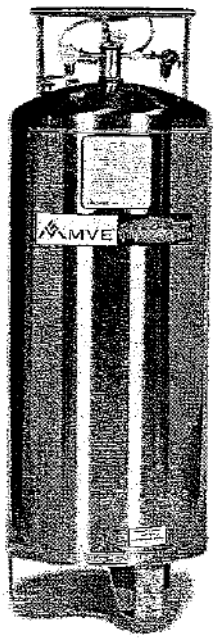
User's Manual



MVE Carbo-Mizer 400™

with Sure-Fill™ and Dual Relief

CHART™

Table of Contents

IMPORTANT SAFETY PRECAUTIONS

All persons responsible for the use and monitoring of this equipment must read and understand the safety and operating information contained in this manual.

WARNINGS

This tank holds and dispenses carbon dioxide (CO_2) gas under pressure. Avoid breathing CO_2 or direct contact with CO_2 in any form; gas, liquid or solid. CO_2 gas displaces oxygen and will not support life.

CO_2 is a colorless tasteless gas with only a slight pungent odor and is, therefore, very difficult to detect without special equipment.

Exposure to CO_2 concentrations higher than 5% can cause unpleasant physical effects including unconsciousness, or death in less than 15 minutes. Even low concentrations of CO_2 can cause:

- Disorientation
- Increased respiration or heart rate
- Shortness of breath or rapid suffocation.

CO_2 is heavier than air and will collect in low areas such as basements, stairwells, and confined spaces. If CO_2 leaks or if high concentrations of CO_2 are suspected in those areas use caution and avoid entering them until they are thoroughly ventilated.

Whenever the tank is inside a building the tank's safety relief circut must be connected to an outdoor vent. The fill box and/or vent must never be located in or above any below-ground spaces or stairwells that might be used by humans. The tank must not block emergency exits, aisles, fire suppression equipment or utility boxes or accesses. lines or hoses must be located away from traffic areas and heat sources and must be protected from potential causes of damage. All connections, lines, and components must be leak-free.

Installation and service of this equipment should be performed only by professional personnal who are qualified to work with CO_2 and the mini-bulk liquid CO_2 pressure vessels, and who are familiar with all pertinent safety procedures.

FIRST AID AND EMERGENCY ACTION

If inhaled:

- Move to fresh air immediately
- If not breathing, give artificial respiration
- If breathing is difficult, give oxygen
- Get immediate medical attention

In case of frostbite:

- End exposure at once
- Do not rub or pour water on area
- Get immediate medical attention

Rescue

- Do not attempt a rescue in areas of high CO_2 concentrations without proper life-support or rescue equipment. Do not become the next victim.
- Thoroughly ventilate areas of possible CO_2 concentration before entering.

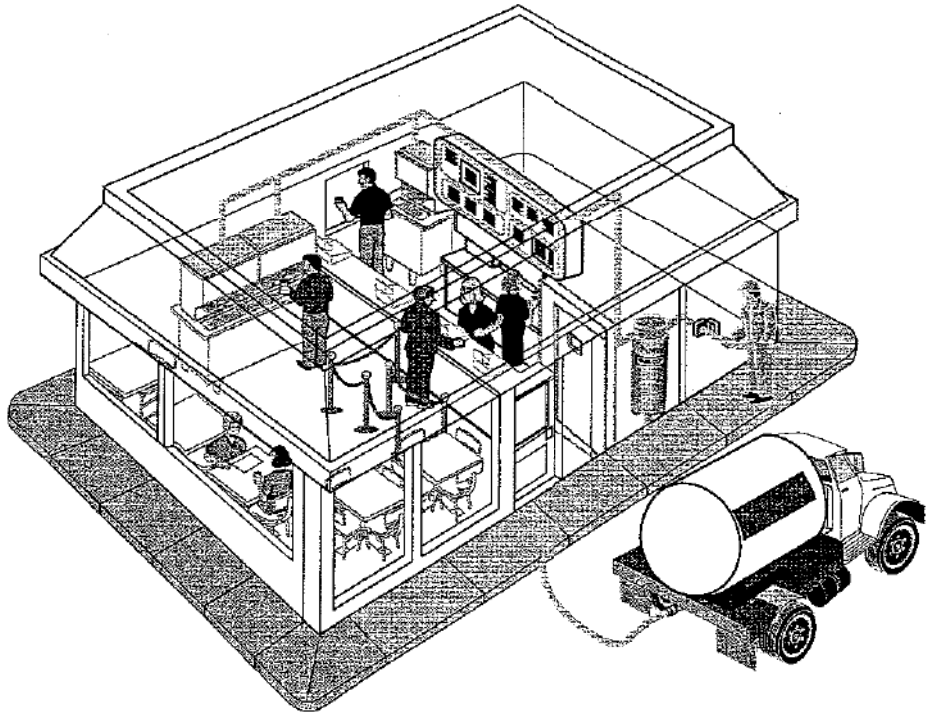
Spills or Leaks

- Immediately evacuate all personnel from affected areas.
- Thoroughly ventilate the area of the spill or leak before entering.

FOR MORE INFORMATION, CONTACT

- Local CO_2 supplier or
- Compressed Gas Association
  725 Jefferson Davis Highway, Suite 1004
  Arlington, VA 22202-4100 USA
  Telephone: (703) 412-0900
  FAX: (703) 412-0128

II General Description



System Overview

The Carbo-Mizer 400 bulk carbon dioxide(CO_2) system is designed for low pressure storage and supply of carbon dioxide gas for carbonation or other purpose. The typical Carbo-Mizer system consists of three primary components; the CO_2 storage tank, the CO_2 fill box, and the fill and vent hoses.

Stationary Versus Portable Installations

The Carbo-Mizer can be operated as a stationary or portable system. The most common system is stationary which employs a permanently installed tank, an outdoor-mounted CO_2 fill box, and the fill and vent hoses. The fill hose and the vent line join the tank to the outdoor fill box.

The CO_2 fill box allows the tank to be filled from outside the building. The delivery process only takes about 5-10 minutes and does not interrupt the restaurant's operations.

If a fill box cannot be installed on the outside of the building or the distance between the fill box and the tank is too long, then the portable tank model might be an alternative. The portable tank includes a 3-wheeled cart and special plumbing components, including: quick disconnect couplings and a tank-mounted fill fitting, to allow the tank to be temporarily disconnected from the gas supply and vent circuits and moved outdoors for refilling. Before electing to use a portable system, consult with MVE for operational limits and considerations.

Storage Tank

The Carbo-Mizer 400 tank is a stainless steel low-pressure tank that holds approximately 400 pounds (181 kg) of CO_2. The tank consists of an inner and an outer vessel, much like a Thermos™ bottle. The space between the two vessels contains a special insulation created mainly by a nearly perfect vacuum. The insulation minimize the entry of unwanted heat into the liquid CO_2 stored inside the tank. When carbon dioxide gas is needed, it is withdrawn from the top of the tank and dispensed to the beverage or other system.

Tank Plumbing

The plumbing components on the tank perform five functions:

- Liquid CO_2 Filling
- Gas Supply
- Pressure Control
- Safety Vent or Pressure Relief
- Pressure and Contents Measurement

The CO_2 fill circuit allows liquid CO_2 to be transferred into the tank. This Carbo-Mizer 400 is equipped with a patented Sure-Fill assembly to increase CO_2 delivery convenience. The pressure control circuit maintains the minimum needed internal tank pressure to supply the CO_2. The gas supply circuit dispenses CO_2 gas to the beverage or other use-point system. The vent/relief circuit allows excess pressure to safely exit the tank and the building. Finally, the contents and pressure gauges indicate the status of the CO_2 inside the tank.

Fill Circuit

The stationary fill circut consists of a fill box with a brass fill fitting, a fill hose, a check valve on the tank, and Chart's patented Sure-Fill assembly. Liquid CO_2 is transferred into the tank throught the brass fill box fitting and the fill hose. The check valve on the tank stops the reverse flow of gas to the fill box. An optional portable tank fill circuit consists of a brass fill fitting mounted on the top of the tank and secured with a bracket.

Chart's Sure-Fill assembly allows fast trouble-free filling without manually venting excess pressure that might develop during a CO_2 delivery. The Sure-Fill automatically maintains the optimal internal tank pressure during filling by venting excess pressure outdoors through the safety vent line and fill box. The Sure-Fill also automatically stops the liquid CO_2 fill process when the tank is full.

Pressure Control Circuit

The pressure control circuit (also called the "pressure building" or "PB" circuit) maintains the internal operating pressure of the tank. Adequate pressure is needed to supply CO_2 gas and to prevent the carbon dioxide from changing to "dry ice", the solid form of CO_2.

II General Description

Pressure Control Circuit (continued)

The pressure building circuit operates by allowing liquid CO_2 to flow through an ambient vaporizer or heat exchange coil located near the bottom of the tank when the inner tank pressure goes below a set pressure. The CO_2 gas produced by the vaporizer returns to the tank and rebuilds the internal tank pressure.

The process of pressure building is controlled by a regulator that senses the internal tank pressure. When tank pressure drops below the set point of the regulator (factory set at 125 psi), the regulator opens, liquid CO_2 flows through the vaporizer, and the tank pressure rises. When the internal pressure reaches the regulator's set point the regulator closes and the flow of liquid CO_2 stops.

During pressure building the cold liquid carbon dioxide flowing through the vaporizer produces a frost or condensation ring around the bottom of the tank as the CO_2 cools the outside of the tank. When CO_2 is being used the frost ring is normal. However, when the CO_2 has not been used, such as in the morning before store operations have begun, frost on the bottom of the tank may indicate a CO_2 leak in a line or the beverage or other use-point system.

Gas Use / Supply Circuit

Carbon dioxide gas is supplied to the use-point through the gas use circuit.
In a Carbo-Mizer, CO_2 gas is withdrawn from the gas space above the liquid CO_2 stored in the tank. When demanded at the use-point, CO_2 gas passes through the shut-off valve and into the final line regulator.

The final line regulator controls the gas delivery pressure to the beverage or other use-point. The factory pressure setting on the Carbo-Mizer s final line regulator is 90 psi, but the pressure may be adjusted depending upon the application. For regular soft drinks the regulator is commonly set between 90 psi and 115 psi.

Additional pressure regulators may be added downstream for other applications such as bag-in-the-box, beer or diet systems. Consult with the use-point equipment manufacturer for the correct pressure regulator and pressure setting(s).

Safety Vent Circuit

The inner pressure vessel of the Carbo-Mizer tank is designed to meet or exceed the ASME Section VIII, Division 1 pressure vessel code. The ASME code dictates that the tank be protected against excess pressure by a safety relief valve.

This vessel uses two vent relief circuits each comprised of a primary 300 psi relief valve and a secondary 450 psi relief valve. One of the relief circuits is always enabled depending on the position of a switch-over valve that can be switched between relief circuits to isolate relief valves and allow occasional relief valve testing or maintenance. The relief valves must always be vented outdoors through either the fill box or a vent tube to prevent potential concentration of CO_2 within the building. The primary relief valve may occasionally open during CO_2 deliveries or or when CO_2 is not being used regularly.

Pressure And Contents Gauges

The tank pressure gauge measures the internal tank pressure in the top space of the tank. The pressure in the tank will range between 115 psi and 300 psi.

Pressure And Contents Gauges (continued)

The contents or liquid level gauge is a float-type indicator. It displays the approximate amount of CO_2 in the tank by measuring the liquid CO_2 level in the tank. As the level of liquid CO_2 changes in the tank, the movement of a magnetic "float" rod causes the needle on the contents gauge to move, indicating the approximate CO_2 contents.

NOTE: Because float-type indicators cannot actually float on the surface of liquefied CO_2, they can only give an approximate indication of the CO_2 level and are not highly accurate.

CO_2 Fill Box

The stainless steel CO_2 fill box is the second major component in a typical stationary Carbo-Mizer system. The purpose of the CO_2 fill box is to provide an accessible filling point for the tank and to vent excess pressure from the tank out of the building. The fill box has a brass fill fitting, a connection for the safety relief valve / vent circuit, and a lockable door.

Two standard types of fill boxes are available; a surface-mounted model or a flush-mounted model. Fill boxes must be mounted outside the building, be easily accessible to the CO_2 supplier for refilling the Carbo-Mizer, and allow for the safe venting of any excess CO_2 gas outdoors. When the Carbo-Mizer is used as a portable system the fill box is replaced by a tank-mounted brass fill fitting and an alternative safety vent line leading outdoors.

NOTE: All tanks, whether stationary or portable, must be vented outdoors so that CO_2 can be safely dispersed outside the building.

Fill Hose And Vent Line

The last major components in a stationary system are the fill hose and vent line. These two lines join the Carbo-Mizer tank with the outdoor fill box. The fill hose is a special pressure rated line which connects the brass fill fitting in the fill box to the fill circuit on the tank. The vent line is as important as any component in the system. It connects the safety relief valves on the tank to either the outdoor fill box or to an alternative outdoor vent tube.

NOTE: Whether used as a stationary or portable tank, the Carbo-Mizer must always be connected to an outdoor vent line when the tank contains CO_2 and is indoors.

The Bulk CO_2 Supplier

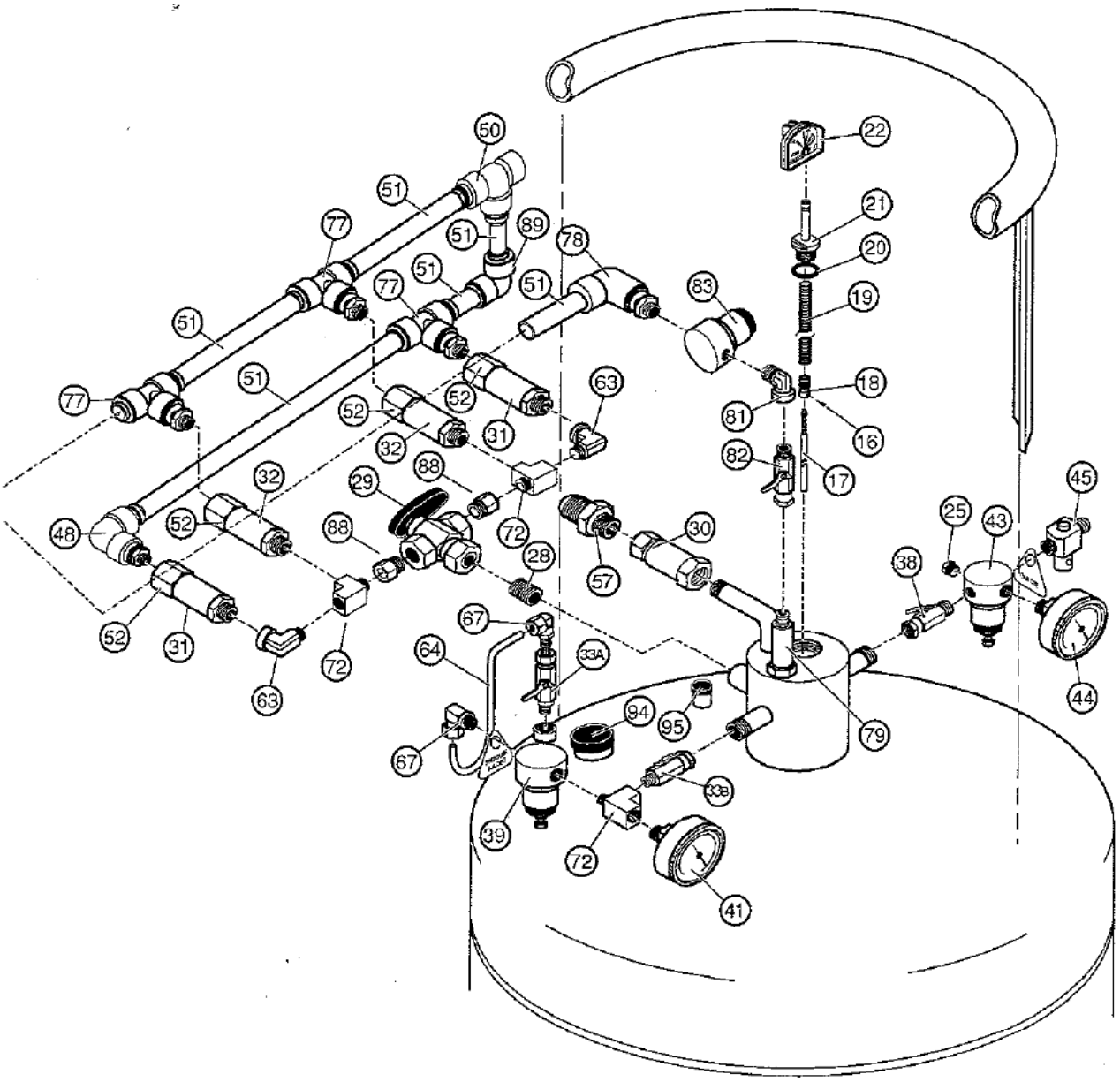
The bulk CO_2 supplier is and important part of your system. Most CO_2 suppliers not only provide timely CO_2 delivery, but also install and service your Carbo-Mizer system.

For service, parts, information, and emergency CO_2 delivery or other CO_2 related assistance, contact the local MVE authorized CO_2 supplier.

A place has been saved on page 18 of this manual to record the name and phone number of your CO_2 supplier, as well as other important serivce contacts.

III Parts Identification

Carbo-Mizer 400 Storage Tank with Sure-Fill™ and Dual vent options Part No. 11553778



Carbo-Mizer 400 with Sure-Fill™
and Dual Relief

Carbo-Mizer 400 Sure-Fill

Parts Identification

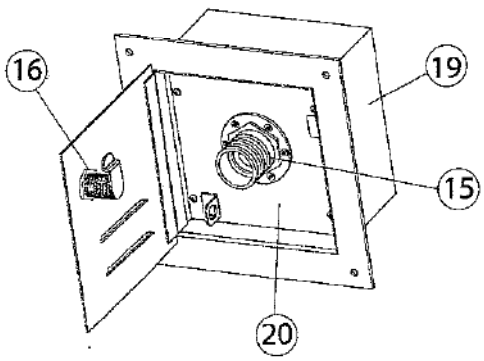
Carbo-Mizer 400™ Storage Tank with Sure-Fill™ and Dual Relief **Part No. 11553778**

ITEM	PART NO.	DESCRIPTION	QTY	FUNCTION
16	2952321	Set screw, spring retainer	1	Holds spring retainer in position on float rod
17	9094119	Float Rod (42½") with Magnet	1	Floats in liquid CO_2 to measure tank contents
18	5411622	Spring Retainer	1	Secures spring to float rod for adjustment
19	5411029	Extension Spring	1	Provides tension on float rod
20	2300244	O-Ring, Liquid Level Gauge	1	Seals brass plug to tank
21	5411612	Plug, Brass, Liquid Level Gauge (3/4"-16)	1	Secures float rod assembly to tank
16, 17, 18, 19, 21	10601088	Liquid Level Float Assembly	1	Measures liquid CO_2 level in tank
22	10591422	Liquid Level / Contents Gauge (Roto-Cal)	1	Indicates approximate liquid CO_2 contents
25	1212962	Brass Plug (1/8" MPT)	1	Seals unused port on regulator
28	1310102	Hex Nipple (½" MPT)	1	Connects mod. 3-way valve to tank knuckle
29	10924039	Ball Valve, 3-way (modified)	1	Switches between relief valve circuits
30	1717872	Check Valve (3/8" FPT)	1	Isolates CO_2 fill hose from tank
31	1812062	Relief Valve, 450 psig (¼" MPT)	2	Secondary inner vessel safety relief valve
32	11547714	Relief Valve, 300 psig (¼" MPT)	2	Primary inner vessel safety relief valve
33A	1716162	Ball Valve (¼" MPT X ¼" FPT)	1	Isolates "liquid side" of PB regulator
33B	1716162	Ball Valve (¼" MPT X ¼" FPT)	1	Isolates "gas side" of PB regulator
38	1716162	Ball Valve (¼" MPT X ¼" FPT)	1	On / off control for gas supply
39	2112222	Regulator, Pressure Building 125 psi (¼" FPT)	1	Controls PB circuit to regulate tank pressure
41	2015179	Pressure Gauge, 0-400 psi (¼" MPT CBM)	1	Displays internal tank pressure
43	2111682	Regulator, Final Line, 90 psi (¼" FPT)	1	Controls CO_2 gas pressure to use point
44	2013262	Pressure Gauge, 0-160 psi (1/8" MPT CBM)	1	Displays CO_2 gas pressure to use point
45	1811502	Relief Valve, 130 psi (¼" MPT X ¼" MPT 45^0 Flare)	1	Protects gas supply line and use point equipment from excess pressure
48	10486454	Elbow, Swivel (1/2" ODT X 3/8" MPT)	1	Joins 450 psig relief valve to vent circuit
50	11553971	Tee Union, Nylon (½" ODT)	1	Joins vent circuits with vent line
51	2811726	Tube, White Nylon (½" ODT)	3 ft.	Joins vent circuit components
52	1611592	Adapter, Pipe-Away (3/8" FPT)	4	Joins relief valves with vent circuit
57	1110112	Connector (5/8" ODT X 3/8" MPT 45^0 Flare)	1	Connects CO_2 fill hose to tank
63	1210462	Street Elbow, 90^0 (¼" MPT)	2	Joins tank vent with 450 psig relief valves
64	5503831	Tubing, SS (5/16" OD)	1	Joins PB isolation valve with regulator
67	11553786	Elbow, Brass, 90^0 (5/16" ODT X ¼" MPT)	2	Joins 5/16" SS tubing with PB components
72	1211702	Street Tee (¼" MPT X ¼" FPT X ¼" FPT)	3	Joins plumbing circuit components
77	10643077	Tee, Nylon (½" ODT X 3/8" MPT X ½" ODT)	3	Joins relief valve with vent circuit
78	10562517	Elbow, Swivel (½" ODT X ¼" MPT)	1	Joins Sure-Fill assembly with vent circuit
79	10601045	Sure-Fill™ Assembly (¾"-16)	1	Controls CO_2 filling and pressure venting
81	1210462	Elbow, Brass, 90^0 (¼" MPT X ¼" FPT)	1	Connects Sure-Fill regulator to isolation valve
82	1716162	Isolation Valve (¼" MPT X ¼" FPT)	1	Opens / closes Sure-Fill circuit
83	1812279	Regulator, Sure-Fill, 200 psi (¼" FPT)	1	Vents excess pressure during CO_2 filling
88	1210032	Hex Bushing (½" MPT X ¼ FPT)	2	Joins 3-way valve with street tee's on vent circuit
89	11554009	Elbow Union, Nylon (½" ODT)	1	Joins vent circuits
94	3911217	Cap (Black), Vacuum Pump-Out Port	1	Covers access to vacuum space **(DO NOT REMOVE PLUG!)**
95	3911016	Cap (Blue), Vacuum Regeneration Port	1	Covers access to vacuum regeneration system
	3811619	Label, Triangle, Pressure Builder	1	Identifies pressure building circuit
	3811599	Label, Triangle, Gas Use	1	Identifies gas use line
	3817149	Label, Carbo-Mizer	1	Denotes tank model
	3836609	Label, Operations	1	Describes tank safety and operations

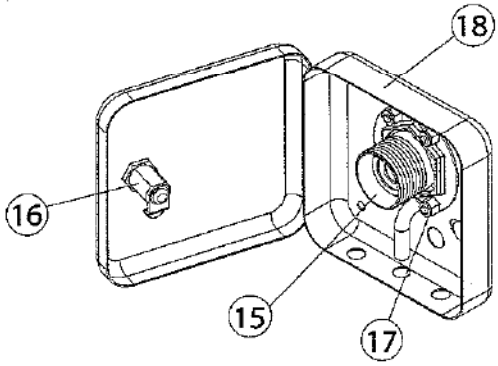
III Parts Identification

Stationary Installation Components

Flush-Mount Fill Box
Part No. 9723139



Surface-Mount Fill Box
Part No. 9722279



ITEM	PART NO.	DESCRIPTION	QTY.	FUNCTION
15	11381021	CO_2 Fill Fitting, Brass	1	Connection for CO_2 delivery tank hose
16	4310689	Lock Assembly	1	Locks fill box
17	2914071	Locknut SS °-20 W/NYL Insert	4	Attach fill fitting to fill box studs
18	11386771	Surface-Mount CO_2 Fill Box (without fittings)	1	Allows outdoor filling and venting of tank
19	9111289	Flush-Mount CO_2 Fill Box	1	Allows outdoor filling and venting of tank
20	10503517	Flush-Mount Fill Box Plate	1	Holds brass fill fitting
	10802912	CO_2 Fill Hose Only, 5 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	10802921	CO_2 Fill Hose Only, 10 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	10802947	CO_2 Fill Hose Only, 15 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	10802939	CO_2 Fill Hose Only, 25 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	10973341	CO_2 Fill Hose Only, 30 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	10973359	CO_2 Fill Hose Only, 50 ft. (2000 psi & FDA)		Transfers liquid CO_2 from fill box into tank
	2811726	Vent Hose Only (lengths match fill hose)		Vents excess tank pressure outdoors

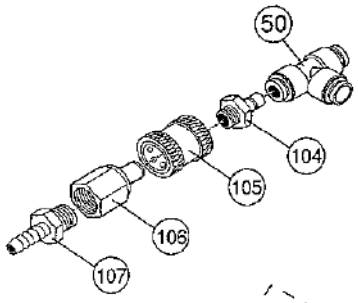
Fill and Vent Hose Kits

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
10973252	5 ft. Fill & Vent Hose	10973332	25 ft. Fill & Vent Hose
10973308	10 ft. Fill & Vent Hose	10973341	30 ft. Fill & Vent Hose
10973324	15 ft. Fill & Vent hose	10973359	50 ft. Fill & Vent Hose

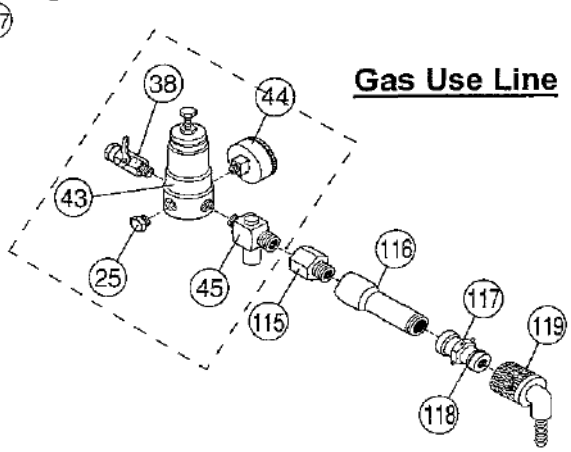
Parts Identification III

Portable Installation Kit Components — Part No. 10818261

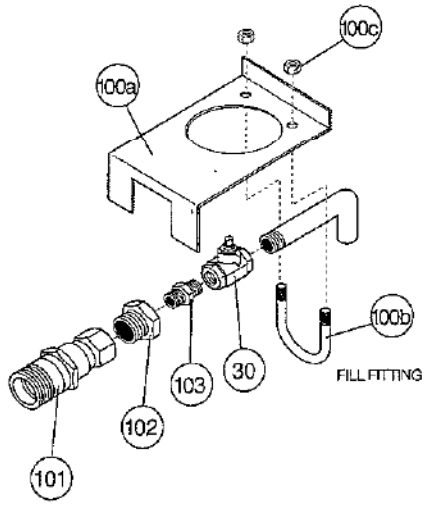
Vent Line



Gas Use Line



Fill Fitting



ITEM	PART NO.	DESCRIPTION	QTY.	FUNCTION
25	1212962	Plug 1/8" NPT	1	Seals unused gauge port
30	1717872	Check Valve (3/8" NPT) [With Sure-Fill]	1	Isolates liquid CO_2 fill hose from tank
30 Alt.	10804547	Ball Valve (3/8" NPT) [Without Sure-Fill]	1	Emergency shut-off for CO_2 fill hose / circuit
50	10486462	Tee, Nylon ½" OD	1	Vent hose connection tee
100A	10724192	CO_2 Fill Fitting Support Bracket	1	Secures CO_2 fill fitting to tank
100B	10644601	U-Bolt	1	Secures fill fitting bracket
100C	2914071	Locking Nut	1	Secures u-bolt to fill fitting bracket
101	10662041	CO_2 Fill Fitting, Brass (¾" thread)	1	Connects CO_2 transfer hose to tank CO_2 fill line
102	1212062	Hex Bushing (3/8" FPT x ¾" MPT)	1	Joins fill fitting to tank
103	1310072	Hex Nipple (3/8" NPT x 1-¼" long)	1	Joins fill fitting to tank
104	10811528	Plastic Connector (3/8" NPT x ½" OD))	1	Secures quick connector to vent line
105	10811552	Quick Connector, Ball-Lock, Female (3/8" FPT x 3/8" Coupler)	1	Allows quick connection & release of vent hose
106	10811544	Quick Connector, Ball-Lock, Male (3/8" FPT x 3/8" Nipple)	1	Allows quick connection & release of vent hose
107	10811536	Hose Barb (3/8" OD x 3/8" MPT)	1	Joins quick connector to vent line
115	10808038	Connector, Brass, 45° (¼" MPT, ¼" ODT)	1	Connects relief valve to gas use line
116	10847854	Tank Boss Adapter (¼" FPT)	1	Connects 2-pin connector to gas use line
117	6511631	Two-Pin Quick Connect, Male	1	Allows connection & release of CO_2 supply line
118	4710619	O-ring (½" OD)	1	Seals 2-pin connectors when joined together
119	6511706	Two-Pin Quick Connect, Female (¼" Barb)	1	Allows connection & release of CO_2 supply line
	9711449 (Not Shown)	Portable Handling Cart with Towing Handle (20" OD tanks only)	1	Allows movement of portable tanks over smooth level surfaces

IV Specifications

Carbo-Mizer 400

Dimensions		
Diameter	20 in.	(508 mm)
Height (Standard Stationary Model)	66 in.	(1677 mm)
Empty Weight	305 lb.	(138 kg)
Full Weight	705 lb.	(320 kg)
Gross Capacity	46 gal.	(175 liters)
Storage Capacity	400 lb.	(181 kg)
Gas Use Regulator Connection	¼" 45° Flare Fitting	
Fill Line Connection	5/8" Male 45° Flare Fitting	
Vent Line Connection	½" OD Tubing Compression	
Rates and Pressures		
Continuous CO_2 Delivery Rate	5.5 lb./hr.*	(2.5 kg/hr.)*
Peak Flow Rate	10.0 lb./hr.*	(4.5 kg/hr.)*
Evaporation Rate**	2.5 lb./day	(1.1 kg/day)
Max. Allowable Working Pressure (MAWP)	300 psig.	(20.7 bar g)
Primary Relief Valve Setting	300 psig.	(20.7 bar g)
Secondary Relief Valve Setting	450 psig.	(31.0 bar g)
Sure-Fill Regulator Setting	200 psig	(13.8 bar g)
Design Criteria		
Design Specifications	ASME Section VIII, Division 1	
Fill System	"Low-Loss" Single Line	
Patented Sure-Fill System	Recommended Option	
Patented Collection & Purge System	Recommended Option	
Insulation Type	Super Insulation with Vacuum	
Pressure Control System	Pressure Building (PB) Circuit	
Liquid Level Gauge	Float Type: Magnetic Roto-Cal	
Outer Vessel Material	Stainless Steel	
Inner Vessel Material	Stainless Steel	
Fill Fitting	¾" OD Threaded Brass Coupling	
Fill Box Design	Surface-Mount or Flush-Mount	
Floor Mount Design	Six Inch Permanent Legs	

Footnotes:
* Equals approximately 350 - 16 oz. drinks per hour continuous and 640 - 16 oz. drinks per hour peak
** No CO_2 loss in normal applications

Operation and Troubleshooting V

Ten (10) Facts You Need To Know

1. The tank's normal internal operating pressure (Item 41) is between 110 psi and 150 psi.
2. The tank pressure can be as high as 300 psi after a delivery, but returns to its normal operating pressure after several days of normal CO_2 use.
3. The gas supply pressure (Item 44) is normally between 90 psi and 120 psi.
4. Frost or condensation on the tank is normal during periods of CO_2 use.
5. Frost or condensation on the tank before starting the daily use of CO_2 is a sign of a CO_2 leak. Have the leak fixed.
6. A full tank holds 400 pounds of CO_2. Typical Carbo-Mizer users use 40 - 100 pounds of CO_2 per week.
7. The contents gauge (Item 22) displays the approximate amount of liquid CO_2 in the tank.
8. Never allow the internal tank pressure (Item 41) to drop below 61 psi. CO_2 turns to dry ice below 61 psi. Stop using CO_2 from the Carbo-Mizer if the pressure reaches 70 psi or less.
9. Isolation or shut-off valves are open when the valve handle is parallel to the valve body and the line. Valves are closed when the handle is perpendicular to the valve body and the line.
10. Check the tank every day before starting operations and CO_2 use. Check for:
    - CO_2 leaks (See **"Safety"**.)
    - Pressure readings (Items 41 and 44)
    - CO_2 contents (Item 22)
    - Abnormal frost or condensation
    - Anything unusual.

General Operating Instructions

- Always use caution around CO_2. Read and understand the **"Safety"** section of this manual.
- The Carbo-Mizer system does not require adjustment under normal operating conditions.
- Check the tank daily before using CO_2. See need-to-know fact number 10.
- In an emergency, the flow of CO_2 from or through the Carbo-Mizer can be stopped by closing the isolation or shut-off valves. Flow of CO_2 can be stopped by closing the following valves:
    - Item 38 to stop the flow of gas from the tank to the beverage or other use-point system.
    - Item 30 to stop the flow or leakage of CO_2 out of the tank via the fill hose and/or the brass fill fitting in the outdoor fill box.
    - Items 33a and/or 33b to stop the flow of CO_2 through the pressure control-pressure building (PB) circuit.
- For CO_2 equipment problems, call your CO_2 supplier or a CO_2 service specialist.
- Before calling for service or troubleshooting assistance, please have the following information at hand:
    - Serial number of the tank
    - Description of the problem
    - Readings from the contents gauge (Item 22), the tank pressure gauge (Item 41) and the final line pressure gauge (Item 44).
    - Any special observations (for example: unusual frosting, events related to the problem, etc.)

V Operation and Troubleshooting

TROUBLESHOOTING GUIDE - TANK

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
No CO_2 to carbonator or other use-point system. OR Carbonated drinks are flat.	Bulk CO_2 tank empty.	1. Switch to emergency CO_2 gas cylinder. 2. Call CO_2 supplier for delivery.
	Isolation valve (#38) to final line regulator is closed.	1. Open valve or valves as needed.
	Tank pressure (#41) is low (110 psi or less).	1. Switch to emergency CO_2 gas cylinder 2. Stop CO_2 withdrawal from bulk CO_2 tank. Close isolation valve (#38). 3. If tank pressure fails to rebuild, see section on low tank pressure.
	Pressure building regulator (#39) not operating properly.	1. Check isolation valves (#33a & b) to insure they are open. Valve handles should be parallel with the line. 2. Regulator is set too low, plugged, or faulty. Call CO_2 service agent
	Unknown	1. Call CO_2 service agent.
Frost on the bottom or sides of the tank.	A normal condition during or following CO_2 use.	NONE
	Leak in gas supply lines, beverage system and/or CO_2 fill box. (Frost is present on tank after extended periods with no CO_2 use.)	1. See "**Safety**". Evacuate & ventilate. Check for frost in the morning before CO_2 has been used. If possible, locate and correct leak. 2. Call appropriate equipment service agent.
Frost on the top of the tank.	Normal condition during periods of CO_2 use.	NONE
	CO_2 leak from tank plumbing, CO_2 fill box, tank safety system and/or beverage system. (Frost is present after extended periods with no intentional CO_2 use.)	1. See "**Safety**". Evacuate & ventilate the room. 2. Check for frost in the morning prior to any CO_2 use & other indicators, such as: high CO_2 usage, frost on sides of the tank, low tank pressure, etc. Locate & correct leak if possible. 3. Call appropriate service agent.
Routinely low tank pressure. (#41 below 125 psi)	Pressure building regulator (#39) set too low.	1. Call CO_2 service agent for service.
	PB shut-off valve (#33a & b) closed.	1. Open valve by turning handle parallel to line.
	CO_2 leak from tank plumbing, CO_2 fill box and/or tank safety system	1. See "**Safety**". Evacuate & ventilate the room. 2. Call CO_2 service agent.
	PB plugged or Unknown	1. Call CO_2 service agent.

TROUBLESHOOTING GUIDE - TANK

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Routinely high tank pressure. (#41 over 200 psi)	Normal condition for several days following a CO_2 delivery.	NONE
	Normal when little or no CO_2 is used.	NONE
	Pressure builder regulator (#39) set too high.	1. Call CO_2 service agent.
	Tank has a weak vacuum.	1. Call CO_2 service agent.
High CO_2 usage.	Increased beverage sales or CO_2 use.	NONE
	Tank pressure (#41) routinely too high.	1. See section on tank pressure too high.
	CO_2 leak from tank plumbing, CO_2 fill box, gas lines, and/or beverage or other use-point equipment.	1. See "**Safety**". Evacuate & ventilate room. 2. Locate leak & correct if possible 3. Call appropriate CO_2 or service agent.
	Error in CO_2 delivery or supplier invoice.	1. Check CO_2 usage history / pattern against supplier invoices. Consult CO2 supplier.
CO_2 tank will not fill.	CO_2 tank is already full.	NONE
	CO_2 fill or check valve (#30) is faulty.	1. Consult CO_2 supplier or service agent.
	Brass fill fitting in CO_2 fill box and/or on truck's delivery hose is faulty.	1. Consult with CO_2 supplier or service agent. 2. Have brass fill fitting(s) replaced, if needed.
	Pressure differential between store tank and delivery tank is too small. (At start of fill, store tank pressure should be 110 psi - 150 psi and delivery tank should be 275 psi - 300 psi).	1. Verify delivery tank pressure is at least 275 psi and store tank pressure (#41) is between 110 psi - 150 psi. 3. Vent store tank to lower pressure if needed. 4. NEVER vent store tank pressure to lower than 125 psi.
	Sure Fill™ assembly is not venting excess gas. Tank pressure did not return to normal operating pressure..	1. Tank pressure must return to below 200 psi between filling times allowing the internal ball to fall into the open position. 2. Consult CO_2 supplier.
	Leak in Sure Fill™ assembly	1. Correct leak. Leak check. 2. Contact CO_2 supplier.
	Delivery tank is empty.	1. Consult supplier. Arrange another delivery.
	Delivery tank empty or truck delivery hose is obstructed, e.g. vehicle stopped on hose or hose is bent.	1. Ask driver to make another delivery or clear obstruction or wait until obstruction clears.

V Operation and Troubleshooting

TROUBLESHOOTING GUIDE - TANK

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Hissing sounds or evidence of gas leaking.	Normal for short periods of time from some regulators and relief valves.	1. See "**Safety**". Evacuate and ventilate room / area. 2. Observe leak, if it is not large and does not last long and occur frequently, no action may be needed. 3. If above combined conditions do not exist, call CO_2 service agent and see "**Safety**".
	Large leaks, leaks from elsewhere in the system, sustained leaks, or frequent leaks are **not** normal.	1. See "**Safety**". 2. Evacuate all personnel from affected areas. 3. Ventilate room / area. 4. Call CO_2 service agent.
Final line / gas use pressure gauge (#44) is below 90 psi.	Final line regulator (#43) intentionally set lower by beverage service agent.	NONE
	Final line regulator (#43) not operating in proper pressure range.	1. Call CO_2 service agent.
	Final line pressure gauge (#44) damaged or faulty.	1. Call CO_2 service agent.
	One or more of the causes listed in "no CO_2" or "flat drinks" problem section.	1. See problem sections above regarding "no CO_2", "flat drinks", etc. 2. Call CO_2 service agent.

For CO_2 equipment problems, call your CO_2 supplier or an authorized CO_2 service specialist.

TROUBLESHOOTING GUIDE - FILL BOX

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Fill box door will not close, lock, or open.	Wrong key.	1. Verify correct key and retry. 2. Contact CO_2 supplier for spare key. 3. Order new key from MVE.
	Lock dirty or damaged.	1. Clean and oil lock 2. Replace lock, if necessary
Brass fill fitting in fill box leaking or hissing.	Particle of ice or debris caught in fill fitting poppet.	1. If driver is still on site, reconnect CO_2 delivery hose and then disconnect. 2. If driver not available, carefully press poppet with dull instrument to reseat poppet. 3. If leak continues after line warms up, close tank fill isolation valve (#30) and call service agent to replace fitting.
	Fitting is defective or sealing surface is worn due to normal wear and tear.	1. Close tank fill isolation valve (#30) and call service agent to replace fitting.
Brass fill fitting threads are worn or stripped.	Normal wear & tear. Fill fitting must be replaced.	1. Contact CO_2 service agent to replace fitting.
	Cross threading the coupler with the CO_2 delivery hose coupler	1. Contact CO_2 service agent to replace fitting.
CO_2 is venting from fill box.	Normal during a CO_2 delivery.	NONE
	Normal for short periods of time if tank pressure is at or over 300 psi	1. NONE if for short period(s) of time 2. If tank pressure consistently over 300 psi, see section on tank pressure too high.
	Fill fitting is not sealing properly.	1. Call CO_2 service agent to replace fitting.

For CO_2 equipment problems, call your CO_2 supplier or an authorized CO_2 service specialist.

VI Ordering Service And Parts

Service and Maintenance

1. Service or maintenance work on the Carbo-Mizer 400 should be performed only by CHART trained and authorized professional service agents who are familiar with CO_2, mini-bulk liquid CO_2 pressure vessels, and all pertinent safety and service procedures. CHART recommends the use of CHART approved replacement parts. Contact CHART for the name of the authorized service agent(s) in your area.
2. Before calling for service or troubleshooting assistance, please have the following information at hand:
   - Serial number of the tank
   - Description of the problem
   - Readings from
     - the contents gauge (Item 22),
     - the tank pressure gauge (Item 41) and
     - the final line pressure gauge (Item 44).
   - Any special observations (for example: unusual frosting, events related to the problem, etc.)
3. CHART recommends that a thorough preventative maintenance check be performed on the Carbo-Mizer system by a qualified professional service agent at least once every two years. The check should be done to insure safety and the optimal performance of the system.
4. The Carbo-Mizer has no user serviceable parts. All service work should be performed by an authorized professional service agent.
5. NOTE: Any attempt to service the equipment by an unauthorized person or to perform unauthorized modifications will void the warranty.

Ordering Parts Or Service

For parts or service contact your local authorized CHART CO_2 supplier or equipment service agent. To insure prompt processing of your order, list each item separately, taking care to specify the quantity, the part number, and the description of each item being ordered.

Important Telephone Numbers

Company	Contact Person	Phone Number
CO_2 Supplier	_____	_____
	After-Hours / Emergency Number	_____
CO_2 Service Agent	_____	_____
CO_2 Installer	_____	_____
CHART Customer Service	(952) 882-5000 or	(800) 247-4446 {toll free in US}
CHART Technical Service	(952) 882-5000 or	(800) 253-1769 {toll free in US}

WARRANTY VII

WARRANTY POLICY

CHART Ind. (CHART) warrants to the Purchaser the Carbo-Mizer 400 bulk CO_2 system equipment for 90 (ninety) days from the CHART invoice date, that said equipment shall be free from any defects in workmanship and materials. CHART also warrants the reliability of the vacuum in the Carbo-Mizer 400 tank for 5 (five) years from the date of the original CHART invoice.

Purchaser agrees that as a pre-condition to any CHART liability hereunder, Purchaser or its appointed agents shall fully inspect all goods immediately upon delivery and shall give CHART written notice of any claim or purported defect within ten (10) days after discovery of such defect.

As a further pre-condition to any CHART liability hereunder, both parts replacement and labor must be supplied by an approved CHART service company. CHART may elect to repair or replace such equipment or any defective component or part thereof which proves to be defective, or to refund the purchase price paid by the original Purchaser. CHART shall not be liable for defects caused by the effects of normal wear and tear, erosion, corrosion, fire, explosion, misuse, or unauthorized modification.

Alterations or repair by others than those designated and approved by CHART or operation of such equipment in a manner inconsistent with CHART accepted practices and all operating instructions, unless pre-authorized in writing by CHART, shall void this Warranty.

CHART's sole and exclusive liability under this Warranty is to the Purchaser and shall not exceed the lesser of the cost of repair, cost of replacement, or refund of the net purchase price paid by the original Purchaser.

CHART is not liable for any losses (including CO_2), damages, or costs of delays, including incidental or consequential damages. CHART specifically makes no warranties or guarantees, expressed or implied, including the warranties of merchantability or fitness for a particular purpose or use, other than those warranties expressed herein.

WARRANTY CLAIMS PROCEDURE

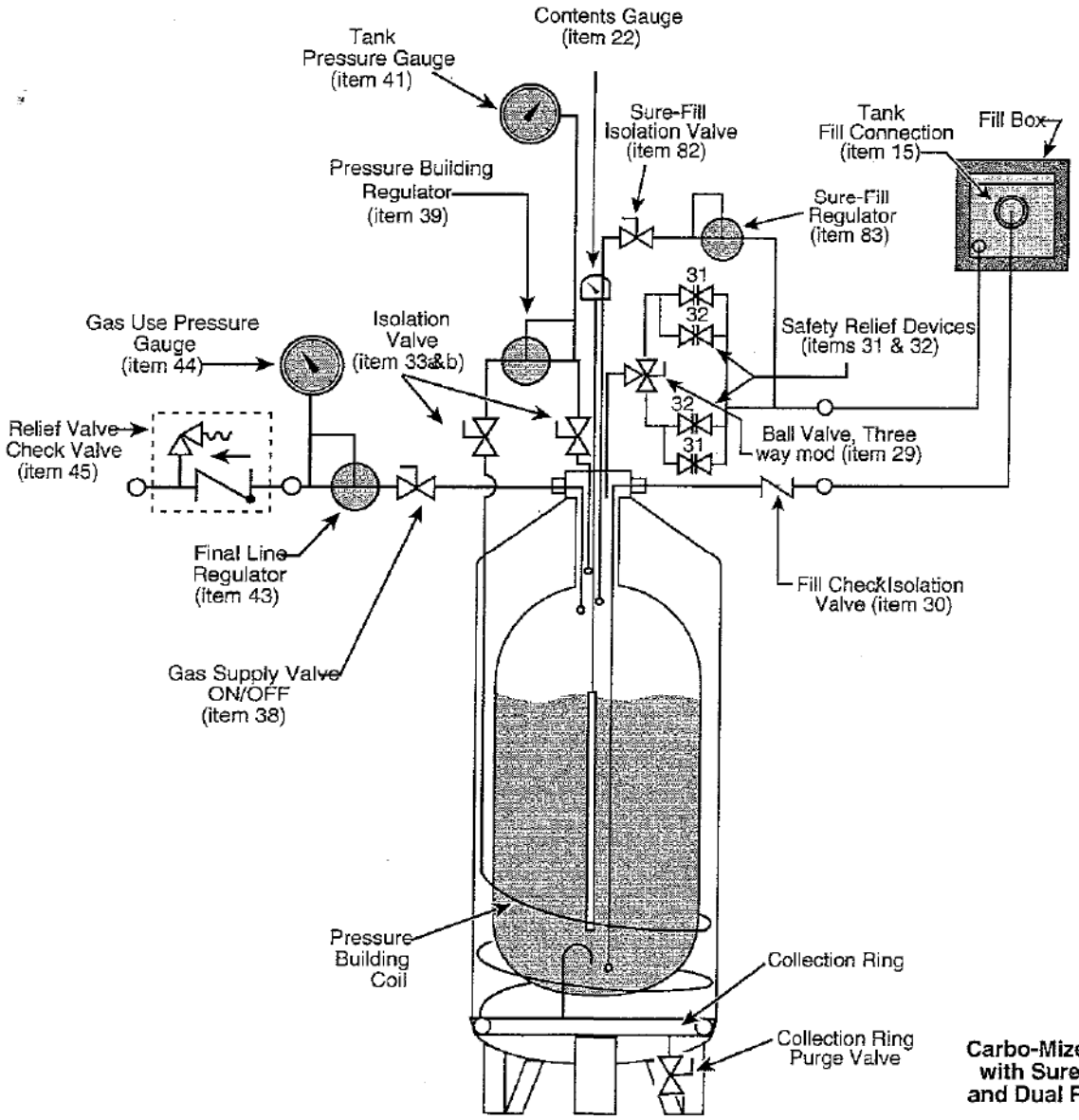
1. All warranty claims must be previously authorized by: CHART, Ind. Telephonic/ electronic approval may be obtained by contacting Restaurant Products Technical Services at:
   - Telephone: 952-882-5000
     800-253-1769
     (toll free in U.S.)
   - Facsimile: 952-882-5185

   or by writing to:

   CHART, Ind.
   Restaurant Technical Services
   3505 County Road 42 West
   Burnsville, MN 55306-3803
   USA

2. Authorization must be obtained from CHART prior to shipping any equipment to CHART facilities. The model and serial number of the tank must be provided in order to process the return. If approved, a Return Material Authorization (RMA) number will be provided. The RMA number must be prominently indicated on the packing slip and any packaging which accompanies the goods being returned. The customer returning the goods is responsible for all freight, proper packing, and any damage incurred during shipment of the goods back to CHART.

VIII System Flow Schematic



Carbo-Mizer 400 with Sure Fill™ and Dual Relief

Chart Industries - MVE Beverage Systems
3505 County Road 42 West
Burnsville, MN 55306 - 3803 USA