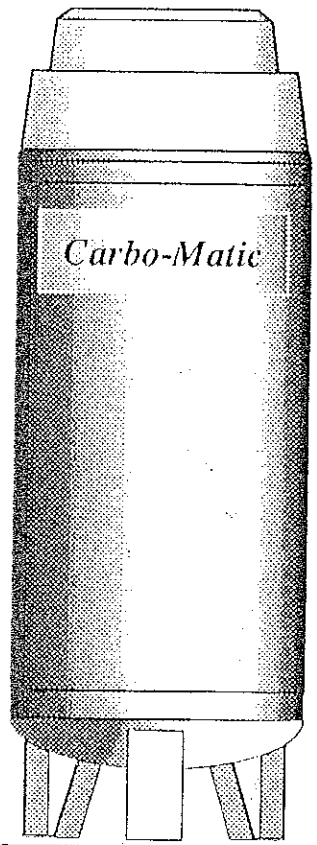
USER'S MANUAL

Carbo-Matic

FOR USE WITH CIG MODELS 200/400



MVE CSE

CIG Carbo-Matic 200/400

INTRODUCTION

This manual has been compiled for use in conjunction with MVE/CSI Carbo-Matic CIG Model 200/400 liquid carbon dioxide storage units. It is intended to provide a general overview of the equipment and includes all of the information necessary to operate the unit in beverage carbonation service. Any comments or suggestions relating to this publication should be forwarded to:

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Bloomington, MN 55425-1636 USA
International Sales Department
Telephone: (612) 853-9600
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SAFETY

This chapter provides general information regarding the safe handling and use of CO_2. The following cautions and warnings should be read and understood by all users of CO_2 gas in Carbo-Matic units before operating or attempting to perform any service work on the equipment.

WARNING: Carbon Dioxide gas is heavier than air and will not support life. Exposure to high concentrations of CO_2 gas can cause asphyxiation and death. Always store the unit in a well ventilated area and exercise extreme caution when approaching a CO_2 tank which is venting or leaking gas to the atmosphere. Be sure that the vent hose from the tank is connected to the filling station to insure outside venting of CO_2 gas.

CAUTION: The MVE/CSI Carbo-Matic is a pressure vessel designed to store CO_2 liquid and gas at cold temperature and pressures. DO NOT attempt to loosen or remove any fittings from this unit. Equipment servicing should be performed only by factory authorized service personnel; and then, only with the CO_2 liquid and pressure removed from the vessel.

CAUTION: Liquid CO_2 or parts contacting liquid CO_2 may be extremely cold (-109 F). Use the proper protection when handling cold equipment.

CAUTION: The installation of the Carbo-Matic should be done so that it does not block electrical boxes or fire escapes. The vent line that connects to the tank's safety relief devices must be free of kinks or obstructions. It must connect to the fill box on the outside of the building. All plumbing connections should be leak free. The hoses connecting the store tank and the filling station should be out of the traffic area and protected from damage.

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FACTS OF OPERATION

The Carbo-Matic system is completely automatic, requiring minimal adjustment or operator monitoring, and little scheduled maintenance. The system is designed to store and deliver carbon dioxide gas (CO_2) to your beverage system.

The Carbo-Matic system consists of 3 major assemblies: the remote filling station, the storage tank, and their connecting hoses.

The filling station is located on the outside of the building where it is convenient for the CO_2 distributor to fill. It is connected to the storage tank with hoses so that liquid CO_2 can be transferred into the tank from outside the building. The hoses also connect the storage tank's safety relief valves to the outside where they can vent safely.

The storage tank is a permanently installed, vacuum insulate, pressure vessel. It is designed to hold liquid and gas CO_2 at cold temperatures for long periods of time. It has a pressure control system that keeps the tank normal operating pressure between 130 and 300 psi. It will supply CO_2 gas to any beverage system. The tank pressure can be monitored at the deluxe fill station (See item 4 on the deluxe illustration schematic). The amount of CO_2 in the vessel can be determined by looking at the liquid level gauge (Item 3) in the deluxe fill station.

The gas is supplied to the beverage equipment through a regulator (Item 11) that is mounted outside of the tank shroud. The outlet pressure of the regulator should be set between 90 and 100 psi. CO_2 delivery pressure can be monitored on the final line regulator gauge (Item 10).

The vaporization of the cold CO_2 liquid into gas occurs through the internal stainless steel vaporizer that is between the inner and outer vessel. The coil and other plumbing components will sweat or frost during beverage operation.

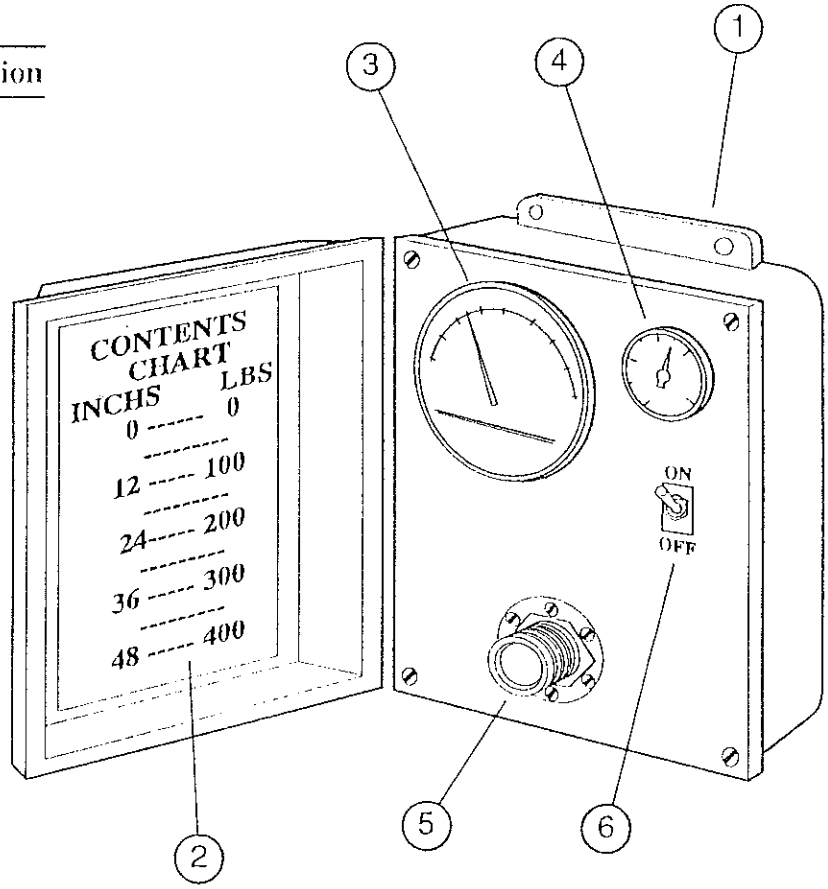
The CO_2 gas supply can be shut off by closing the gas supply isolation valve (Item 16). Turn the handle up.

CIG CARBO-MATIC TANK SPECIFICATIONS

Model:		200		400	
Dimensions		*English*	*Metric*	*English*	*Metric*
Diameter	(in/mm)	16	406	20	508
Height	(in/mm)	51-9/16	1310	62-7/8	1597
Weight, Empty	(lbs./kg)	180	81.6	290	131.5
Weight, Full	(lbs./kg)	380	172.4	690	313
Capacity					
Liquid	(gallons/liters)	21	79.4	48	181.7
Gas	(SCF/SCM)	1750	49.5	4000	113.2
Weight	(lbs/kg of CO_2)	200	90.7	400	181.4
Gas Supply Rates					
Maximum Flow:					
(lbs/hour)	(kg/hour)	3	1.4	12	5.4
Minimum Flow					
(lbs./day)	(kg/day)	1.5	0.68	2.5	1.2
(CF/hour)	(cc/hour)	0.5	14	1	28.3
Pressure Rates					
Maximum Allowable Pressure		300 psi	20.7 bar	300 psi	20.7 bar
Relief Valve Setting (primary)		300 psi	20.7 bar	300 psi	20.7 bar
Relief Valve Setting (secondary)		450 psi	31.0 bar	450 psi	31.0 bar
Normal Working Pressure		140-225 psi	9.7-15.5 bar	140 -225 psi	9.7-15.5 bar
Design Criteria					
Maximum Allowable Pressure		300 psi	20.7 bar	300 psi	20.7 bar
Vessel Material (inner)		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

PARTS IDENTIFICATION

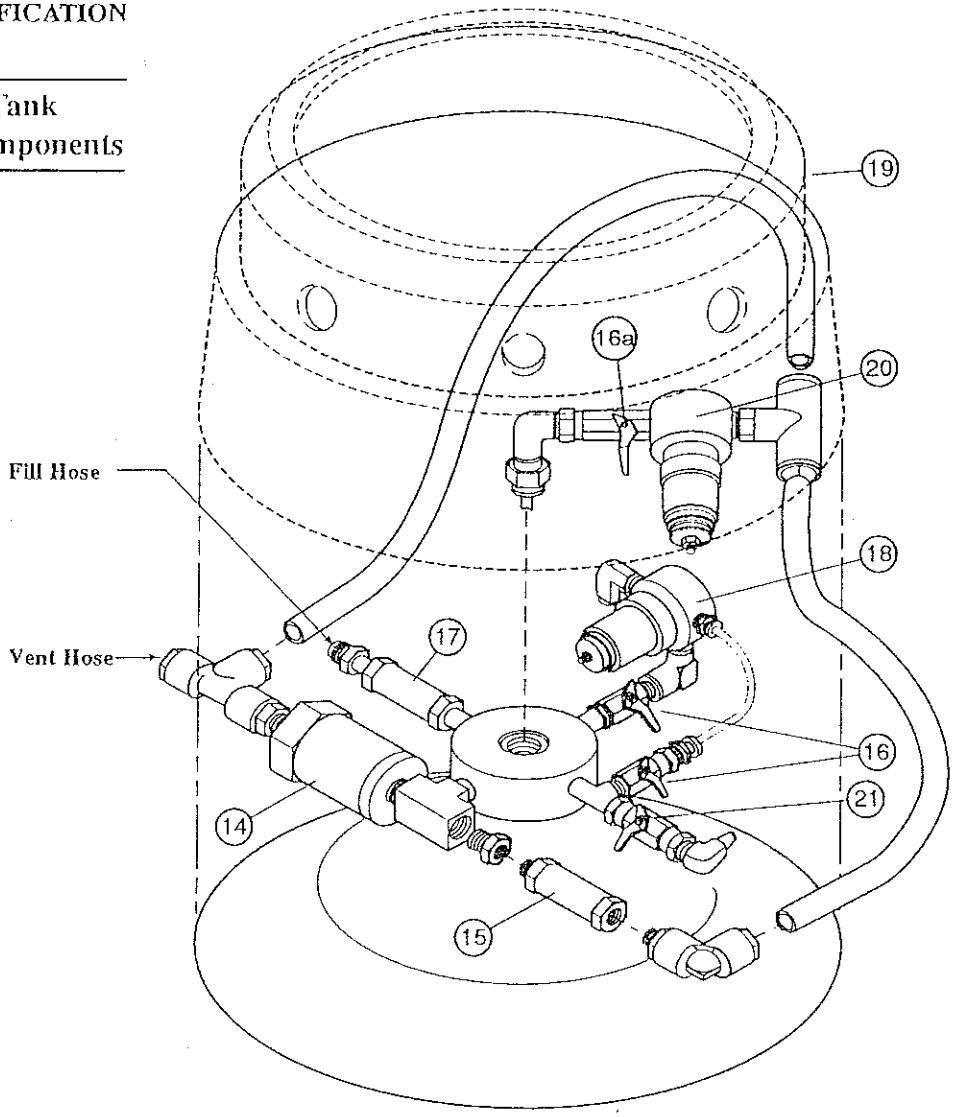
Deluxe Filling Station



ITEM	NUMBER	DESCRIPTION	QTY	FUNCTION
1	10485970	Deluxe Fill Box Assembly	1	Complete Assembly
2	38-3087-9	Contents Chart	1	Converts the gauge reading into lbs. CO_2
3	20-1377-9	CO_2 Contents Gauge	1	Displays the CO_2 liquid level
4	20-1432-9	CO_2 Pressure Gauge	1	Displays the CO_2 tank pressure
5	13-1248-2	Liquid Fill Fitting	1	Connection for filling CO_2
6	17-1771-2	Gauge Isolation Switch	1	Turns the Contents Gauge On/Off

PARTS IDENTIFICATION

Storage Tank Plumbing Components



ITEM	NUMBER	DESCRIPTION	QTY	FUNCTION
14	18-1125-2	Safety Relief Valve (Primary)	1	Relieves excess pressure (300 psi)
15	18-1206-2	Safety Relief Valve (Secondary)	1	Relieves excess pressure (450 psi)
16	17-1616-2	Isolation Valve	2	Isolates Components
16a	17-1616-2	Sure-Fill Isolation Valve	1	Isolates Sure-Fill Regulator
17	17-1787-2	Fill Valve (One way check)	1	Isolates the tank from the fill station
18	18-1228-9	Pressure Maintaining Regulator	1	Holds the tank pressure at 140 psi
19	85-0991-6	Shroud (200)	1	Protects plumbing
19	85-1203-6	Shroud (400)	1	Protects plumbing
20	18-1227-9	Regulator (Sure-Fill)	1	Vents excess filling gas at 210 psi
21	17-1757-9	Isolation Valve to Beverage System	1	Isolates final line to beverage system

COMPONENT DESCRIPTION

It is important to become familiar with the major components of the Carbo-Matic system.

The *Final Line Regulator* (Item 11) is mounted externally on the Carbo-Matic unit. It maintains the proper line pressure for carbonation. The *pressure gauge* (Item 10) displays the pressure of the gas going to the beverage machine. Normal operating range for this reading is 90-120 psi. In many cases additional regulators may be required to supply other functions, such as Bag-in-Box pumps or syrup drive systems. Consult with the suppliers of that equipment for proper pressure recommendations.

The *Control Valves* for the Carbo-Matic system are factory set and should not be adjusted. The *Pressure Maintaining Regulator* (Item 18) is sometimes called an economizer regulator. It controls the operating pressure of the storage tank and has a set pressure of 140 psi. It delivers liquid CO_2 to the vaporizer coil if the tank pressure is below the set pressure, or CO_2 gas to the drink system if the tank pressure is above the set pressure. The filling of the storage tank with liquid CO_2 is controlled by two automatic check valves. The *Fill Connection* (Item 5) located in the filling station and the *Fill Isolation Valve* (Item 17) on the tank only allow liquid to flow into the tank.

The Carbo-Matic storage tank is equipped with a *Sure-Fill System* (Item 20) that automatically controls the filling of the tank. It uses a preset regulator to vent a small amount of CO_2 gas at the end of the filling operation. The regulator is connected to a float valve located inside the tank. When the rising liquid level shuts off the float valve, the filling operation is automatically stopped. This system guarantees a full tank. There is a *Sure-Fill Isolation Valve* (Item 16a) that can be used to turn the system off for servicing.

The Carbo-Matic storage vessel has two *Safety Relief Devices* (Items 14 &15) that protect it from overpressurization. These devices are connected to the filling station and vented outside the building. The main relief valve (Item 14) may vent during the filling of the tank.

The Carbo-Matic storage tank pressure is shown in the deluxe filling station on the Pressure Gauge (Item 4) located in the panel. The CO_2 liquid level can be read in the deluxe filling station on the large contents gauge (Item 3) that reads the liquid level within 5 pound increments.

DAILY OPERATION

Set-Up: The MVE/CSI Carbo-Matic is designed to supply gas to the carbonator. The system is designed to be as automatic as possible. The morning set-up of this equipment is minimal. Follow these steps:

1. Check the contents gauge located in the deluxe fill box on the outside of the store (Item 3). The reading on the gauge is in inches of water. The reading in inches of water can be converted to pounds of CO_2 remaining in the tank by referring to the chart that is affixed to the inside of the door to the deluxe fill box.

2. Check the storage tank pressure gauge (Item 4) to see that it is above 125 psi. The normal operating pressure is between 140 psi and 175 psi. The pressure can be as high as 300 psi after a CO_2 delivery.

3. Check the carbonator pressure gauge (Item 10) to make sure that it is set at 90 psi.

4. Inspect the outside of the vessel for frost build-up. If there has not been a recent CO_2 fill or the beverage system has not been used for the last 6-8 hours, frost should not be present.

5. Make sure that the gas supply isolation valve (Item 16) is open. Handle turned down.

Close: No steps are required.

TROUBLESHOOTING GUIDE

Problem	Probable Cause	Corrective Action
Drinks are flat	Out of CO_2	Check the contents gauge (Item 3). If empty, contact CO_2 supplier for delivery.
	Final line regulator set too low.	1. Pressure gauge (Item 10) should show 90-110 psi 2. If too low, loosen the locknut and adjust the regulator. 3. If drinks are still flat, contact service agent.
	Kink or obstruction in in CO_2 line.	Inspect line for kinks or obstructions.
	Large CO_2 leak.	1. Listen for leaking gas. 2. Inspect line for holes.
	Tank pressure too low.	Pressure gauge (Item 4) should be 130-300 psi. If less than 100, contact service agent.
	Drink temperature too warm.	See manual for beverage system or call service agent.
	Beverage system malfunction.	Contact service agent
Frost on the plumbing and outside of tank.	High CO_2 consumption caused by lunch or dinner rush.	None required. Frost will disappear when volume drops.
	Leak in beverage system, figals or bag in box.	If frost appears early in morning or continuously then system has a leak and service agent must be contacted.
Hissing coming from tank.	Safety relief valve (Item 14) is functioning.	Check gauge (Item 4), if reading is 280 psi or higher then device is functioning properly. If the pressure is less than 280 psi then relief valve opens too early. Contact the service agent.
	Leak in the plumbing components.	1. Ventilate area to reduce CO_2 concentration. 2. Call the service agent to perform the necessary leak testing and component tightening.
Tank won't fill.	Tank is already full.	Check contents gauge (Item 3).
	Tank pressure is above 225 psi.	Contact the service agent.
	Blockage in line.	Contact the service agent.

CIG Carbo-Matic 200/400

SERVICE AND MAINTENANCE

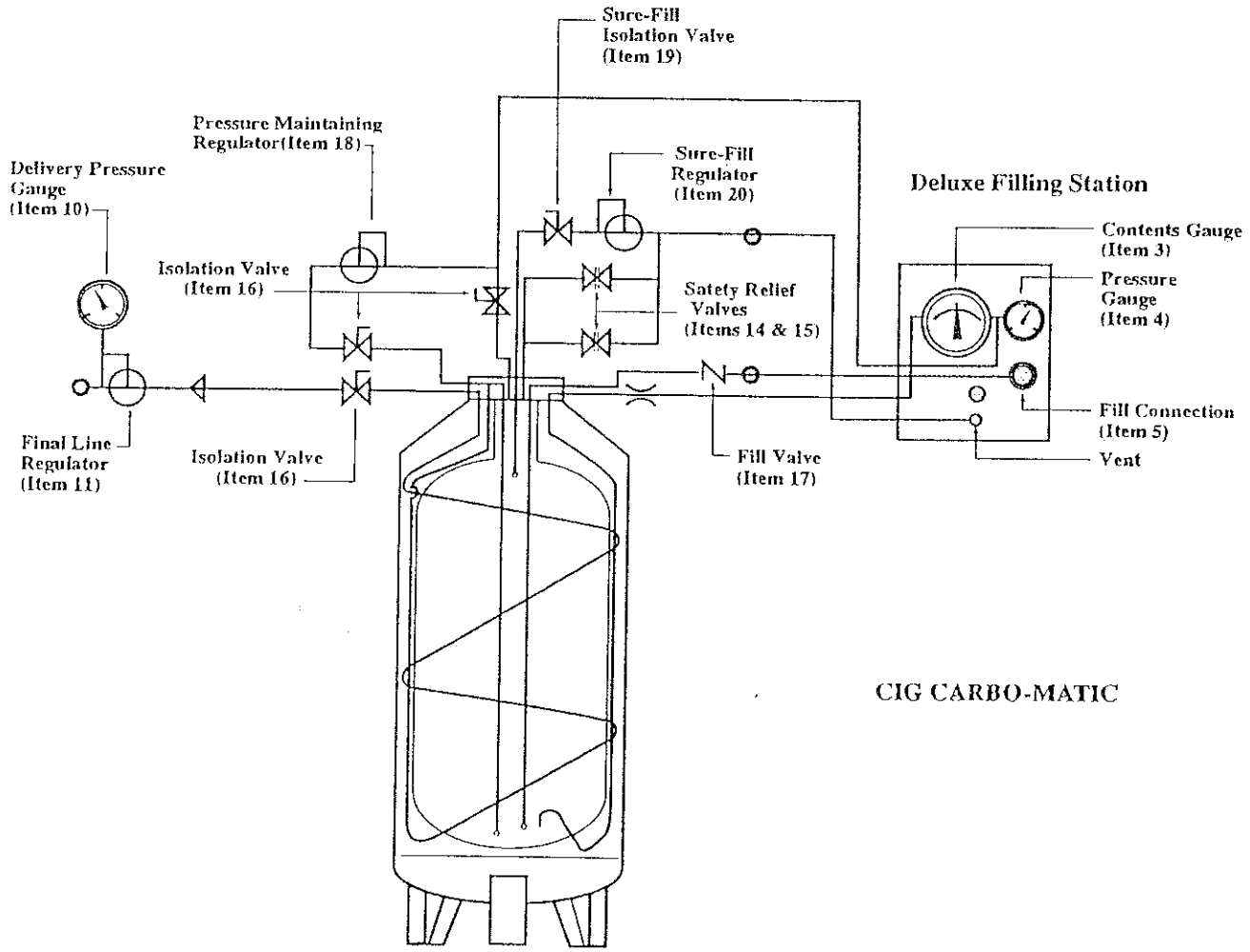
The Carbo-Matic system is designed to be automatic and only requires the adjustment of the final line regulator (Item 11).

Service or maintenance work should only be performed by MVE/CSI Authorized Agents. Contact MVE/CSI for the Agent in your area.

Use only MVE/CSI replacement parts.

Contact MVE/CSI:
8011 34th Avenue South, Suite 100
Bloomington, MN 55425-1636
Technical Service Department
612-853-9600
(612) 853-9661

SYSTEM SCHEMATIC



CIG CARBO-MATIC

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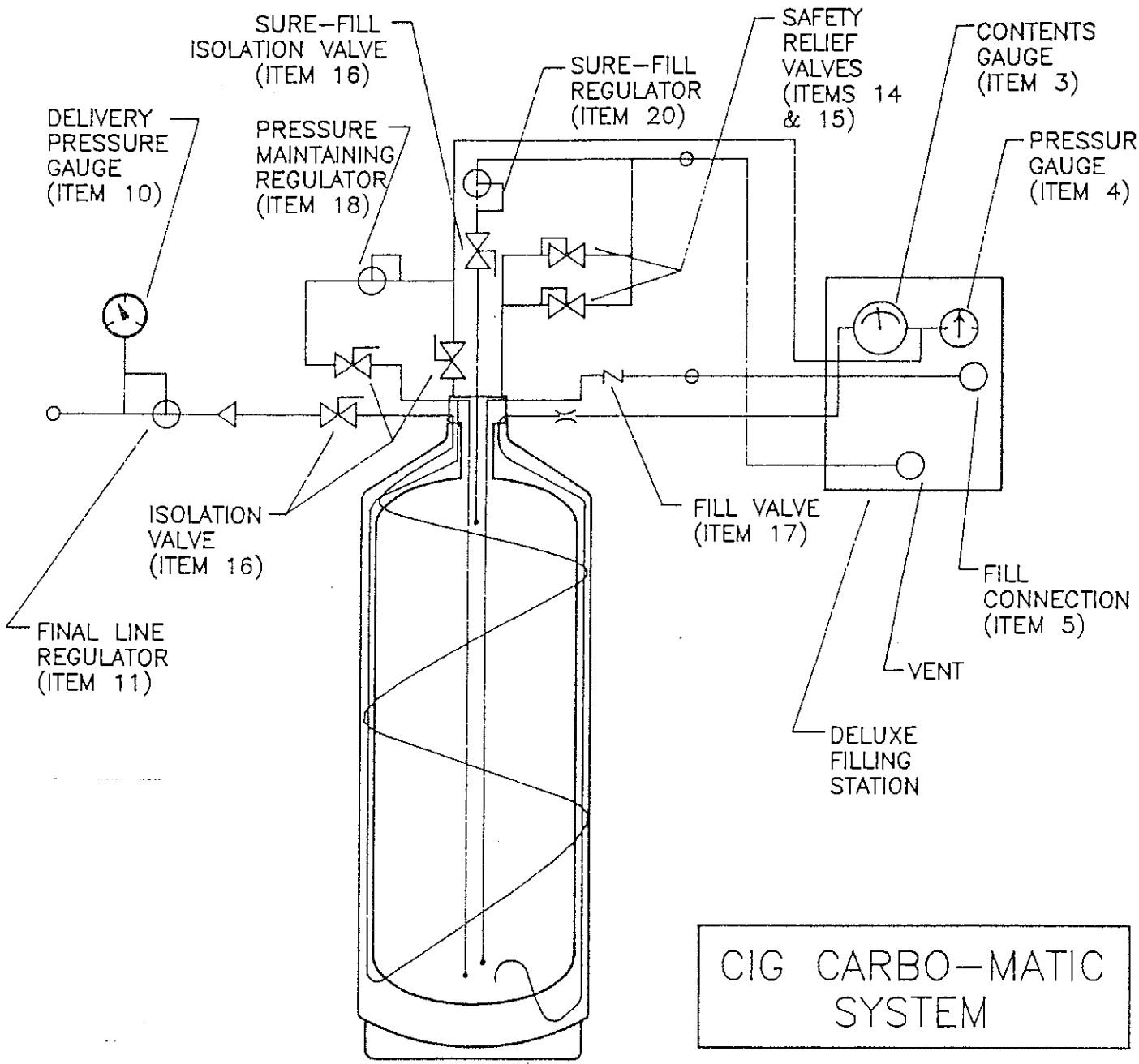

CIG CARBO–MATIC SYSTEM

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