Installation Manual

Carbo-Mizer and Carbo-Matic

MVE®

I Table of Contents

Safety Information

The MVE Bulk (CO_2) System is designed for the safe storage of carbon dioxide CO_2 refrigerated liquid. No modifications or changes should be made in the equipment without proper authorization from Minnesota Valley Engineering, Inc.

Carbon Dioxide Handling Precautions

Carbon dioxide gas is an asphyxiant. Concentrations of 10% or more can cause 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. It is heavier than air, so 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 the 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 immediately.

If solid CO_2 (dry ice) or compressed CO_2 gas comes in contact with the skin or mouth, stop the exposure immediately. If frostbite has occurred, obtain medical attention. Do not rub the area. Do not apply heat warmer than 170°F (41.7°C).

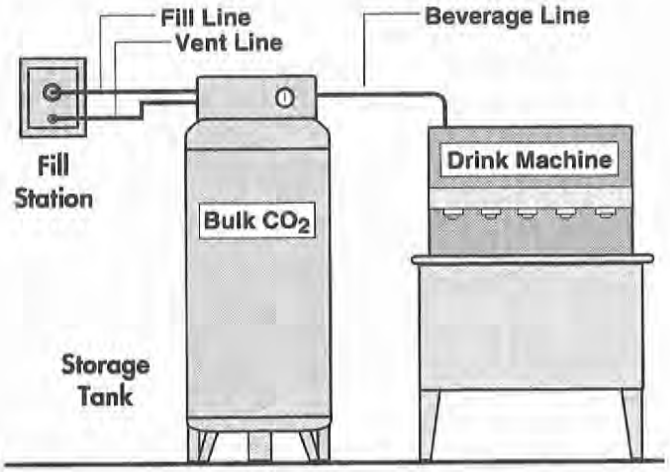
If solid CO_2 (dry ice) or cold CO_2 vapor comes in contact with the eyes, stop the exposure immediately and obtain medical attention.

More information can be obtained by contacting your CO_2 supplier or the Compressed Gas Association, 725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4100, or phone (703) 412-0900.

II Introduction

General

The Bulk CO_2 Storage System is designed to provide users of carbon dioxide a safe, convenient method of storing and delivering carbon dioxide to the beverage system. The Bulk CO_2 System consists of the storage tank, lockable fill station, and connecting fill and vent hoses.



Storage Tank

The storage tank is a vacuum insulated, double walled, stainless steel storage tank. It includes a plumbing configuration and vaporizer coil to maintain adequate withdrawal rates.

An adjustable line regulator supplies CO_2 gas to the beverage system at the desired pressure. The regulator is normally set between 90 and 115 psi.

The bulk CO_2 storage tank is protected from damage due to excessive pressure by primary and secondary relief valves which vent safely outside. The tank is also equipped with 6" stainless steel unibody legs so it can be bolted securely to the floor.

Fill Station

The remote fill station (either surface or flush mounted) is permanently mounted on the outside wall and is used for filling the storage tank with liquid carbon dioxide.

It is equipped with a fill connection which allows the CO_2 delivery person to fill the storage tank without entering the store. It also has a lockable door.

The fill station serves as a vent location where excessive CO_2 gas from the storage tank safety valves can be released harmlessly outside.

Fill and Vent Hoses

MVE fill hoses are manufactured using only FDA approved food grade fittings. Each hose is factory cut to a specified length and the hose fittings are pre-crimped to eliminate potential leaks. The vent hose is firmly attached to both the storage tank and the fill station so that CO_2 can be vented safely outside. The standard size fill hose is supplied at a 15 foot length.

Tank Operating Facts

1. Normal tank operating pressure is between 110-175 psi.
2. Tank pressure may be as high as 300 psi after delivery.
3. Final line pressure is normally 90-115 psi.
4. Frost near bottom of tank is normal during periods of high CO_2 draw, ie. lunch hour rush and dinner rush.
5. If frost appears continuously, especially in mornings, there is a leak in the beverage system or it is on CO_2 drive.
6. The amount of CO_2 product in the storage tank can be determined by referring to the CO_2 contents gauge on the tank. (1/4 full = 100 lbs. of CO_2).

SPECIFICATIONS	CARBO-MIZER 400	CARBO-MATIC 400
Dimensions		
Diameter (in.)	20	20
Height (in.)	65	62
Empty Weight (lbs.)	305	290
Filled Weight (lbs.)	705	690
Gross Capacity (liters)	170	170
Storage Capacity, Liquid (lbs.)	400	400
Gas Use Connection	1/4" Male Flare	1/4" NPT
Fill Connection	3/4" Quick Coupler	3/4" Quick Coupler
Vent Connection	1/2" Tube Size	1/2" Tube Size
Rates and Pressures		
CO_2 Delivery Rate (continuous)	5.5 lbs. CO_2/hour *	5.0 lbs. CO_2/hour *
Peak Flow Rate	10 lbs. CO_2/hour	10 lbs. CO_2/hour
Evaporation Rate	2.5 lbs./day	2.5 lbs./day
Maximum Allowable Working Pressure	300 psig	300 psig
Normal Operating Pressure Range	110-200 psig	110-200 psig
ASME Primary Relief Valve Setting	300 psig	300 psig
Secondary Relief Valve Setting	450 psig	450 psig
Soft Drink Relief Valve (w/check valve)	130 psi	N/A
Design Criteria		
Design Specifications	ASME ***	ASME ***
Fill System	Lo-Loss Single Line Filling	Lo-Loss Sure Fill
Insulation Type	Super Insulation **	Super Insulation **
Liquid Level Gauge	Roto-Cal/Float Type	Differential Pressure
Vacuum Jacket Material	201 Stainless Steel	201 Stainless Steel
Inner Vessel Material	201 Stainless Steel	201 Stainless Steel
Fill Box Design	Flush or Surface Mounted	Flush or Surface Mounted

* Approximately 600 and 750 drinks per hour respectively.

** High vacuum

*** Boiler and Pressure Design Section VIII, Division 1

III Installation Tools and Supplies

General

Installation of the Bulk CO_2 System requires that certain tools and supplies be available. For simple and economical installations, the following supplies and tools should be maintained, however, not all installations will require them.

All tools and installation supplies will be provided by the MVE authorized distributor or installation agent.

Installation Supplies

Silicone Sealant (clear and white)

2" PVC Pipe and Elbows

1/4" Plastic Screw Anchors

1/4" x 1" Self-Tapping Screws

9" Cable Ties

PVC Cement

Duct Tape

Teflon Tape

PVC Flanges

Chalk or Marker

Leak Check Solution

Installation Hardware

Hardware	MVE P/N
Clamps for 1/4" I.D. Tubing	34-1132-1
1/4" Hose Barb Nipple	16-1148-1
1/4" Female Flare Nut	16-1147-1
1/4" Hose Barb x 1/4" Female Elbow	16-1146-1
3/8" Hose Barb x 1/4" Female Flare Nut Connector	11-1122-2
1/4" I.D. Beverage Tubing	28-1141-6
1/2" Anchors	
1/4" Bolts	

Note: Stainless steel fittings should be used.

Warning: When using the following tools, suitable eye and ear protection must be worn. Failure to do so could result in serious personal injury.

Installation Tools

Electric Hammer Drill: Used for drilling holes and chiseling brick. Accessories include:

- 3/4" x 21" Scaling Chisel
- 2-1/2" Core Bit
- 1" x 21: Drill Bit (Masonry)
- 1/4" x 13" Masonry Bit
- 1/2" Masonry Bit

7-1/4" Builders Circular Saw: Used for scoring brick and cutting wood exteriors. Accessories include:

- Masonry Cutoff Wheel
- Combination Blade

Reciprocating Saw: Used for cutting through wood walls. Accessories include:

- Metal Cutting Blades
- Wood Cutting Blades

Electric Hand Drill: Used for drilling anchor holes. Accessories include:

- 1/4" and 3/8" Masonry Bits
- Set of Twist Drills
- 2-1/2" Hole Saw

Oxy-Acetylene Torch: Used for cutting rebar in poured concrete walls and floors.

Additional Required Supplies, Hardware and Tools

Hand Truck with Strapping Attachment

Torpedo Level

Carpenter Square

Extension Cord

Oetiker clamp Pliers

Step Ladder

Caulk Gun

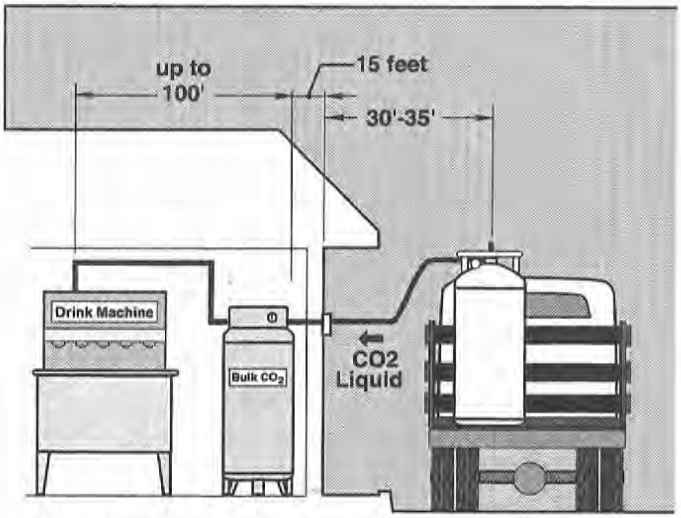
Assorted Hand Tools

Flashlight

Location of Equipment IV

General

Prior to the installation of the Bulk CO_2 system, a site survey should be performed to determine the tank and fill station location. The survey must be conducted with either the store owner, corporate supervisor, or their designated representative. At this time, a survey form will be completed. The survey form should then be signed by both parties. Any modifications to the installation after the survey form has been completed, must be noted on the original survey form and signed off by the person who approved the original survey.



Fill Box Location

The fill box location must be determined before locating the CO_2 tank. It must be situated to allow easy access by delivery personnel. Generally, about three 3-1/2 - 4 feet high on the back wall of the store is preferable. When placing the fill box, keep in mind the length of the fill hose from delivery truck. This fill hose is 35 feet long which is more than enough for most locations. The length of the line from the fill box to the CO_2 tank is 15 feet. The fill box may be located in the drive-thru lane as long as the fill hose is across the drive-thru for as little time as possible. The CO_2 delivery hose may be driven over when it is pressurized during the filling operation.

When determining the fill box location, always check the inside wall of the store to be sure that the box will not interfere with objects such as electrical panels, freezers, sinks, etc. Care must also be taken to insure that installation of the fill box will not damage anything inside the wall such as electrical conduits. On stores where the fill lines from the fill box to the tank must be sleeved, be sure to locate the box so the inside sleeving will not be damaged and will not interfere with the store's operation.

Storage Tank Location

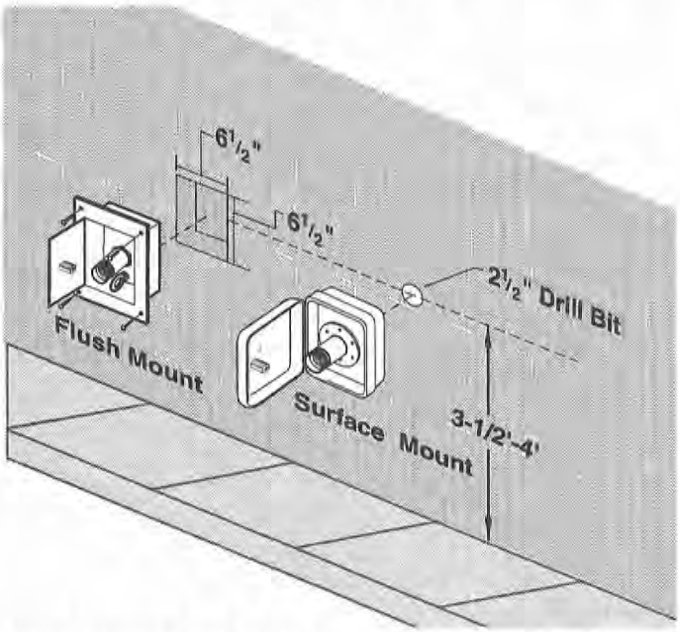
Once the fill box location is determined, the location of the CO_2 storage tank can be determined. The primary factors for placing the storage tank are space requirements and hose length from the fill box. The factory hose is 15 feet long. This is a fixed length hose with fittings pre-crimped on each end. The storage tank must be placed within 15 feed of the fill box in any direction. The distance from the storage tank to the beverage machine is not critical. Typical distances from the tank to the beverage machine are from 5 to 100 feet. The storage tank must be placed so that it does not interfere with items such as electrical panels, sinks, hallways, etc. It is desirable to place the tank in the most out-of-the-way location available, however, the tank should not be placed such that it is inaccessible if service is ever required.

V Fill Station Installation

General

Refer to section three of this manual for proper tools. Since the fill station is the only part of the system which is visible to the general public, extra care must be taken.

Before marking the fill station location on the exterior wall, check to be sure that the fill box will not interfere with or obstruct any electrical lines and/or conduit, plumbing, gas lines, etc. inside the store or out.



Flush Mounted Fill Station

1. Remove panel from the inside of the fill station.
2. Mark a 6-1/2" square on exterior wall using a level and carpenter's square to assure squareness.
3. Hold fill box to outline on wall. If outline is not correct, redraw it using the above steps.

Perimeter Cut on Exterior Wall

Warning: Always wear goggles, gloves, and a dust mask when making perimeter cuts. Failure to comply could result in severe personal injury.

Caution: Do not attempt to remove material from exterior wall without first making perimeter cut.

For brick, concrete or block wall, use circular saw with a masonry blade. Make cut along inside of outline 1/2" to 1" deep.

For wood walls, use saw with a combination blade. Perimeter cut depth should equal the wood thickness.

Using a hammer drill with 3/4" scaling chisel, start chiseling away brick near bottom of saw cut and work towards the top.

Caution: Use extreme care when handling chisel near edge of perimeter saw cut. The chisels may have a tendency to "jump" around which could damage surrounding brick. Failure to comply could result in personal injury and/or property damage.

1. Remove brick debris from hole.
2. Slide fill box into opening to verify fit. (it should slide easily into the opening and fit flush to brick surface).
3. Hold box in opening and mark center of the large hole, the vent connection, and four corner mounting holes.
4. Drill corner mounting holes using 1/4" masonry bit. (Holes should be approximately 1-1/2" deep).
5. Insert plastic screw anchors.
6. Drill center hole using 2-1/2" core bit.

   Caution: If inside wall is tiled, care must be taken to avoid damage. The large hole must be drilled from inside to outside. To do this, drill a 1/4" pilot hole through from the outside; then go inside and drill through using the pilot hole as a guide.
7. Fasten box using sheet metal screws.

Fill Station Installation V

Flush Mounted on Concrete Wall

1. Poured concrete is difficult to chisel. Inside of perimeter cut should be perforated with 3/4" holes drilled 4-1/2" deep to allow easy separation of wall material.

2. Use hammer drill and 3/4" scaling chisel to remove wall material. Begin chiseling near the bottom of the perimeter and work toward the top.

   Caution: Use extreme caution when removing wall material. The chisel has a tendency to "jump" around which could damage surrounding wall. Failure to comply could result in personal injury and/or property damage.

3. Remove concrete debris from hole.

   Note: Some walls use reinforcing rods. Cut rebar with oxy-acetylene torch if necessary.

4. Test hole size with fill station box. Box should fit into hole easily and be flush with outer wall. Continue as for brick wall installation.

Flush Mounted on Wood Wall or Wood Construction

Drill 1/4" holes in corners of flange of fill box. Mark holes in wood and drill for plastic anchors.

Surface Mounted Fill Box Installation

In cases where a surface mounted box is preferred, the fill station will be mounted to the outside surface of the store.

1. Remove inside panel from fill station box.

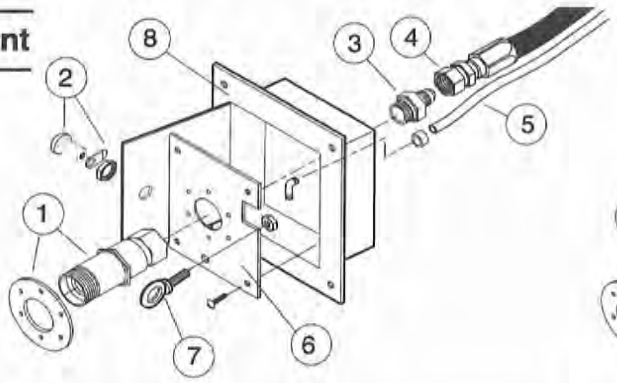
2. Hold box up in desired location and mark center hole and four corner holes. Use a level for accuracy.

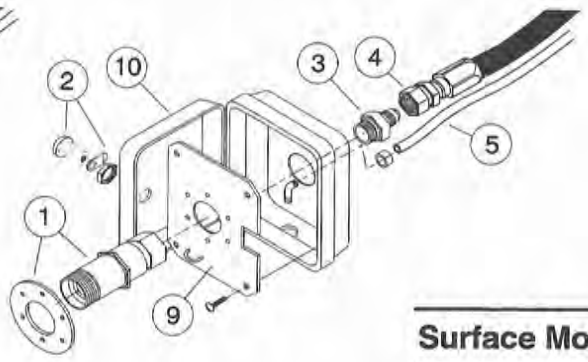
3. Drill center hole using 2-1/2" bit.

4. Drill four (4) corner holes with 1/4" bit to allow insertion of plastic screw anchors.

5. Fasten box in place using sheet metal screws.

Flush Mount





Surface Mount

ITEM NO.	PART NO.	DESCRIPTION	QTY	FUNCTION
1	13-1248-2	Fill Connection Valve	1	Connection for distributor fill hose
2	10521627	Lock Assembly	1	Locks fill box
3	11-1118-2	Connector	1	Connects fill hose to valve
4	37-1109-7	Fill Hose	1	Transfers liquid CO_2 from fill box to tank
5	28-1172-6	Vent Hose	1	Transfer vent gas from tank to fill box
6	10503517	Flush Box plate	1	Holds fill connector valve
7	29-5238-4	Eyelet	1	Locks delivery hose
8	91-1113-9	Flush Mount Box	1	Mounts into outside wall
9	55-0322-1	Surface Box Plate		Holds fill connection valve
10	10569583	Surface Mount Box	1	Mounts on outside wall
–	55-5773-9	Complete Flush Fill Station		
–	97-2132-9	Complete Surface Fill Station		
–	97-2193-9	15" Hose Kit		

VI Installation of Hoses and Lines

General

Running the liquid fill and vent hoses from the fill box to the tank, will most likely be done differently at each location. By following the basic rules and guidelines listed below, the lines can be run easily and as simply as possible.

1. Run all lines so that they are as inconspicuous as possible.
2. Lines should be secured together with cable ties at 18 inch intervals.
3. Lines should be anchored using 2 inch conduit straps every two to three feet.
4. Lines should be run either horizontally or vertically whenever possible, plumb and level.
5. Never leave loose lines hanging. Sags in the lines indicate an unprofessional job.
6. Excess line should be coiled and cable tied.

Hose Connection to Fill Box Panel

1. Fasten vent line to the back of the control panel.
2. Fasten flare connection on fill hose to the flare fitting on the back of fill fitting.
3. Feed both lines back into store while pushing panel back into the fill box.
4. Loosely fasten panel into box (it will be removed for pressure checking later).

Slab Stores

The tank distance from the outside fill box will vary from 12 inches to 15 running feet. The lines are generally attached to the wall with conduit straps every 18 inches. It is not necessary to run lines through a conduit sleeve, but if lines are exposed to a high traffic area and it is apparent lines may be damaged, it would be best to run them through a conduit sleeve for protection. The sleeve material generally used is 2 inch PVC piping.

1. Feed the liquid fill and vent hoses through PVC wall flange (on inside wall, if used).
2. If the lines are being run without sleeving material, proceed to step 8.
3. If sleeving material is being used, size and cut the sleeve material to the proper length with a 90 degree elbow toward the wall flange.
4. Feed the lines through PVC sleeve and elbows.
5. Bond the sleeve and elbow together, only if necessary, with PVC glue. Bond as little as possible for future service.
6. Run sleeving conduit to tank.
7. Attach PVC sleeve to wall with conduit straps.
8. Run lines to tank. Attach lines to wall with conduit straps every two to three feet.
9. Excess line should be coiled and cable-tied and attached to wall conduit straps.

Basement Stores

In some basement stores, the tank is located on the first floor. If this is so, see the section on Slab Stores. If the Bulk CO_2 tank is located in a basement, it may be necessary to use a sleeve for protection and cosmetic reasons. Sleeve material is generally 2 inch PVC pipe using 90 degree elbow with floor and wall flanges. A hole must be drilled in the floor to allow the lines to pass to the basement. The sleeve must be secure and parallel to the wall. The following procedure should be used to run sleeved lines from fill box to tank:

1. Check the basement ceiling for any destruction.
2. Drill through the floor approximately 3 to 4 inches from the wall using the hammer drill and 2-1/2" core bit.
3. Size and cut the sleeve material to the proper length with a 90 degree elbow. The finished assembly should be square to the wall and floor.
4. Feed the liquid fill and vent hoses through the PVC sleeve, wall and floor flanges.
5. Bond the sleeve and elbow together, only if necessary, with PVC glue. Bond as little as possible for future service.
6. Feed the lines through the floor.
7. Attach the sleeve flanges to the floor and wall using two 1/4" x 1" screws with anchor.
8. Run lines to the tank.
9. Excess line should be coiled and cable tied and attached to the wall. Attach the hose lines to the wall with conduit straps every two to three feet.

Installation of Storage Tank VII

Bolting to Floor

The Bulk CO_2 tank is equipped with three (3) 6" legs to allow access for cleaning below and around the tank. To ensure a safe environment, the tank ***must*** be bolted to the floor.

1. Place tank in position with gauges facing forward.
2. Mark holes in floor, move tank.
3. Drill holes using 1/2" masonry bit.
4. Blow out dust and insert anchors.
5. Move tank back into position and install lag bolts.

   Note: Install rear bolt first and then tighten all bolts hand tight.
6. Tighten bolts.

Connecting Lines to CO_2 Storage Tank

Prior to installing the lines on the CO_2 tank, any residual pressure should be vented off. This is done by opening the use valve.

Note: The residual positive pressure in Bulk CO_2 tanks when shipped is a CO_2 gas product.

1. Connect liquid fill hose to inlet flare fitting on Bulk CO_2 tank, open tank fill valve.
2. Cut vent hose to proper length.

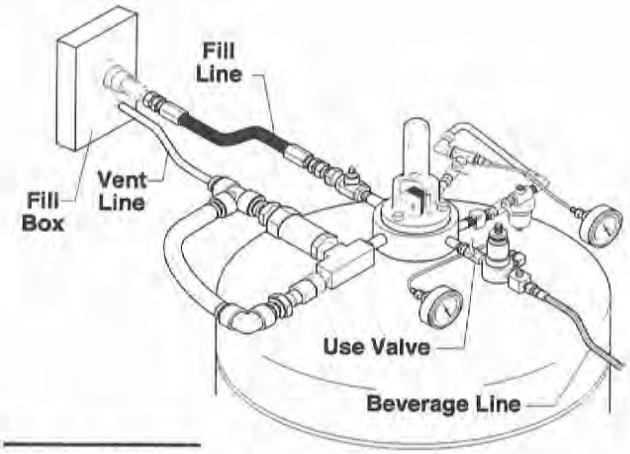
   Note: Tube must be cut squarely to fit tank.
3. Slide vent tube into the plastic tee on the 300 psi relief valve.
4. Connect beverage tubing to supply regulator.

Note: For best results, the CO_2 tank should be filled at this time. This will assure that all lines will be properly purged prior to connecting to the beverage system.

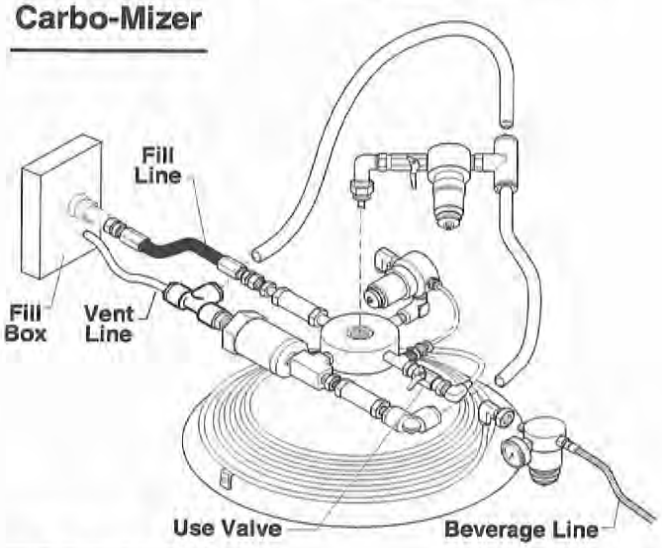
Caution: Every CO_2 storage tank (Carbo-Mizer or Carbo-Matic) must be vented outside to prevent hazardous CO_2 concentrations from developing if the relief valve should open.

Installation of Tank Mounted Fill Fittings (Carbo-Mizer Only)

1. Use a 7/16" wrench to remove three bolts holding sight gauge protector and shroud.
2. Use adjustable wrench to remove flare fitting from liquid inlet valve on rear of tank.
3. Thread short pipe nipple provided into liquid inlet valve (use teflon tape on threads on both ends).
4. Thread 3/4" MPT x 3/8" FPT bushing into quick coupler (use teflon tape).
5. Thread quick coupler onto tank and tighten securely.
6. Slide stainless steel bracket onto tank. Slots on bracket should line up with shroud mounting holes.
7. Adjust bracket so U-shaped opening holds flat sides on quick coupling.
8. Re-install bolts and tighten shroud. Install vent out line from tank to outside.



Carbo-Mizer



Carbo-Matic

VIII Filling The New Bulk CO_2 Tank

Filling of New CO_2 Tank

The first fill of the Bulk CO_2 tank will take 20-30 minutes and a small amount of CO_2 will be vented. The first fill cools the inner vessel of the unit. Because of the insulating efficiency of the CO_2 tank, higher than normal operating pressure can be expected for one to two weeks after the first fill. This is a normal condition during the cool down period.

Filling the Carbo-Mizer

The procedure for performing the first fill of a Carbo-Mizer tank is detailed below:

1. Connect the CO_2 delivery hose to the liquid valve on the CO_2 delivery unit. Open the valve.
2. Open the fill station door and inspect the quick connect for damage, foreign objects and debris. Wipe fitting with a clean, dry, lint-free cloth if necessary.
3. Inspect the delivery hose quick connect. Wipe the fitting if necessary.
4. Connect the delivery hose to the fill station.
5. CO_2 will begin to flow immediately upon connection. The flow of CO_2 will cease when pressure of the storage tank equals the pressure of the delivery unit. At this point, you can assume the cylinder just over 1/2 full.
6. Using leak check solution, check all connections and fittings on the tank and in the fill box for leaks. Repair if necessary. Reinstall shroud and tighten fill box panel.
7. Close the liquid valve on the delivery unit and open the hose drain valve on the hose assembly, to start venting the storage tank.
8. Observe the storage tank pressure gauge drop tank pressure to between 100 and 125 psi. Frost should be seen building up on the outside of the tank on the bottom.
9. Close the hose drain valve.
10. Open the liquid valve on the delivery unit.
11. Again, the flow of CO_2 will cease when pressures equalize. Repeat procedures 7 through 10 as often as necessary to get the tank contents to approximately 300 lbs. on the 400 lb. model.

Filling the Carbo-Matic

The procedure for performing the first fill of the Carbo-Matic tank is detailed below:

1. Connect the CO_2 delivery hose to the liquid valve on the CO_2 delivery unit. Open the valve.
2. Open the fill station door and inspect the quick connect for damage, foreign objects, and debris. Wipe fitting with a clean, dry, lint-free cloth.
3. Inspect the delivery hose quick connect. Wipe fitting if necessary.
4. Connect the delivery hose to the fill station.
5. CO_2 will begin to flow immediately upon connection. Once the storage tank reaches approximately 210-220 psi, the "sure fill" automatic vent valve will open (a venting noise can be heard from behind panel on fill station).
6. When the venting stops, the tank is full. Disconnect fill hose from fill station.
7. Using soap solution, check all connections and fittings on the tank and fill box for leaks. Repair if necessary, tighten fill box panel.

Connecting To The Beverage System IX

General

Running the beverage line from the tank to the beverage machine will most likely be done differently at each location. The distance from the CO_2 tank to the beverage machine is not critical. Typical distances from tank to beverage machine are 5-100 feet. By following the basic rules and guidelines outlined in this section, the lines can be run easily and as simply as possible.

1. Run the line such that it is as inconspicuous as possible.
2. The line should be run either horizontally or vertically whenever possible, plumb and level.
3. Never leave loose line hanging.
4. Cut to proper length.

Note: Some beverage systems may use carbon dioxide for three functions — carbonation of water, pushing of syrup from figals, or driving a bag in the box pump. The different systems require different CO_2 pressures.

Carbonation	90-115 psi
Pressurization of sugar based beverages in figals	60-65 psi
Pressurization of diet beverages in figals	8-12 psi
Driving of Bag-In-Box pumps	45-50 psi

These varying pressures are obtained using step down regulators. Normally a primary regulator is used to reduce the CO_2 tank pressure to 90 psi. Secondary regulators are used to lower the 90 psi down to the required pressures for other functions.

Use of Existing Regulators

Poor performance may result if the high pressure regulator found on a high pressure CO_2cylinder is used with the Bulk CO_2 System. The Bulk CO_2 System is equipped with its own final line regulator.

The secondary regulators found, are normally satisfactory; they should not be used as a primary regulator. Their maximum inlet pressure is usually only 160 psi, pressure above that will often blow the safety.

More information about post mix beverage systems can be found in Installation and Operational Procedures for Pressurized Soft Drink Dispensing Systems published by the NSDA, 1101 Sixteenth St. N.W., Washington, D.C. 20036

Slab Stores

1. Run line up into false ceiling, over to beverage machine.

Basement Stores

1. Run the beverage line overhead alongside of conduit or plumbing; secure with cable ties or conduit straps.

Beverage Hose Hook-Up

1. Open gas use isolation valve on Bulk CO_2 tank.
2. Adjust regulator until CO_2 comes out of end of beverage tubing.
3. Connect beverage tubing to drink system using appropriate fitting.
4. Adjust regulator to desired pressure.

X System Inspection

1. Clean up all excess material, tubing, brick, etc.
2. Soap test all joints to the drink system.

XI Explaining the System

Explaining the System

Upon installation completion of the Bulk CO2 System, it is the installers responsibility to explain the system to the store representative. The following descriptions and functions should be explained in detail.

Description	Function
CO_2 Contents Gauge	Indicates amount of liquid CO_2 in tank.
Final Line Regulator Gauge	Indicates pressure in line from tank.
CO_2 Tank Pressure Gauge	Indicates tank pressure.
Final Line Regulator	Controls pressure in line from tank to beverage machine.
Primary Relief Valve	Prevents tank pressure from exceeding 300 psi.
Gas Valve	On/Off valve for gas flow to the drink system.
Vent Hose	Vents excess to fill box outside.
Fill Hose	Used to fill tank from outside fill box.
Fill Box	Allows connection of liquid transfer line. (Lockable)
Filling Schedule	Should be set up with supplier based on CO_2 use (Normally every two weeks).

Carbon Dioxide Delivery

General

To minimize delivery expense, deliveries should be timed to allow a 200-300 pound delivery. For most restaurants, this will be every 20-30 days. Routes should be planned to minimize travel times and rush hour guidelines.

Important Information

1. Delivery vehicle pressure must be maintained at 280-300 psi for proper operation. *Low pressure can cause 45-50 minute fill times.*
2. If possible, arrange for delivery ticket to be mailed to account to minimize time spent at store.
3. Maintain a delivery log for each account.
4. Begin program with short intervals between deliveries, stretch deliveries out to longer intervals as consumption justifies.
5. A Carbo-Mizer 400 full of CO_2 at 250 psi will deliver approximately 52 lbs. of CO_2 before the pressure builder begins operation.

Carbon Dioxide Consumption XI

General

Restaurant CO_2 consumption is almost impossible to predict, however, the following gives some estimates:

Weekly Syrup Usage (Gallons)	Number of Containers	CO_2 Carbonation Consumption (lbs.)	Push ie., BIB or Figal
10	2	6	1
20	4	12	2
30	6	18	3
40	8	24	4
50	10	36	5
60	12	42	6
70	14	48	7
80	16	54	8
90	18	60	9
100	20	66	10

Based on ration of 0.6lbs. CO_2/gallon syrup.

Drink Volume

A 16 oz. drink is comprised of the following	
Ice	4 oz.
Water	9.6 oz.
Syrup	2.4 oz.
CO_2	0.0112 lbs.
1,000 16 oz drinks requires 11.25 lbs. of CO_2	

Beer Volume

CO_2 can also be used to push beer from kegs. Pressures used are lower to prevent excessive foaming (12-15 psi).

No. of 16 Gallon Kegs	CO_2 Consumed
10	2.5
20	5.0
30	7.5
40	10.0
50	12.5
60	15.0

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