User's Manual

Carbo-Mite™ 160

MVE®

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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 concentrations of less than 5% for less than 15 minutes can cause unconsciousness, injuries or death. Even low concentrations of CO_2 can cause:

- Dizziness, headaches, nausea or disorientation
- Increased respiration or heart rate
- Shortness of breath or rapid suffocation.

CO_2 is heavier than air and can collect in low areas, such as basements, stairwells, and confined spaces. Avoid entry and use caution in areas until thoroughly ventilated if CO_2 leaks or high concentrations of CO_2 are suspected.

The tank safety relief circuit must always be connected to an outdoor vent, whether used as a stationary or portable system and whenever the tank is inside a building.

Fill Box and/or vent must never be located in or above 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. All lines or hoses must be away from traffic areas and heat sources and protected from damage. All connections and lines must be leak-free.

Installation and service of this equipment and deliveries of CO_2 should only be performed by qualified professional personnel familiar with CO_2, mini-bulk liquid CO_2 pressure vessels, and 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.

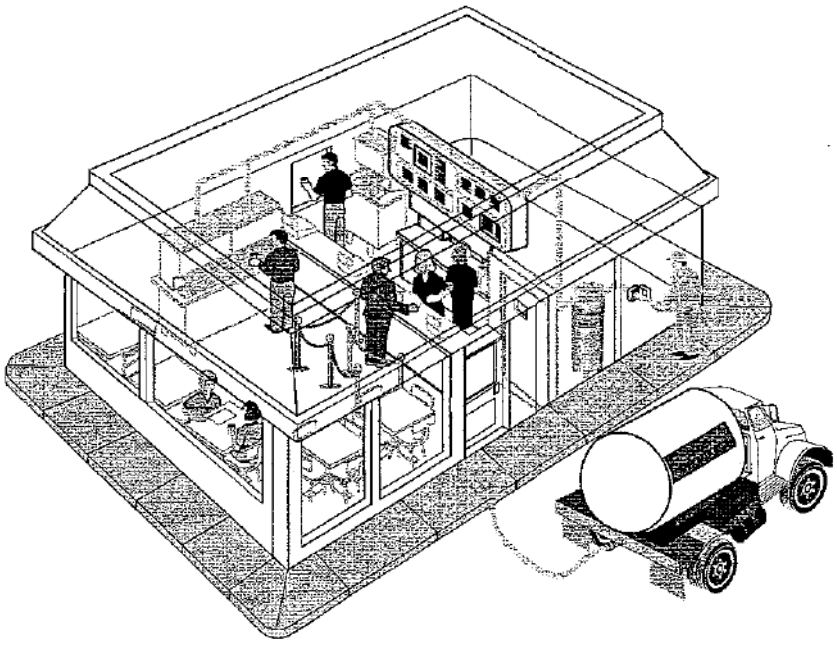
Spills or Leaks

- Evacuate all personnel immediately from affected areas.
- Thoroughly ventilate the area of the spill or leak before entering.
- CO_2 is heavier than air and displaces oxygen and will collect in low or confined areas

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

II General Description



System Overview

The Carbo-Mite 160 bulk carbon dioxide (CO_2) system is designed for the storage and supply of carbon dioxide gas for carbonation or other purposes. The typical Carbo-Mite 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-Mite can be operated as a stationary or portable system. The stationary system, the most common use, employs a permanently installed tank, an outdoor-mounted CO_2 fill box and the connecting 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 by your CO_2 supplier. 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 special plumbing components, such as: quick disconnect couplings and a tank-mounted fill fitting to allow the tank to be temporary disconnected from the gas supply and vent circuits and moved outdoors with an appliance cart for refilling. (Portable plumbing components are displayed in the Parts Identification section of this manual.)

Storage Tank

The Carbo-Mite 160 tank is a stainless steel low pressure tank that holds 160 pounds (72.6 kg) of CO_2. The tank consists of an inner vessel and an outer jacket, like a thermos bottle.

The space between the inner and outer contains a special insulation and has a nearly perfect vacuum. The insulation and vacuum minimize the entry of unwanted heat into the liquid CO_2 inside the tank. When carbon dioxide gas is needed for carbonation or another use, 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
- Pressure Control
- Gas Supply
- Safety Vent or Pressure Relief
- Pressure and Contents Measurement

The CO_2 fill circuit allows liquid CO_2 to be transferred into the tank. The pressure control circuit maintains the minimum needed internal tank pressure to supply CO_2. The gas supply circuit dispenses CO_2 gas to the beverage or other use-point system. The vent or relief circuit allows excess pressure to safely exit the tank and the building, if needed. Finally, the contents and pressure gauges indicate the quantity and pressure of the CO_2 inside the inner tank.

Fill Circuit

The stationary tank fill circuit consists of a brass fill fitting in the CO_2 fill box, a fill hose, and an emergency shut-off valve on the tank. Liquid CO_2 is transferred into the tank through the brass fill box fitting and the fill hose. The portable tank fill circuit consists of a brass fill fitting mounted on the top of the tank and secured with a bracket. For both stationary and portable tanks, the shut-off valve is closed only for emergencies or when servicing the fill fitting.

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.

The pressure building circuit operates by allowing liquid CO_2 to flow through a 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 raises the internal tank pressure.

The process of building pressure is controlled by a regulator which senses the internal tank pressure. When the 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 liquid stops flowing.

II General Description

Pressure Control Circuit (continued)

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 being 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 Or Supply Circuit

Carbon dioxide gas is supplied to the use-point through the supply or gas use circuit. In the Carbo-Mite CO_2 gas is withdrawn from the gas space above the liquid CO_2 stored in the tank. On demand, CO_2 passes through the shut-off valve and into the final line pressure regulator. The final line or gas use pressure regulator (supplied by the gas distributor) controls the pressure to the beverage system or use-point.

The pressure setting of the final line regulator may vary, depending upon the application. For carbonated beverages the regulator is commonly set at approximately 90 psi - 115 psi. The gas supply pressure gauge (supplied by the gas distributor), is usually mounted on the regulator assembly and indicates the pressure of the CO_2 being supplied to the use-point. Additional pressure regulators and gauges may be added downstream for secondary applications, such as: bag-in-the-box, beer or diet drink systems. Consult the related equipment manufacturer for the correct pressure regulator setting(s).

Final Line Pressure Regulator And Pressure Gauge

The Carbo-Mite is supplied without a final line pressure regulator or gauge. The low flow rate of the Carbo-Mite allows the installer or CO_2 supplier several options for pressure regulation and measurement. The first option is to use the high pressure regulator and gauge that may already be installed on the existing high pressure CO_2 cylinder or beverage system. The second option is to install a standard low pressure CO_2 regulator and gauge, similar to those supplied on larger bulk CO_2 tank models. Low-pressure, high and standard flowing regulator assemblies for the Carbo-Mite are available from MVE as options. NOTE: high pressure regulators should never be used in combination with secondary regulators as this will restrict CO_2 gas flow.

Safety Vent Or Pressure Relief Circuit

The inner pressure vessel of the Carbo-Mite 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.

MVE uses two safety relief valves for added safety. The primary relief valve is set at 300 psig. The secondary relief valve is set at 450 psig. The relief valves must always be vented outdoors through either the fill box or a vent tube to prevent the concentration of CO_2 within the building. The primary relief valve may occasionally open during CO_2 deliveries or when insufficient CO_2 is being used on a regular basis.

Pressure And Contents Gauges

The tank pressure gauge measures the internal tank pressure in the top of the tank. The pressure in the tank will range between 110 psi and 300 psi. 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-Mite system. The purpose of the 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.

There are two standard types of fill boxes: a surface-mounted model or a flush-mounted model. Fill boxes must be mounted outside the building, must be placed in an area with good ventilation and must be easily accessible to the CO_2 supplier for refilling the Carbo-Mite. When the Carbo-Mite is used as a portable system the fill box is replaced by a tank-mounted brass fill fitting and an alternative safety vent connected outdoors. NOTE: All tanks must be vented outside so that any excess 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-Mite tank with the outdoor fill box. The fill hose is a special, FDA approved, low temperature, 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-Mite must always be connected to an outdoor vent line when the tank contains CO_2 and is indoors.

Optional PB Circuit Purge Kit

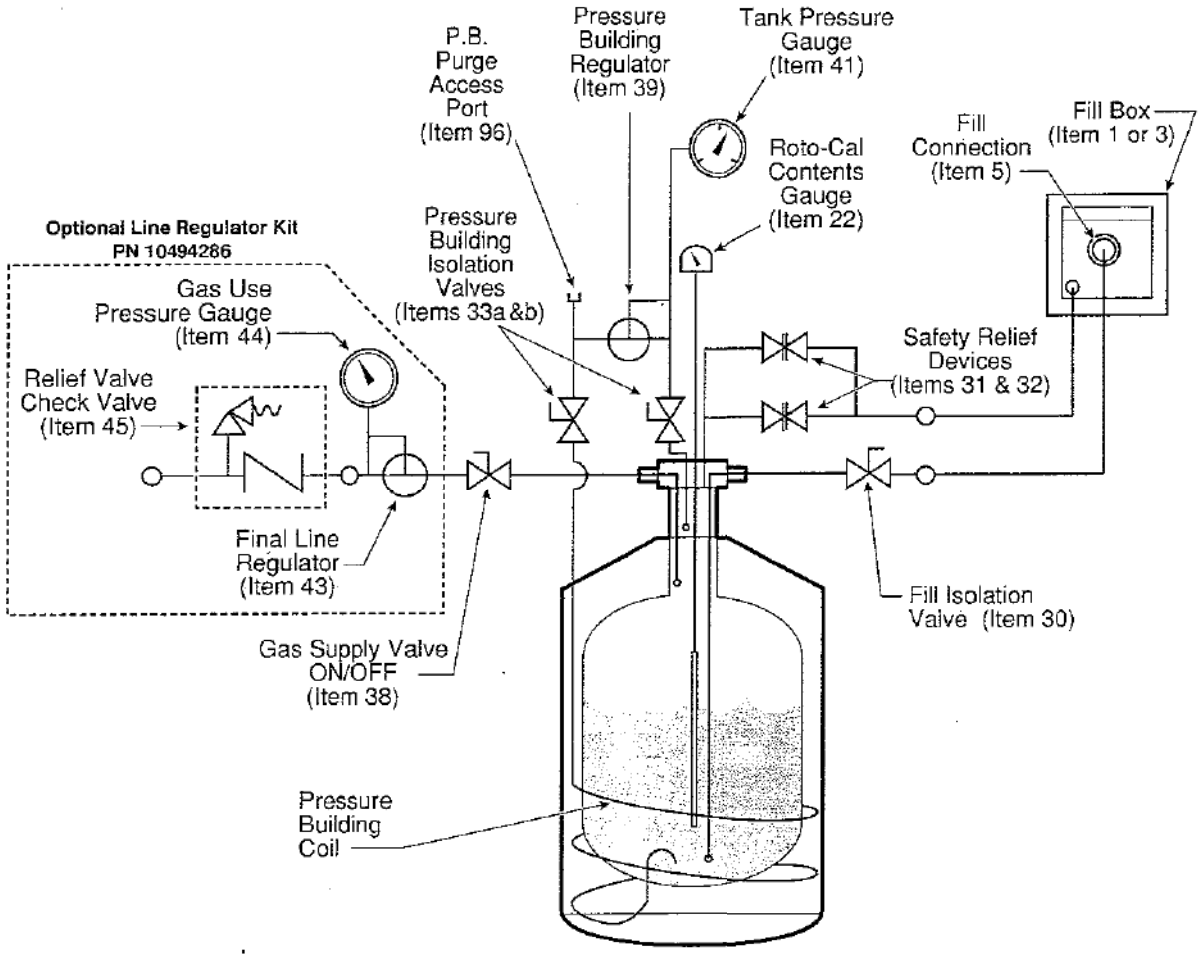
If local supplies of CO_2 contain troublesome levels of impurities, the Carbo-Mite may need to be fitted with a purge kit. Purging contaminants helps prevent plugging of the pressure building circuit.

Your Bulk CO_2 Supplier

Your bulk CO_2 supplier is an important part of your team. Most CO_2 suppliers not only provide you with the timely delivery of CO_2, but will also install and service your Carbo-Mite 160 system. When you need service, parts, information, an emergency CO_2 delivery or other CO_2 related assistance, contact your local MVE authorized CO_2 supplier. They will be happy to assist you.

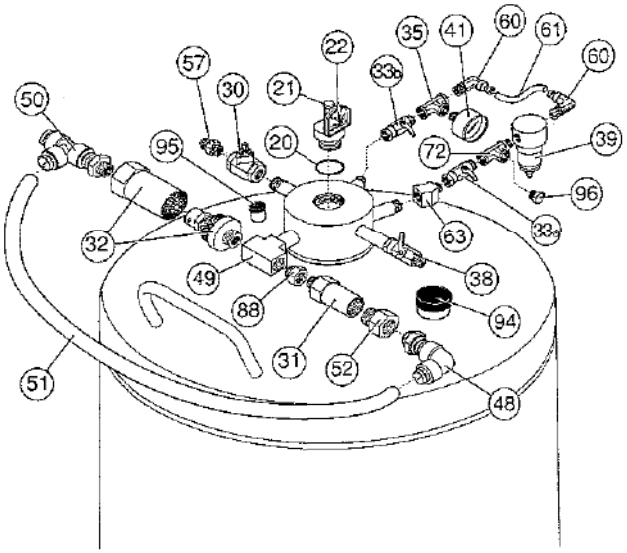
A place has been saved on page 18 of this manual for you to record the name and phone number of your CO_2 supplier, as well as other important service contacts.

III System Flow Schematic



Parts Identification IV

Carbo-Mite 160 Storage Tank — Part No. 10846317

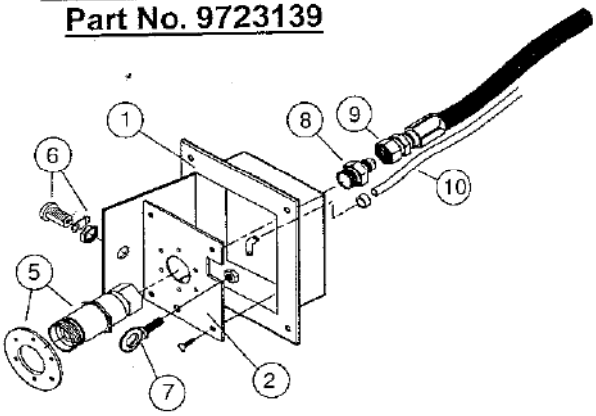


ITEM	PART NO.	DESCRIPTION	QTY.	FUNCTION
20	2300059	O-Ring	1	Seals sight gauge assembly to tank
21	10643114	Sight Gauge Assembly	1	Float rod for liquid CO_2 level
22	10591422	Sight Gauge (Roto-Cal)	1	Indicates liquid CO_2 level
30	10804547	Ball Valve (3/8" NPT Without Handle)	1	Emergency liquid fill shut off valve
31	1812062	Relief Valve (450 psig)	1	Secondary inner vessel safety / relief valve
32	1811252	Relief Valve (300 psig)	1	Primary inner vessel safety / relief valve
33a	1716162	Ball Valve (¼" NPT)	1	Isolation for PB regulator (liquid)
33b	1716162	Ball Valve (¼" NPT)	1	Isolation for PB regulator (gas)
35	1210622	Tee (¼" FPT)	1	Port for pressure gauge
38	1716162	Ball Valve (¼" NPT)	1	On / Off valve for gas supply
39	2112222	Regulator, Pressure Building (PB), 125 psi (¼" NPT)	1	Regulates internal tank pressure
41	2015179	Pressure Gauge (0-400 psi)	1	Displays internal tank pressure
48	10486454	Elbow (½" ODT x 3/8" MPT)	1	Connects vent hose to relief valve
49	1210642	Tee, Brass (½" FPT)	1	Directs tank pressure to both relief valves
50	10486462	Tee, Nylon (½" OD)	1	Vent hose connection tee
51	2811726	Tube, Nylon (½" OD)	1	450 psig relief valve vent hose
52	1611592	Pipe-Away Adapter (3/8" FPT)	1	Connects relief valve to elbow
57	1110112	Connector(3/8" MPT x 5/8"-45° Flare)	1	Liquid hose connector
60	10586666	Elbow, Brass (¼" ODT x ¼" MPT)	2	Pressure building line components
61	2811836	Tube, Nylon (¼" OD)	1	Pressure building line component
63	1210472	Elbow, Street Brass (45°)	1	Orients pressure building line components
72	1211702	Tee, Street Brass (¼" NPT)	1	Purge kit access port
88	1210032	Bushing, Brass (¼" FPT x ½" MPT)	1	Connects 450 psig relief valve to tee
94	None	Vacuum Pump-Out Port	1	Accesses vacuum space (**Do NOT Open**)
95	None	Vacuum Regeneration Port	1	Accesses vacuum regeneration system
96	1211102	Plug, Brass Hex (¼" MPT)	1	Purge kit access plug
	10855133	Label, Carbo-Mite	1	Denotes tank model
	3836609	Label, Operation	1	Denotes tank safety and operation

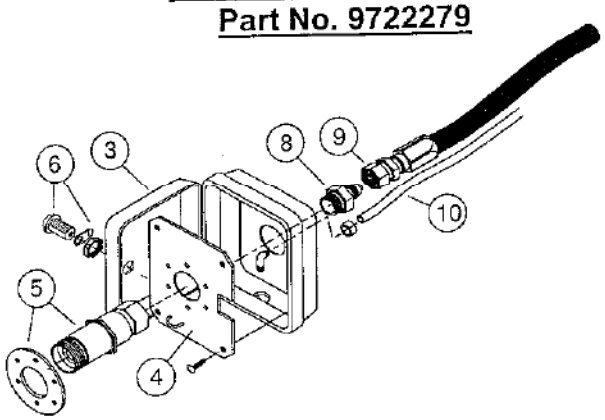
IV Parts Identification

Stationary Installation Components

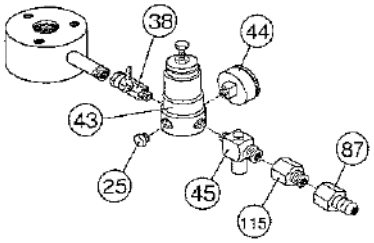
Flush Mount Fill Box
Part No. 9723139



Surface Mount Fill Box
Part No. 9722279



Stationary Gas Use Line
Part No. 10847871



Fill And Vent Hose Kit

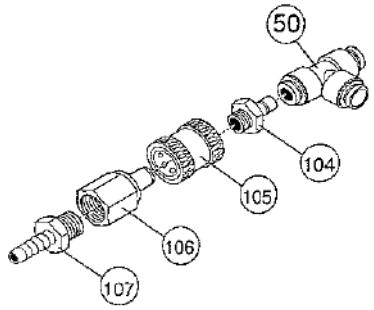
5 Ft.	10973252
10 Ft.	10973308
15 Ft.	10973324
25 Ft.	10973332
30 Ft.	10973341
50 Ft.	10973359

ITEM	PART NO.	DESCRIPTION	QTY.	FUNCTION
1	9111289	Flush Mount Box	1	Mounts into outside wall
2	10503517	Flush Fill Box Plate	1	Holds fill fitting
3	8515811	Surface Mount Box	1	Mounts onto outside wall
4	5503221	Surface Box Plate	1	Holds fill fitting
5	1312482	CO_2 Fill Fitting, Brass (¾" Thread)	1	Connection for CO_2 supplier transfer hose
6	4310689	Lock Assembly	1	Locks fill box
7	2952384	Eyelet	1	Locks delivery hose
8	1111182	Connector	1	Connects fill hose to fill fitting
9	10969801	Fill Hose, 5 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
9	10969819	Fill Hose, 10 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
9	10969827	Fill Hose, 15 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
9	10969835	Fill Hose, 25 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
9	10969843	Fill Hose, 30 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
9	10969851	Fill Hose, 50 Ft. (500 MAWP and FDA)	1	Transfers liquid CO_2 from fill box to tank
10	2811726	Vent Hose	1	Transfers vent gas from tank to fill box
25	1212962	Plug, Brass Hex Head (1/8" MPT)	1	Plugs auxiliary regulator port
38	1716162	Ball Valve (¼" NPT)	1	On / Off valve for gas use line
43	2111682	Regulator, 125 psi (¼ NPT)	1	Regulates gas use pressure
44	2013262	Pressure Gauge, 0-160 psi, 2" Dial	1	Indicates gas use pressure
45	1811502	Relief Valve, 130 psi (¼" MPT x ¼" ODT)	1	Protects lines and beverage equipment
87	10847846	Hose Barb, Brass (¼" OD x ¼" FPT)	1	Connects hose to the gas use line
115	10808038	Connector, Brass (¼" MPT x ¼" ODT)	1	Connects hose barb to the relief valve

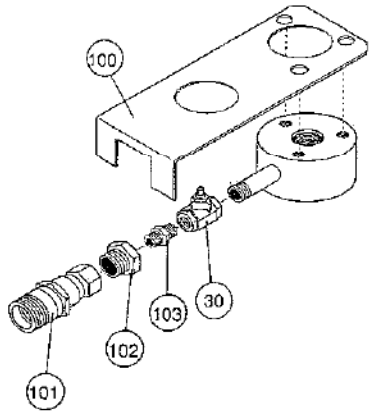
Parts Identification IV

Portable Installation Components — Part No. 10847897

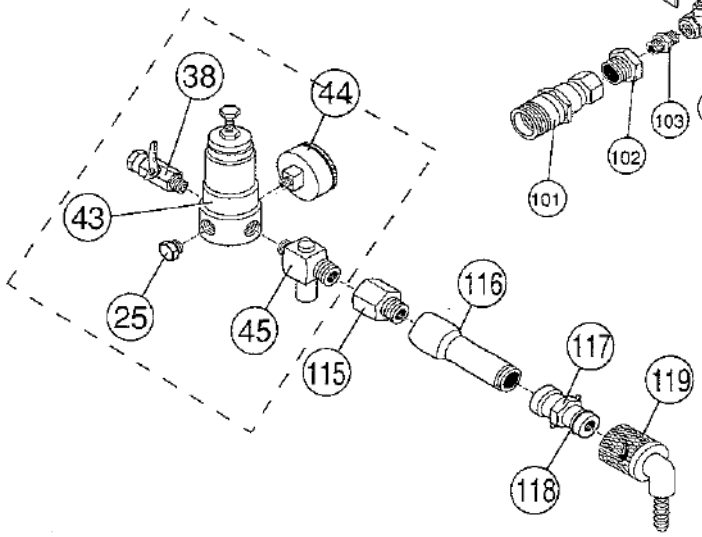
Portable Vent Line



Portable Fill Fitting



Portable Gas Use Line



ITEM	PART NO.	DESCRIPTION	QTY.	FUNCTION
25	1212962	Plug, Brass Hex Head (1/8" MPT)	1	Plugs auxiliary port in pressure regulator
30	10804547	Ball Valve (3/8" NPT Without Handle)	1	Emergency fill line shut off valve
38	1716162	Ball Valve (¼" NPT)	1	On / Off valve for gas supply
43	2111682	Regulator, 125 psi,(¼" NPT)	1	Regulates gas use pressure
44	2013262	Pressure Gauge, 0-160 psi, 2" dial	1	Displays gas use pressure
45	1811502	Relief Valve, 130 psi, (¼" MPT x ¼" OD)	1	Protects lines and beverage equipment
50	10486462	Tee, Nylon ½" OD	1	Vent hose connection tee
100	10933218	Fill Fitting Bracket	1	Mounts fill fitting on to the tank
101	10662041	CO_2 Fill Fitting, Brass (¾" thread)	1	Connects liquid CO_2 hose to fill line
102	1212062	Hex Bushing	1	Secures fill fitting to tank
103	1310072	Hex Nipple	1	Secures fill fitting to tank
104	10811528	Plastic Connector	1	Secures quick connect to vent line
105	10811552	Female Quick Connector	1	Allows quick release of vent hose
106	10811544	Male Quick Connector	1	Allows quick release of vent hose
107	10811536	Hose Barb	1	Secures quick connect to vent line
115	10808038	Brass Connector (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 quick change of CO_2 source
118	4710619	O-ring (½" OD)	1	Prevents CO_2 from leaking at quick connect
119	6511706	Quick Connect (¼" Tube)	1	Allows quick change of CO_2 equipment

V Specifications

Carbo-Mite 160

Dimensions

Diameter	20 in.	(508 mm)
Height	31 in.	(787 mm)
Empty Weight	145 lb.	(66 kg)
Full Weight	305 lb.	(138 kg)
Gross Capacity	18.8 gal.	(71 liters)
Storage Capacity	160 lb.	(73 kg)
Gas Use Line Connection	¼" MPT 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	0.75 lb./hr.*	(0.34 kg/hr.)*
Peak Flow Rate	1.5 lb./hr.*	(0.68 kg/hr.)*
Evaporation Rate	1.2 lb./day	(0.54 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)

Design Criteria

Design Specifications	ASME Section VIII, Division 1
Fill System	"Lo-Loss" Single Line
Insulation Type	Super Insulation with Vacuum
Pressure Control System	Pressure Building (PB) Circuit
Liquid Level Gauge	Float Type: Magnetic Roto-Cal
Vacuum Jacket 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**	Flat Base

Footnotes:

* Equals approximately 65 - 12 oz. drinks per hour continuous and 125 - 12 oz. drinks per hour peak

** Wheel base or leg stand available as options

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 160 pounds of CO_2. Typical Carbo-Mite users use 10 - 30 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-Mite if the pressure (Item 41) 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-Mite 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-Mite 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 the brass fill fitting in the fill box.
    - Items 33a and/or 33b to stop the flow of CO_2 through the 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.)

VI 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 any 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.	Increase in 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 beverage equipment service agent.
	Error in CO_2 delivery or supplier invoice.	1. Check CO_2 usage history / pattern against supplier invoices. 2. Call CO_2 supplier.
CO_2 tank will not fill.	CO_2 tank is already full.	NONE
	CO_2 fill valve (#30) is inoperative.	1. Call 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 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. Ask driver to verify delivery tank pressure is at least 275 psi. 2. Check store tank pressure (#41) to verify it is between 110 psi - 150 psi. 3. Ask driver to vent store tank to lower pressure, and complete fill, if needed. 4. NEVER vent store tank pressure to lower than 125 psi.
	Delivery tank is empty.	1. Ask driver to make another delivery.
	Truck delivery hose is obstructed, e.g. vehicle stopped on hose.	1. Clear obstruction or wait until obstruction clears.

VI 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.	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.

VII Ordering Service And Parts

Service and Maintenance

1. Service or maintenance work on the Carbo-Mite 160 should be performed only by MVE 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. MVE recommends the use MVE approved replacement parts. Contact MVE 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. MVE recommends that a thorough preventative maintenance check be performed on the Carbo-Mite 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-Mite 160 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 unauthorized persons or to perform unauthorized modifications will void the warranty.

Ordering Parts Or Service

For parts or service contact your local authorized MVE 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 ordered.

Important Telephone Numbers

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

WARRANTY VIII

WARRANTY POLICY

MVE, Inc. (MVE) warrants to the Purchaser the Carbo-Mite 160 bulk CO_2 system equipment for 90 (ninety) days from the MVE invoice date, that said equipment shall be free from any defects in workmanship and materials. MVE also warrants the reliability of the vacuum in the Carbo-Mite 160 tank for 5 (five) years from the date of the original MVE invoice.

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

As a further pre-condition to any MVE liability hereunder, both parts replacement and labor must be supplied by an approved MVE service company. MVE 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. MVE 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 MVE or operation of such equipment in a manner inconsistent with MVE accepted practices and all operating instructions, unless pre-authorized in writing by MVE, shall void this Warranty.

MVE'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.

MVE is not liable for any losses (including CO_2), damages, or costs of delays, including incidental or consequential damages. MVE 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: MVE, Inc. Telephonic / electronic approval may be obtained by contacting Restaurant Products Technical Services at:
   - Telephone: 612-882-5000
     800-253-1769
     (toll free in U.S.)
   - Facsimile: 612-882-5185

   or by writing to:

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

2. Authorization must be obtained from MVE prior to shipping any equipment to MVE 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 MVE.

MVE, Inc.
3505 County Road 42 West
Burnsville, MN 55306 - 3803
USA
Phone: 952-882-5000 Fax: 952-882-5185
Web: www.mve-inc.com E-mail: bulk co2@mve-inc.com

Part No. 10855934 5/00