  
800-247-4446 • Fax (612) 882-5185

The manual is divided into five major sections: Safety, Components, System Operation, Trouble Shooting and Repair. It is important to read all of these sections before you perform service work on the Carbo-Matic.

The Components Section contains schematics, illustrations, and diagrams of the individual parts that make up the Carbo-Matic. Item numbers that point out these parts are used throughout this manual to identify the component you are working on. The same item numbers are used in the "User's Manual: Carbo-Matic" that is supplied with the tank to the store managers.

The repair procedures are divided into three categories: adjustments, removal of isolated parts, and pressurized parts replacement.

The trouble shooting guide will refer you to the proper repair procedure as a means of solving the problem.

## CONTENTS

<b>Introduction</b> .....	2
<b>How to use this Manual</b> .....	2
<b>Contents</b> .....	2
<b>Safety</b> .....	3
<b>Service Policy</b> .....	4
<b>Warranty</b> .....	4
<b>Parts Ordering</b> .....	4
<b>Returned Goods Authorization</b> ..	5

### **Component Descriptions**

<b>Schematic, System</b> .....	6
<b>Schematic, Carbo-Matic</b> .....	7
<b>Storage Tank Plumbing</b> .....	8,9
<b>Filling Station, Deluxe</b> .....	10,11
<b>Filling Station, Simple</b> .....	11

### **System Operations**

<b>Filling</b> .....	12
<b>Gas withdrawal</b> .....	13
<b>Pressure Control Regulator</b> .....	13
<b>Safety Relief Valves</b> .....	14
<b>Liquid Level Indicator</b> .....	14

<b>Routine Maintenance</b> .....	14
<b>Trouble Shooting Guide</b> .....	15-17

### **Repair and Maintenance Procedures**

<b>Component Adjustments</b> .....	17
<b>Regulator, Carbonator</b> .....	17
<b>Regulator, Tank Pressure</b> .....	18
<b>Components w/Isolated Valves</b> ..	18
<b>Regulator, Pressure Control</b> .....	18
<b>Regulator, Poppet and Seat</b> .....	18

### **Repair for Pressurized Components**

<b>Depressurization</b> .....	19
<b>Sure-Fill Float</b> .....	19
<b>Safety Relief Valves</b> .....	19
<b>Fill Isolation Valve</b> .....	19

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## **SAFETY INFORMATION**

The Carbo-Matic storage tank is designed for the safe storage of carbon dioxide refrigerated liquid. No modifications or changes should be made in the equipment without proper authorization from Minnesota Valley Engineering, Inc.

### **WARNING**

Before removing cylinder parts or loosening fittings that connect directly to the pressure vessel, empty the container of liquid and release the vapor pressure in a safe manner. External valves and fittings can become extremely cold and may cause painful burns to personnel unless properly protected. Personnel must wear protective gloves and eye protection whenever removing parts or loosening fittings. Failure to do so may result in personal injury because of the extreme cold and pressure in the cylinder.

### **CARBON DIOXIDE CAUTIONS**

Carbon dioxide gas is an asphyxiant. Concentrations of 10% or more can produce unconsciousness or death. Lower concentrations can cause headache, sweating, rapid breathing, increased heart rate, shortness of breath, or dizziness. Carbon dioxide is an odorless gas and should be treated as a material with poor warning properties.

Carbon dioxide is heavier than air. High concentrations may be found in low areas such as basements.

## **RESCUE AND FIRST AID CONSIDERATIONS**

Do not attempt to remove an individual without utilizing proper rescue equipment or you may also become a casualty.

If the exposed person is unconscious, obtain assistance and put into effect your established emergency procedures.

If a person has inhaled large amounts of carbon dioxide and is exhibiting adverse effects, move the exposed individual to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

If solid CO<sub>2</sub> (dry ice) or cold CO<sub>2</sub> vapor comes in contact with the eyes, stop the exposure immediately and obtain medical attention.

More information can be obtained by contacting your CO<sub>2</sub> supplier or the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

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## **SERVICE POLICY**

MVE makes every effort to manufacture the Carbo-Matic to the high standards required for a cryogenic pressure vessel. The inner vessel is designed, inspected, and tested to the requirements of the ASME Pressure Vessel Code, Section 8, Division 1. The vacuum insulation system and plumbing components are performance tested at the factory. However, even the finest equipment may require some service to be performed in the field by authorized agents. Read this section to understand the agent's responsibilities before any work on the Carbo-Matic is started.

## **WARRANTY**

MVE, Inc., the manufacturer of the Carbo-Matic, warrants to the purchaser of the Carbo-Matic that the product shall be free from defects in material and workmanship which result in the breakdown or failure under normal use for a period of 1 year from the date of installation to the original purchaser, MVE warrants the component plumbing parts for a period of 90 days and warrants the vacuum performance of this tank for a period of 1 year.

MVE's liability under this warranty shall be limited to the lesser of the repair, replacement, or refund of the purchase price, of the equipment that proves to be defective, MVE shall not be liable for any defects caused by the effects of normal wear and tear, erosion, corrosion, fire, or explosion, and shall not be liable for any special, indirect, or consequential damage incurred by the purchaser as a result of any claimed defect.

MVE, Inc., specifically makes no warranties or guarantees, expressed or implied, including but no limited to the warranties of merchant-ability or fitness

for the particular purpose or use, other than those specified herein. No warranties shall be implied under the uniform commercial code other than warranty of title.

## **DEFECTIVE OR MISSING PARTS**

Defective parts should be returned to the factory as soon as possible. Prior to returning the part, contact:

MVE, Inc.

3505 County Road 42 West

Burnsville, MN 55306-3803

Technical Service: (800) 253-1769

for a Customer Return Authorization number.

Missing parts should be reported to the Customer Service Group at MVE:  
(800) 247-4446.

## **ORDERING PARTS/SERVICE**

### **How to Order**

For prompt service and shipment contact MVE Customer Service at (800) 247-4446 or one of its authorized distributors. To insure prompt processing of your orders, list each item separately, taking care to specify quantity, the part number, and description of each item ordered.

### **Terms**

Terms of NET 30 days will be extended to those customers of known and acceptable financial standing. All other orders must be accompanied by a check or will be shipped C.O.D. Customers desiring to purchase on an open account should direct its inquiries to the credit department. All sales taxes are the responsibility of the buyer. Prices quoted do not include sales tax. MVE at its option may charge for and collect sales taxes. Prices and terms, designs materials, specifications, weights and dimensions for equipment or parts are subject to change without notice.

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### **METHOD OF SHIPMENT**

All merchandise is priced F.O.B. factory. All shipments are carefully packed and labeled to prevent damage or loss. Crates, boxes, and cartons used are of approved weight and strength. Orders not routed by the purchaser will be shipped at our discretion via the best method possible without any liability on our part for such selection.

### **PURCHASER PICK-UP**

**Service parts and orders must be received at least 24 hours prior to personal pick-up.** Equipment orders must be received at least 7 days prior to personal pick-up.

### **DAMAGED AND LOST SHIPMENTS**

The responsibility of MVE ceases upon acceptance of its products being shipped in good condition by the carrier. Any damage or loss sustained in shipment should be reported to the delivering carrier immediately. The carrier is responsible for all shipments. If you receive a damaged shipment, ask the carrier's agent for a claim form and have the carrier prepare an inspection report for you. The completed claim inspection report, a copy of MVE's invoice, the freight bill, and a letter estimating the cost of repair or replacement must be submitted to the carrier before they can process your claim.

Compare the number of cartons listed on our packing list or Bill of Lading. If they do not agree, be sure to note the shortage on the receipt. The carrier is responsible for delivery of the specified number of cartons.

UPS shipments are insured individually and UPS will replace all merchandise that is lost.

Notify us immediately if you wish to trace merchandise lost in transit.

### **RETURN OF MERCHANDISE**

No merchandise is to be returned without our approval. The purchaser must prepay the freight for all returned goods. After receiving our approval, all merchandise must be returned to our factory:

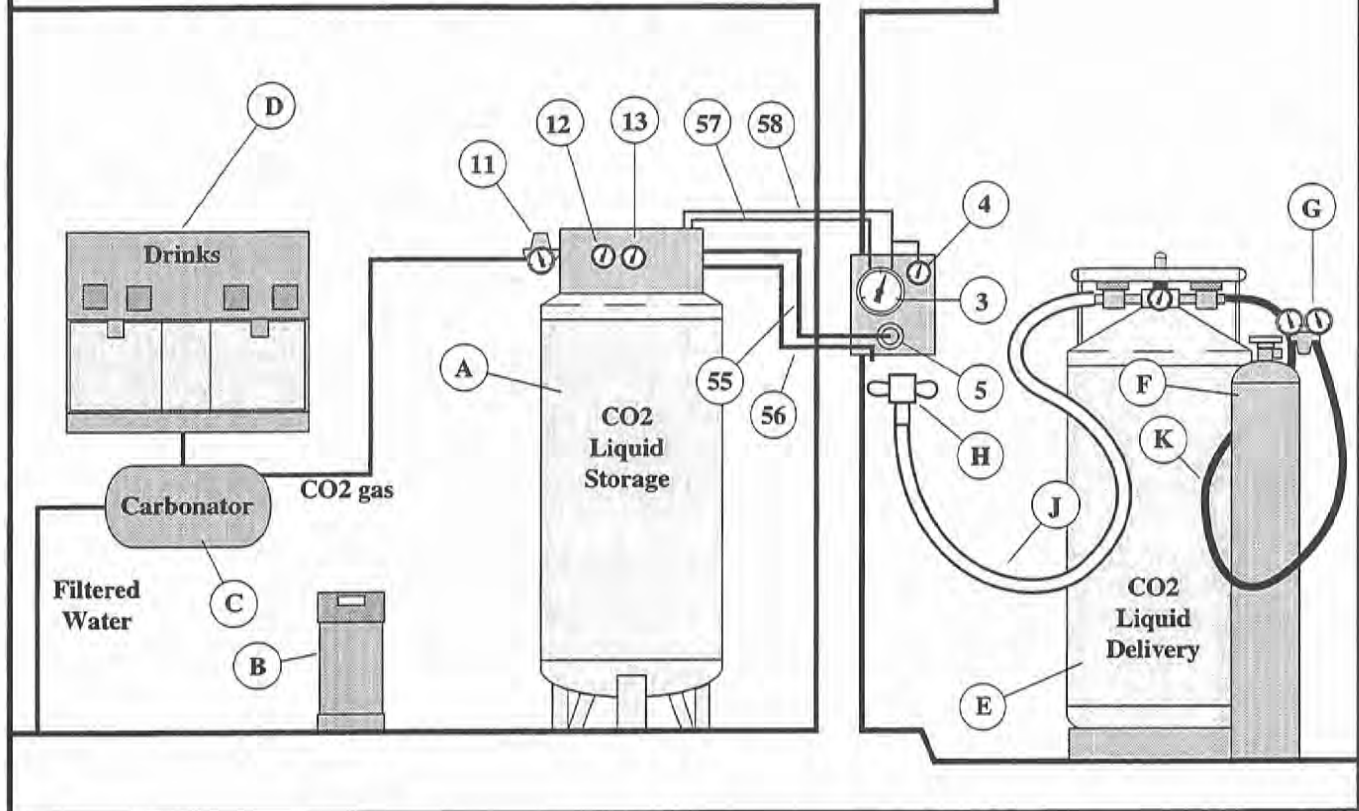
MVE - Canton Facility  
Interstate 575 & Airport Drive  
Canton, Georgia 30114

MVE, Inc. is not responsible for merchandise returned to any location other than our factory.

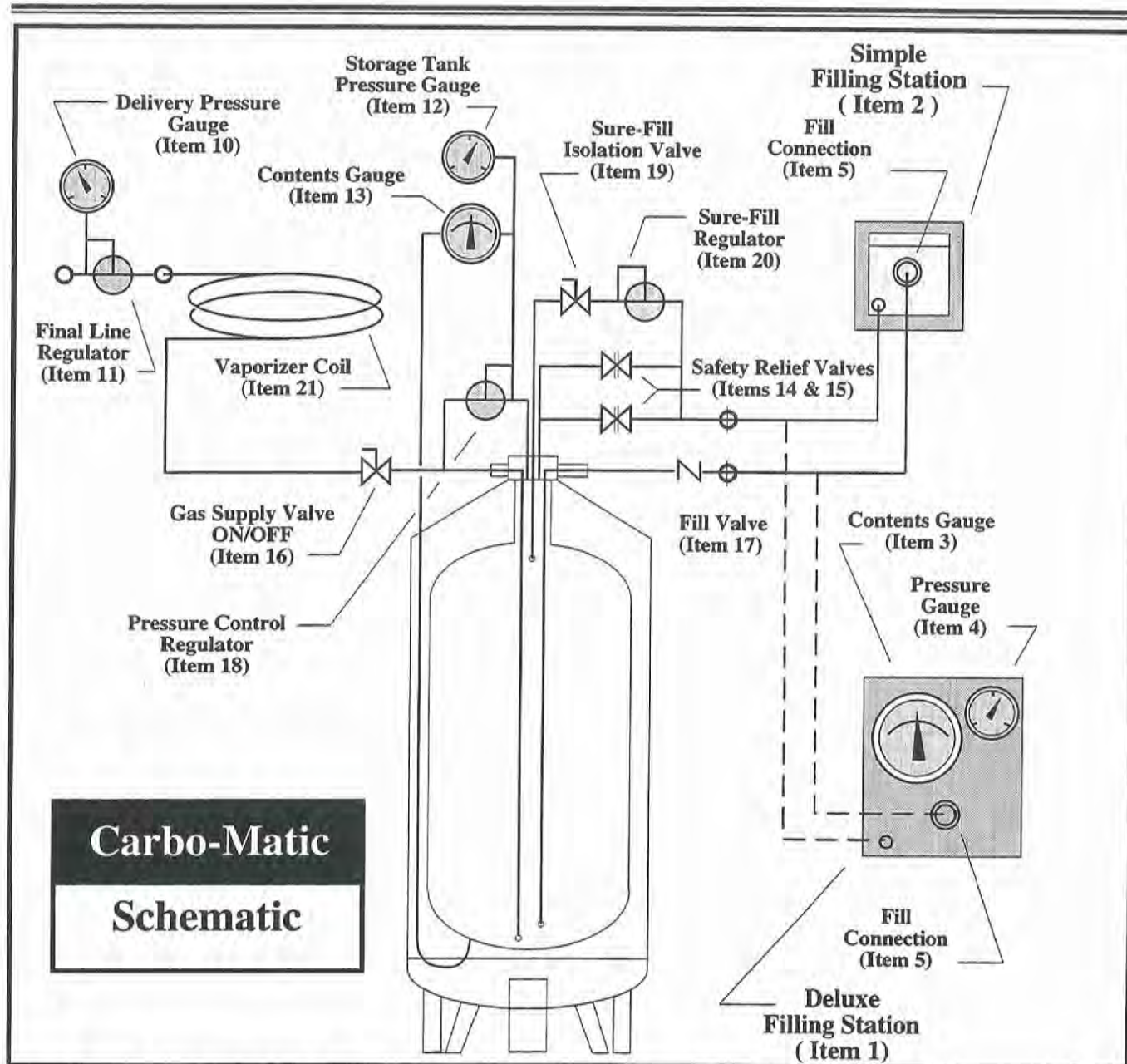
### **CUSTOMER RETURN AUTHORIZATION**

1. Call MVE and ask for Customer Service: (800) 247-4446 or Technical Service: (800) 253-1769.
2. Indicate customer name, bill to address, ship to address, invoice number, and part number.
3. Indicate reason for return and any additional comments.
4. A Customer Return Authorization Number (CRA#) will be assigned. This number should be printed with black marker on the package to be returned.
5. Credit will be issued to account upon receipt of returned part or tank.
6. If a replacement part or tank is needed, place the order at this time.

# Carbo-Matic System



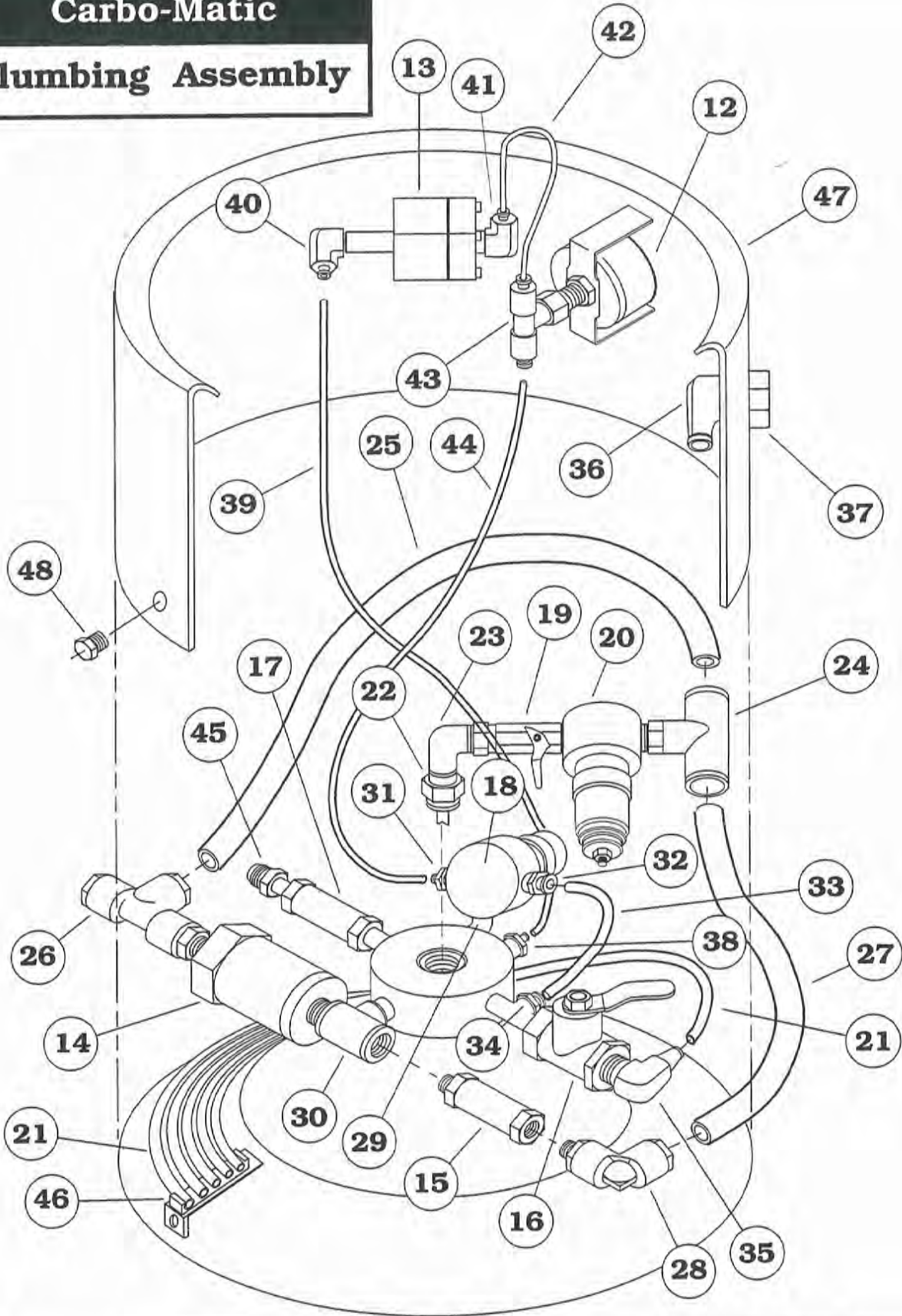
<u>ITEM</u>	<u>DESCRIPTION</u>	<u>FUNCTION</u>
A	Carbo-Matic Storage Tank	Stores liquid CO <sub>2</sub> , delivers gas
B	Syrup Container	Stores syrup (figal or bag-in-box)
C	Carbonator Tank	Uses CO <sub>2</sub> gas to carbonate water
D	Drink Dispenser	Mixes carbonated water & syrup
E	Liquid CO <sub>2</sub> Delivery Tank	Stores and delivers liquid CO <sub>2</sub>
F	High Pressure CO <sub>2</sub> Tank	Stores CO <sub>2</sub> gas at 1000 psi
G	Regulator (set at 300 psi)	Reduces CO <sub>2</sub> gas pressure
H	Delivery Fill & Vent Fitting	Connects delivery tank to filling station
J	Delivery Hose	Delivers CO <sub>2</sub> liquid
K	CO <sub>2</sub> Pressure Hose	Connects gas source to delivery tank
1	Deluxe Filling Station	Completed assembly
2	Simple Filling Station	Completed assembly
3	CO <sub>2</sub> Contents Gauge	Displays the CO <sub>2</sub> liquid level
4	CO <sub>2</sub> Pressure Gauge	Displays the CO <sub>2</sub> tank pressure
5	Liquid Fill Fitting	Connection for filling CO <sub>2</sub>



**Carbo-Matic  
Schematic**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>FUNCTION</u>
10	Line Pressure Gauge	Displays line pressure to use point
11	Final Line Regulator	Controls gas to beverage equipment
12	Tank Pressure Gauge	Displays tank working pressure
13	Tank Contents Gauge	Displays CO <sub>2</sub> liquid level
14	Safety Relief Valve (Primary)	Relieves excess pressure (300 psi)
15	Safety Relief Valve (Secondary)	Relieves excess pressure (450 psi)
16	Gas Supply Valve	Turns the gas flow on and off to use point
17	Fill Check Valve (One way check)	Isolates the tank from the fill station
18	Pressure Control Regulator	Maintains the tank pressure at 140 psi
19	Isolation Valve (Sure-Fill)	Turns off Sure-Fill system
20	Regulator (Sure-Fill)	Vents excess gas when filling at 210 psi
21	Vaporizer Coil	Turns cold liquid CO <sub>2</sub> into gas

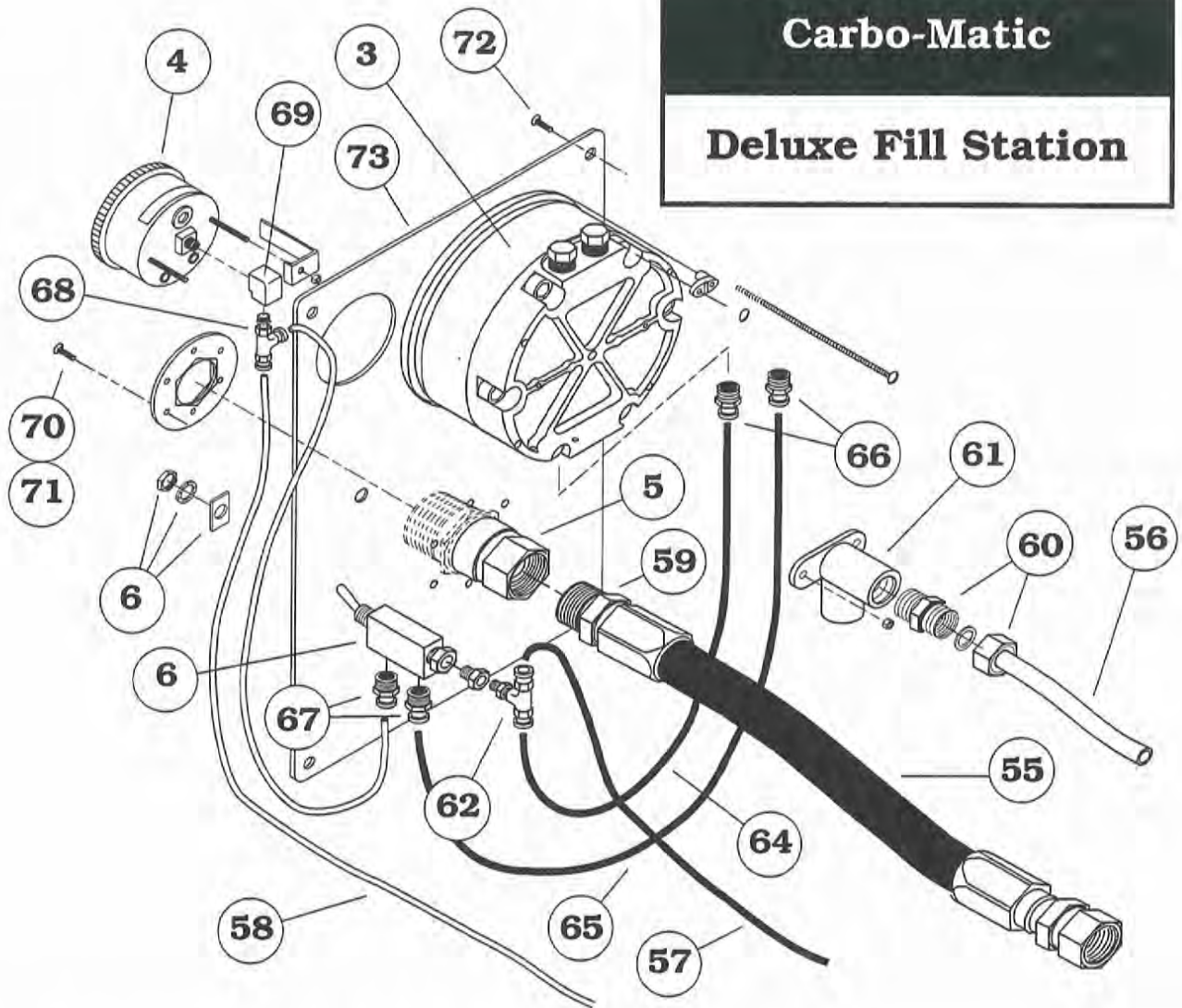
# Carbo-Matic Plumbing Assembly





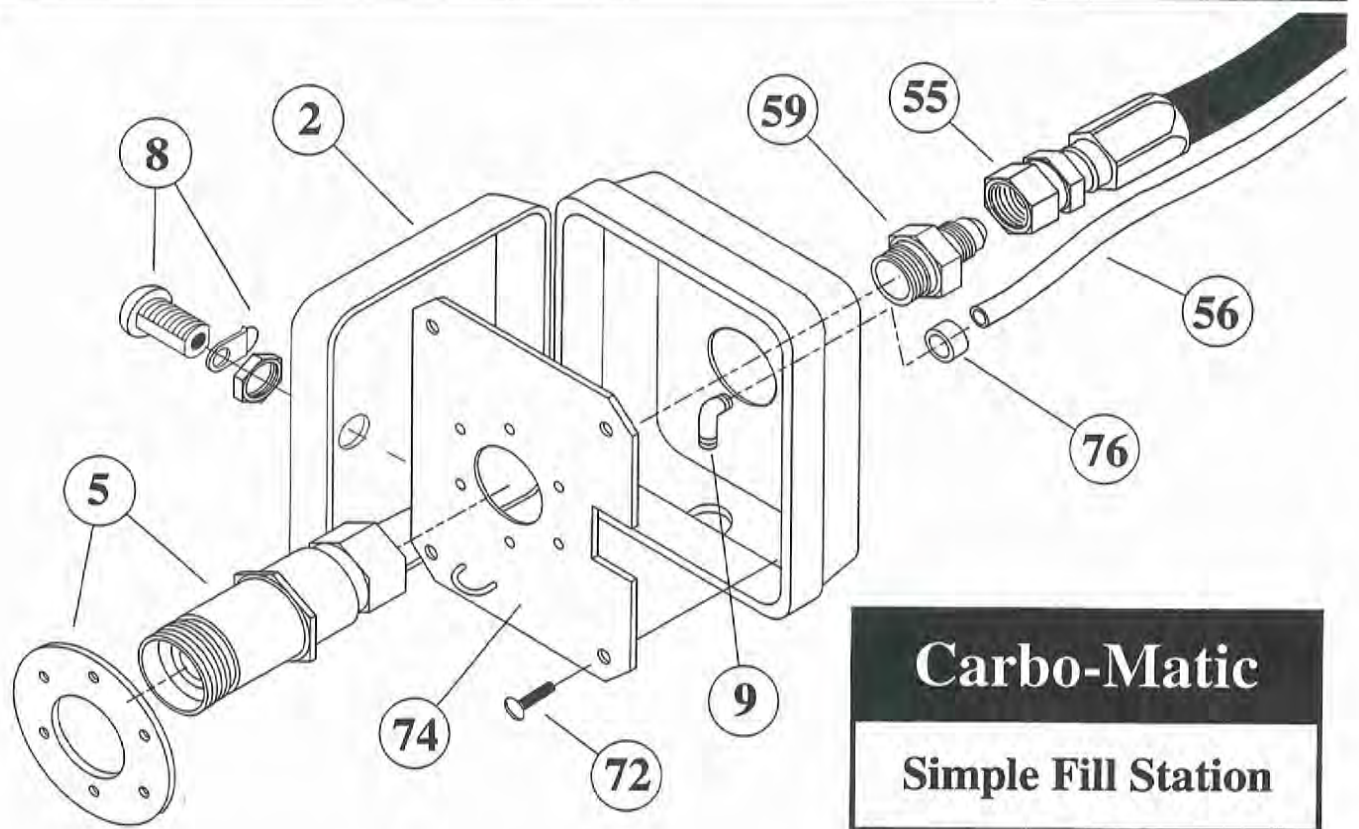
ITEM	NUMBER	QTY	DESCRIPTION
12	2014329	1	Pressure Gauge (0-400 psi)
13	2013799	1	Contents Gauge
14	1811252	1	Relief Valve (Set at 300 psi)
15	1812062	1	Relief Valve (Set at 450 psi)
16	1717579	1	Gas Supply Valve - 1/4 FPT (Ball)
17	1717872	1	Fill Valve - 1/4 FPT (check)
18	1812289	1	Regulator - Set at 140 psi
19	1716162	1	Isolation Valve - 1/4 MPT X 1/4 FPT (Ball)
20	1812279	1	Regulator - Set at 200 psi
21	2811836	1	Vaporizer - 1/4 ODT X 21 Feet
22	8511889	1	Sure-Fill Float Assembly
23	1210462	1	90 Elbow - 1/4 NPT (street)
24	10486518	1	Tee - 1/4 MPT X 1/2 ODT (Nylon)
25	2811726	1	Tube - 1/2 ODT (Nylon)
26	10486462	1	Tee - 1/2 ODT X 1/2 ODT X MPT
27	2811726	1	Tube - 1/2 ODT (Nylon)
28	10486454	1	90 Elbow 1/2 ODT X 3/8 MPT
29	1212632	1	45 Elbow 1/4 NPT (Street)
30	1213592	1	Tee - 1/2 FPT
31	1013672	1	Coupling - 1/8 MPT X 1/8 ODT
32	1013322	1	Coupling - 1/4 MPT X 1/4 ODT
33	2811836	1	Tube - 1/4 ODT (Nylon)
34	1013322	1	Coupling - 1/4 MPT X 1/4 ODT
35	10586666	1	90 Elbow - 1/4 ODT X 1/4 MPT
36	10586666	1	90 Elbow - 1/4 ODT X 1/4 MPT
37	1013362	1	Anchor Connector - 1/4 FPT X 3/4 - 16
38	1013672	1	Coupling - 1/8 MPT X 1/8 ODT
39	2811346	1	Tube - 1/8 ODT Black (Nylon)
40	1013422	1	90 Elbow - 1/8 MPT X 1/8 ODT 1
41	1013422	1	90 Elbow - 1/8 MPT X 1/8 ODT
42	2811826	1	Tube - 1/8 ODT (Nylon)
43	1013996	1	Tee - 1/8 FPT X 1/8 ODT X 1/8 ODT
44	2811826	1	Tube - 1/8 ODT White (Nylon)
45	1110112	1	Fill Connector - 5/8 Flare X 3/8 MPT
46	5811466	4	Tube Rack - 1/4 ODT
47	8511841	1	Shroud - 16" Dia. Stainless Steel
48	2910501	4	Bolt - 1/4-20 UNC

## Carbo-Matic Deluxe Fill Station



ITEM	NUMBER	QTY	DESCRIPTION
1*	8501579	1	Deluxe Fill (Box Only)
2	10569583	1	Simple Fill (Box Only)
3	2013779	1	CO2 Contents Gauge
4	2012279	1	Pressure Gauge - 0-400 psi
5	1312482	1	Fill Fitting
6	1717712	1	Switch - Gauge Isolation
7*	3830879	1	Contents Chart (Deluxe Fill)
8	10521627	1	Lock and Key Assembly
9	N/A	1	Vent Fitting

\* Not Shown in Illustration

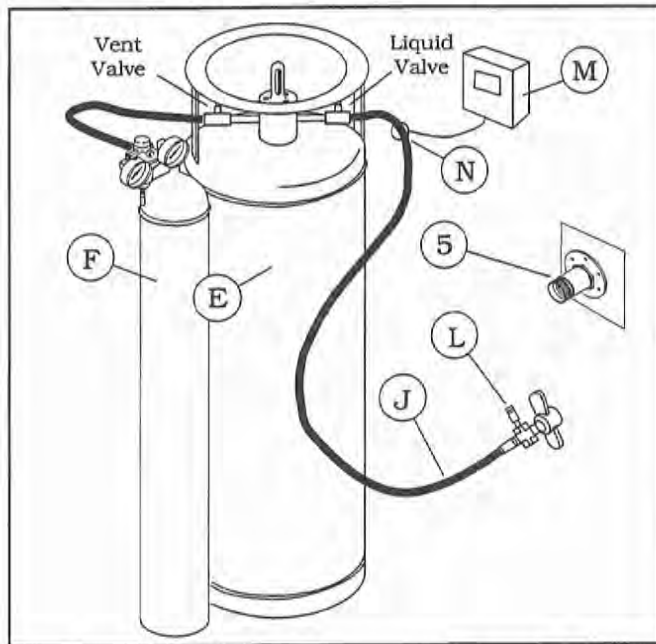


## Carbo-Matic

### Simple Fill Station

ITEM	NUMBER	QTY	DESCRIPTION
55	3711097	1	Fill Hose Assembly - 5/8 Flare
56	2811726	1	Vent Hose - 1/2 ODT
57	2811346	1	Tube - 1/8 ODT X 20 Ft. (Black)
58	2811826	1	Tube - 1/8 ODT X 20 Ft. (White)
59	1111182	1	Fill Connector - 5/8 Flare X 3/4 MPT
60	1013436	1	Coupling - 1/2 ODT X 1/2 MPT
61	1013456	1	Vent Connector Assembly
62	1213342	1	Tee - 1/8 MPT X 1/8 ODT X 1/8 ODT
64	2811346	1	Tube - 1/8 ODT X 18" (Black)
65	2811826	1	Tube - 1/8 ODT X 18" (White)
66	1013482	2	Coupling - 1/4 MPT X 1/8 ODT
67	1013632	2	Coupling - 1/8 MPT X 1/8 ODT
68	1213332	1	Tee - 1/8 ODT X 1/8 MPT X 1/8 ODT
69	1213352	1	90 ELBOW - 1/8 FPT
70	2910971	6	Screw, Slotted 10-32 X 1/2" long
71	2913771	6	Nut - 10-32
72	2913601	4	Screw, Flathead 10-24 X 1/4" long
73	8501551	1	Gauge Plate - Deluxe
74	5503221	1	Gauge Plate - Simple
76	N/A	1	Clamp - 1/2 ODT

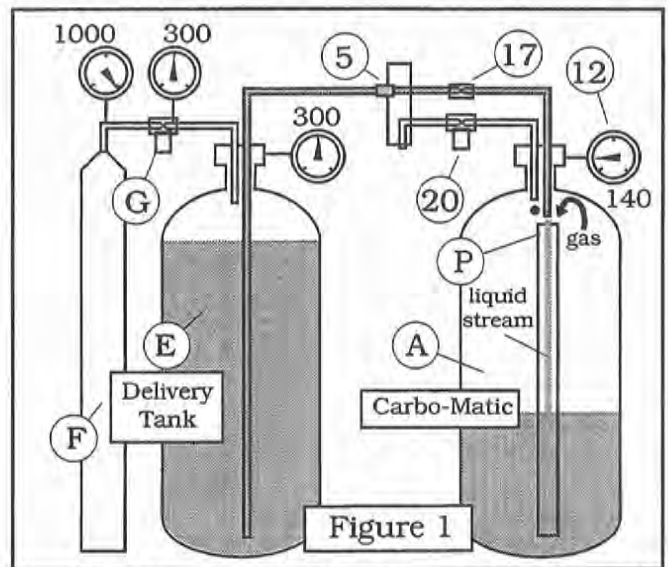
## CARBO-MATIC SYSTEM OPERATIONS



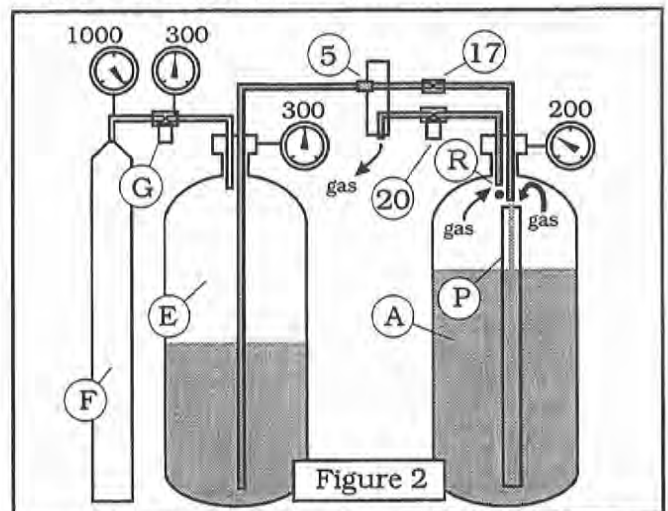
### SYSTEM OPERATION-FILLING

The Carbo-Matic system is designed to be filled from outside the restaurant through the fill station fitting (Item 5). The distributor should have a liquid delivery tank (Item E), a high pressure bottle (Item F) with regulator (Item G) and a 50 foot filling hose (Item J). The liquid in the delivery tank should be saturated at 300 psi for optimum filling. The high pressure back up bottle should be connected through a regulator to the vent valve of the delivery tank. The regulator should be set at 300 psi to help maintain the delivery tank pressure while filling. The 50 ft. delivery hose should be connected to the liquid valve of the delivery tank. It should have a line relief valve (Item L) located at the filling end. A flow meter (Item M) can be added to this system at connection (Item N) to measure the amount of liquid CO<sub>2</sub> delivered.

The Carbo-Matic is designed to fill automatically. It is equipped with a patented sure-fill system that automatically maintains filling pressure and shuts off when the tank is full.



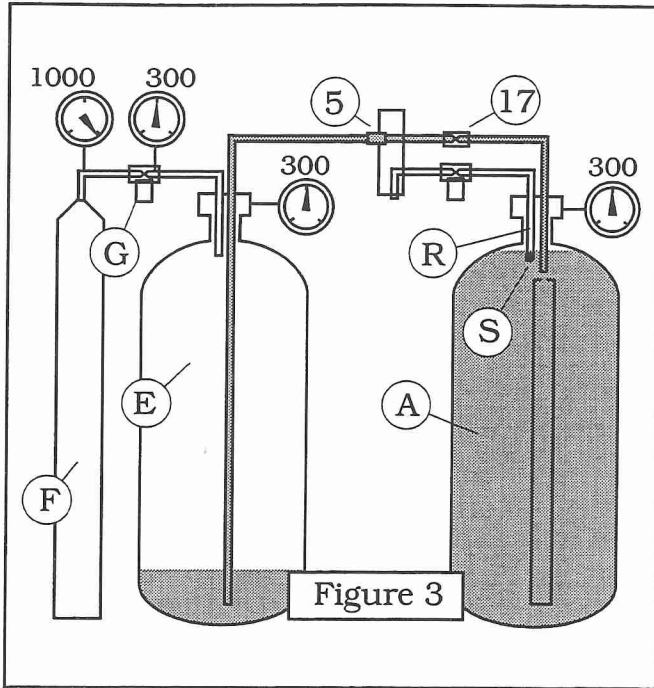
The Carbo-Matic, shown in (Fig. 1), contains some liquid CO<sub>2</sub> at a working pressure of 140 psi. The delivery tank has a pressure of 300 psi, which forces liquid CO<sub>2</sub> through the hose and into the Carbo-Matic. As the liquid goes through the eductor (Item P) it accelerates and pulls gas from the top of the tank into the liquid stream. The mixing of liquid and gas keeps the pressure in the Carbo-Matic from rising too quickly.



As filling continues (Fig. 2) the pressure rises to 210 psi. The sure-fill regulator (Item 20) opens and releases gas from the vent tube (Item R) and vents it outside the store. The Carbo-Matic pressure is now maintained between 200 and 250 psi while filling continues.

When the liquid CO<sub>2</sub> reaches the full mark (the bottom of the vent tube Item R), it lifts a float valve (Item S) and shuts off the venting (Fig. 3).

The vent gas that was exiting the wall box stops abruptly and indicates the fill is over. The delivery tank pressure and the Carbo-Matic pressure equalize immediately and discontinue the liquid flow.



The normal filling operation of the Carbo-Matic system is:

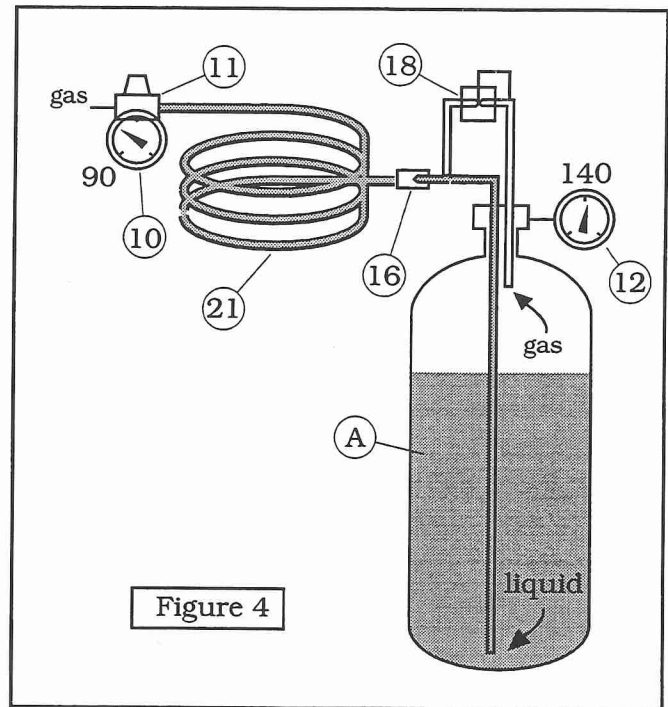
1. Open the fill station (Item 1 or 2).
2. Note the tank pressure (Item 4 or 12). It should be between 125 and 175 psi.
3. Note the liquid level (Item 3 or 13) to reference the amount of CO<sub>2</sub> product needed.
4. Connect the filling hose to the fill fitting (Item 5) by threading the wing nut until it stops.
5. Open the liquid delivery valve on the delivery tank.
6. When the delivery tank pressure equals the Carbo-Matic pressure (Item 4 or 12) the filling is over.
7. Remove the delivery hose.

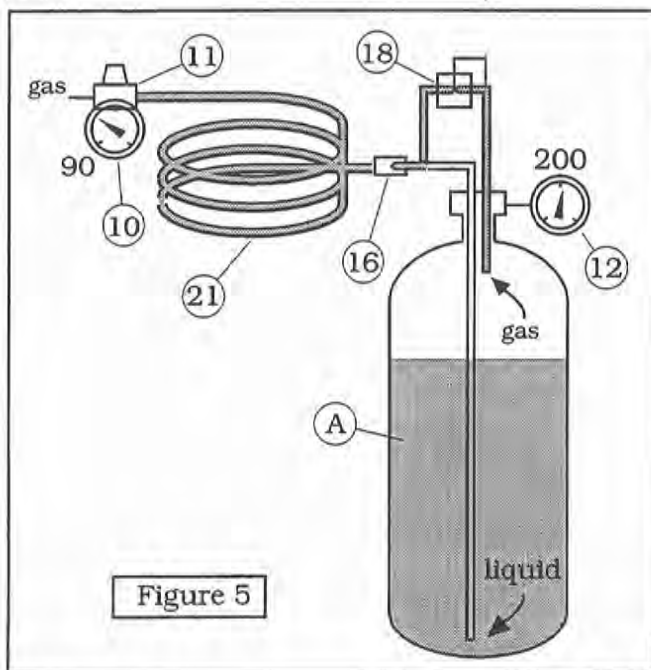
## SYSTEM OPERATION - GAS WITHDRAWAL

The Carbo-Matic system is designed to store liquid CO<sub>2</sub> at pressures between 140 and 300 psi and deliver it as CO<sub>2</sub> gas.

The plumbing assembly on the top of the tank needs a Fluid Line Regulator (Item 11) and gauge (Item 10) to connect it to the carbonator. The pressure setting of this regulator (page 17) should be made in accordance with the beverage equipment specifications.

The Carbo-Matic tank (Fig. 4) provides gas during the normal operating pressure of 140 psi by pulling liquid CO<sub>2</sub> up from the bottom of the tank and vaporizing it in a coil (Item 21). As the cold liquid vaporizes it will form moisture or frost on the top center of the tank and on the coils. The CO<sub>2</sub> gas flows through the vaporizer, into the pressure reducing regulator (Item 11), and into the beverage system.





If the tank was recently filled (Fig. 5), its pressure will be above the normal 140 psi. The pressure control regulator (Item 18) will be open. It will take gas from the top of the tank and feed it into the vaporizer (Item 21) and through to the beverage system. The tank pressure (Item 12) will be reduced while the gas is removed until 140 psi is reached. At that time the pressure control regulator (Item 18) will close and liquid will begin to be drawn from the dip tube on the bottom of the tank. The tank pressure will not be reduced while liquid is being drawn from it. The adjustment of the pressure control regulator (page 18) is what controls the normal operating pressure of the Carbo-Matic system.

### **SYSTEM OPERATION - SAFETY DEVICES**

The Carbo-Matic is a pressure vessel that is designed to the ASME, Section 8, Division 1 Code. It is required to have safety relief devices that connect to the top of the pressure vessel and vent outside the restaurant. These valves are designed to handle excessive pressure rise

in the vessel even in a fire condition.

The primary safety relief valve (Item 14) is set to open at 300 psi. This controls the maximum working pressure of the Carbo-Matic. The secondary relief valve (Item 15) is set at 450 psi and will operate if the primary relief valve fails. Both relief valves are connected to the vent line that exits the restaurant into the filling station.

### **SYSTEM OPERATION - LIQUID LEVEL GAUGE**

The liquid level gauge (Item 3 or 13) is a pressure differential type gauge. It compares the pressure at the top of the tank to that at the bottom. The difference in these pressures is the weight of the liquid being applied to the bottom. The pressure line coming off the bottom of the tank is connected to an 1/8 ODT fitting (Item 38) and is called the "High" side. The tubing connection to the high side is black 1/8 ODT nylon (Items 39 & 57). The "Low" side connection is (Item 31) where the white 1/8 ODT nylon (Items 44 & 58) connects.

### **ROUTINE MAINTENANCE**

The Carbo-Matic requires only a small amount of routine maintenance to keep the system working properly. The basic principle of this system is that when the tank has liquid CO<sub>2</sub> in it and is operating between 130 psi and 150 psi, it is operating normally. The Users Manual provided to the restaurant management asks that they check the gauges for normal operation on a routine basis. Their trouble shooting guide will cover routine examination and direct them to call for service if the system fails to operate.

### TROUBLE SHOOTING GUIDE

Problem	Probable Cause	Corrective Action
Tank won't fill	Tank is already full	None
	Tank is full, gauge reads wrong.	Check level gauge (Item 3 or 13). If low, check for a leak on the "low" side lines.
		Check level Gauge (Item 3 or 13). If high, check for a leak on the "High" side lines.
	Tank pressure is above 225 psi.	Vent tank to 150 psi and fill. See Trouble Shooting Guide for tank high pressure.
	Delivery tank pressure is too low (below 285 psi).	Boost pressure up to 300 psi with a high pressure cylinder and regulator.
Blockage of hoses or fillings.	Remove hoses and check for obstructions.	
Tank pressure is too low (below 120 psi)	Leaks in the plumbing	Leak check all the plumbing, hoses, fillings and filling station connections with snoop
	Pressure Control Regulator (Item 18) is set too low.	Adjust as described in repair procedure (page 18). Note: Adjusting the regulator will not be noticed until after the next fill.
Tank pressure is too high (above 225 psi).	System is not in use.	Turn the gas supply valve (Item 16) on.
	Tank was recently filled.	The pressure slowly reduces from 300 psi to 140 psi as gas is used. A normal store will reduce the pressure in 48 hrs.

### TROUBLE SHOOTING GUIDE

Problem	Probable Cause	Corrective Action
Tank pressure is too high (above 225 psi).	The pressure control regulator (Item 18) is set too high.	Adjust the regulator per the procedure found on (Page 18).
	Weak vacuum - The side of the tank is cold or sweats during periods of non-use (morning set-up).	Call factory for assistance
Tank is always frosting.	During a high use period	Normal-the frost will go away after the high use is over.
	Tank pressure is normal but frost won't go away-Leak in beverage system.	Leak check the tank and beverage system.
	Tank pressure is high and frost won't go away.	Leak check the tank and beverage system. If a leak is not found and the pressure does not go down; there may be a bad vacuum. Call Factory for assistance.
Tank won't supply gas.	Valves are shut off.	Open gas supply valves (Items 16).
	Low pressure in the tank-pressure gauge (Item 12 on the tank and Item 4 in the filling station) read below 90 psi.	Tank is empty. Refill.
		Tank has depressurized and become dry ice if the gauges read 60-70 psi. Find the leak and repair.
	Low pressure in the line. The tank gauge (Item 12) reads normal but the regulator gauge (Item 10) reads below 90 psi.	Check for obstructions in regulator (Item 11).
There may be an obstruction inside the withdrawal tube. Call the factory for assistance.		



## TROUBLE SHOOTING GUIDE

Problem	Probable Cause	Corrective Action
Sure - Fill won't operate.	Isolation Valve (Item 19) is shut.	Open Isolation Valve
	Float Valve is stuck up. Possible leaks in Item (19, 20, 22, and 23).	Release the Float Valve with the procedure on Page 19.

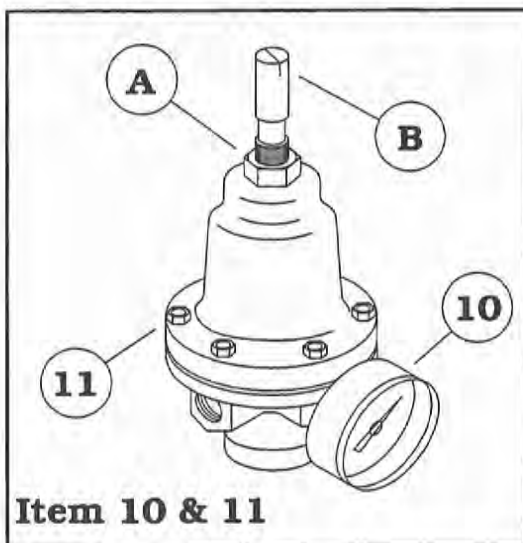
## Repair and Maintenance Procedures

### REPAIR PROCEDURE FOR COMPONENT ADJUSTMENTS

The following section covers the basic adjustments that can be made to the Carbo-Matic System without taking the tank out of service and removing its CO<sub>2</sub> product. Each procedure is referenced by the item number of the component and has an illustration that refers to the parts needed for adjustment. No special tools are required.

#### ITEM 11- CARBONATOR REGULATOR

Adjustment to Item 11 will vary the CO<sub>2</sub> line pressure that is providing gas to the beverage carbonator. The recommended pressure setting is 90 psig.



To Adjust:

1. Make sure the system is on, the Gas Supply Valve (Item 16) is open.
2. Loosen the locknut (Item A) on the regulator (Item 11).
3. Tighten or loosen the adjusting knob (Item B) until the proper pressure reading is seen on the pressure gauge (Item 10).
4. Confirm the new setting by watching the pressure gauge (Item 10) while CO<sub>2</sub> flow is happening (ie, drinks are being made).
5. While holding (Item B) in its position, tighten the locknut (Item A).

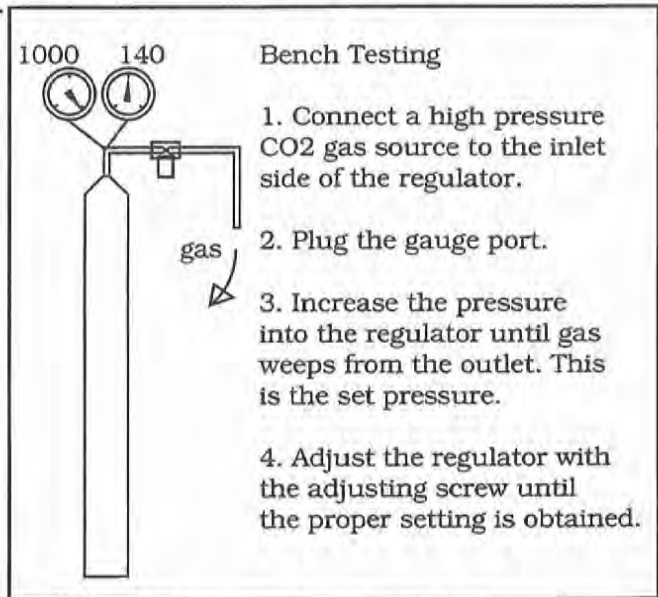
## PRESSURE CONTROL REGULATOR

The pressure control regulator (Item 18) is designed to be open at the set pressure or higher. This allows gas to be taken from the top of the tank and supplied to the restaurant. While the regulator is open the tank pressure will decrease.

This style of regulator (Economizer) does not display changes in its setting on the tank pressure gauge (Item 12). The proper adjustment requires the removal of the regulator (Item 18) and bench adjustment. The following rule of thumb adjustment can be made without depressurizing the tank. This regulator should be set at 140 psig.

1. Note the normal pressure setting of the tank (Item 12).
2. Loosen the locknut.
3. Turn the adjustment screw inward to increase the pressure setting. Only adjust 1/4 turn clockwise at a time.
4. OR, turn the adjustment screw out to decrease the pressure setting. Only adjust 1/4 turn counter clockwise at a time.
5. Pressurize the Carbo-Matic by filling the tank.
6. After 1 week and before the next fill, note the new normal pressure setting.

Repeat steps 2 through 5 until the pressure setting is correct.



1. Connect a high pressure CO2 gas source to the inlet side of the regulator.

2. Plug the gauge port.

3. Increase the pressure into the regulator until gas weeps from the outlet. This is the set pressure.

4. Adjust the regulator with the adjusting screw until the proper setting is obtained.

## REPAIR PROCEDURE FOR COMPONENTS WITH ISOLATION VALVES

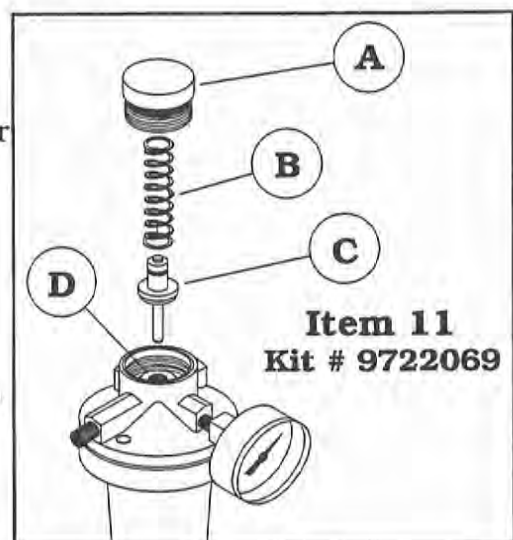
These components should be periodically inspected for wear and replaced if necessary. They are easily accessible and will not interrupt beverage service.

### ITEM 11 - REGULATOR SEAT AND POPPET REPLACEMENT

Wear and foreign material can cause the regulator seats to leak and not hold pressure.

To Replace:

1. Turn off the gas supply valve (Items 16).
2. Depressurize the lines until gauge (Items 10) reads 0 psi.
3. Unscrew the bottom of the regulator (Item A).
4. Remove the spring (Item B) and poppet (Item C).
5. Inspect the seat (Item D) and poppet (Item C) for wear. Clean or replace worn parts.
6. Reassemble the regulator (Items 11).
7. Turn valve (Item 16) on to repressurize.



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## REPAIR PROCEDURE FOR COMPONENTS THAT ARE ALWAYS PRESSURIZED

Certain components are connected directly to the pressure vessel of the Carbo-Matic tank. Isolation and ON/OFF valves (Items 19 and 16) connect to the pressure vessel so that other components can be removed without depressurizing the tank. The safety relief valves (Items 14 & 15) connect directly to the pressure vessel and are not isolated with a valve. When working on any component connected to the pressure vessel, remove the liquid and depressurize the system.

To Depressurize:

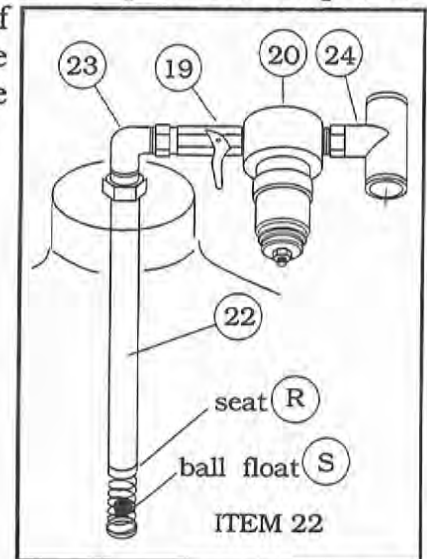
1. Allow the Carbo-Matic tank to go empty of CO<sub>2</sub>.
2. Turn the gas supply valve (Item 16) off.
3. Connect a back-up CO<sub>2</sub> cylinder to the beverage system.
3. Vent the Carbo-Matic.
4. Make sure the pressure gauge (Item 12) reads 0 psi.

### ITEM 22 - SURE-FILL FLOAT ASSEMBLY

The sure-fill system is designed to vent during the filling procedure and stop when full. When the liquid lifts the ball float (Item S) into the seat of the dip tube (Item R), venting stops and the fill is complete. When the liquid level or tank pressure drops, the ball float (Item S) falls and becomes ready for the next fill. If the ball doesn't drop, there is probably a leak in the components making up the sure-fill assembly or excessive pressure in the storage tank.

To Repair:

1. Isolate the system by turning off valve (Item 19).
2. Remove (Item 24 and 20).
3. Connect a CO<sub>2</sub> source at 300 psi to the inlet of (Item 19).
4. Open the isolation valve (Item 19) to dislodge the ball float.
5. Close the isolation valve (Item 19).
6. Reassemble the plumbing.
7. Open the Isolation Valve (Item 19) and leak check the system.



### ITEMS 16, 17, 18, 36, AND 38 AND SAFETY VALVES 14 AND 15.

To replace the following parts or any part connected directly to the pressure vessel.

To Replace:

1. Follow the procedure to depressurize the tank found on page 23.
2. Remove and replace the parts.
3. Pressurize the tank and leak check with snoop.



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