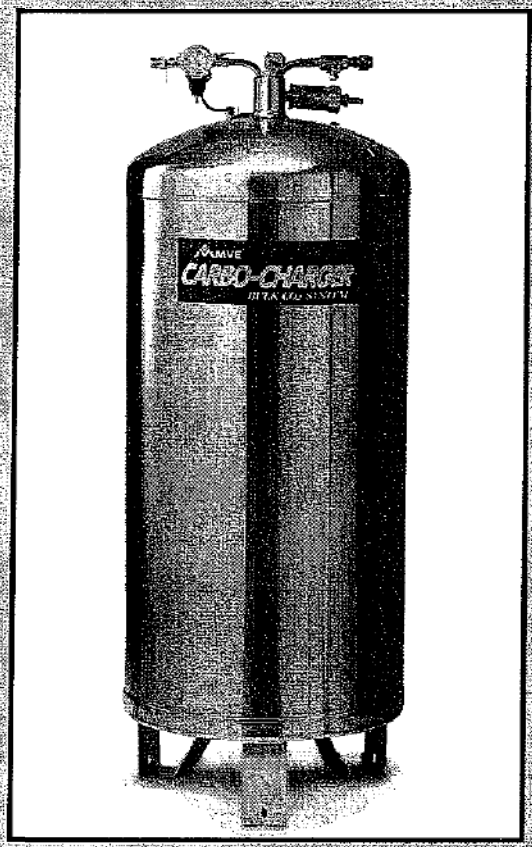
# Users Manual




# Carbo-Charger

MVE

# I Safety

## SYSTEM DESCRIPTION

This manual is to be used in conjunction with the normal operation of the MVE Carbo-Charger $CO_2$ storage system. The following terms are used throughout this manual.

| | |
|---|---|
| WARNING | **Description of a condition that can result in personal injury or death.** |
| *CAUTION* | *Description of a condition that can result in equipment or component damage.* |
| NOTE: | A statement containing information important enough to emphasize or repeat. |
| (ITEM) | Item numbers used throughout this manual refer to the Parts Identification section, page 4 and 5. |

The Carbo-Charger Storage Tank is designed for the safe storage of carbon dioxide refrigerated liquid. No modifications or changes should be made in the equipment without proper authorization from MVE, Inc..

The following cautions and warnings should be read and understood by all users of $CO_2$ gas in Carbo-Charger units before operating or attempting to perform any service work on the equipment.

**WARNING: Carbon Dioxide gas is heavier than air and will not support life. Exposure to concentrations of 10% or more can produce unconsciousness or death. Lower concentrations can cause headache, sweating, rapid breathing, increased heart rate, shortness of breath, or dizziness. Carbon dioxide is an odorless gas and should be treated as a material with poor warning properties.**

Carbon dioxide is heavier than air so high concentrations may be found in low areas such a 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 as soon as possible.

**WARNING: If solid $CO_2$ (dry ice) or compressed $CO_2$ gas comes in contact with the skin, eyes, or mouth, stop the exposure immediately and obtain medical attention.**

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

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# Specifications II

## SYSTEM DESCRIPTION

The Carbo-Charger Bulk $CO_2$ Storage System is designed to provide users of carbon dioxide a safe, convenient means of storing and delivering carbon dioxide to beverage systems. The Carbo-Charger System consists of the fill box, fill hose and storage tank.

## FILL BOX

The fill box is mounted on the outside of the facility and is used for filling the storage tank with liquid carbon dioxide. It is equipped with a self-closing fill connection which allows the $CO_2$ delivery person to easily fill the storage tank. Filling does not require the delivery person to enter the facility.

The fill box also serves as a vent location where $CO_2$ gas from the storage tank safety relief valve can be released harmlessly to the outside.

The fill box is permanently connected to the storage tank with a fill and vent hose.

## STORAGE TANK

The storage tank has a vacuum insulated stainless steel pressure vessel located inside a "ultra coat" carbon steel outer jacket. The insulation prevents the cold liquid $CO_2$ from boiling away. It includes an automatic pressure building system to maintain adequate $CO_2$ gas withdrawal.

An optional regulator supplies $CO_2$ gas to the beverage system at the desired pressure. To prevent carbonator overpressurization, this regulator can be equipped with a 130 psi relief valve and check valve.

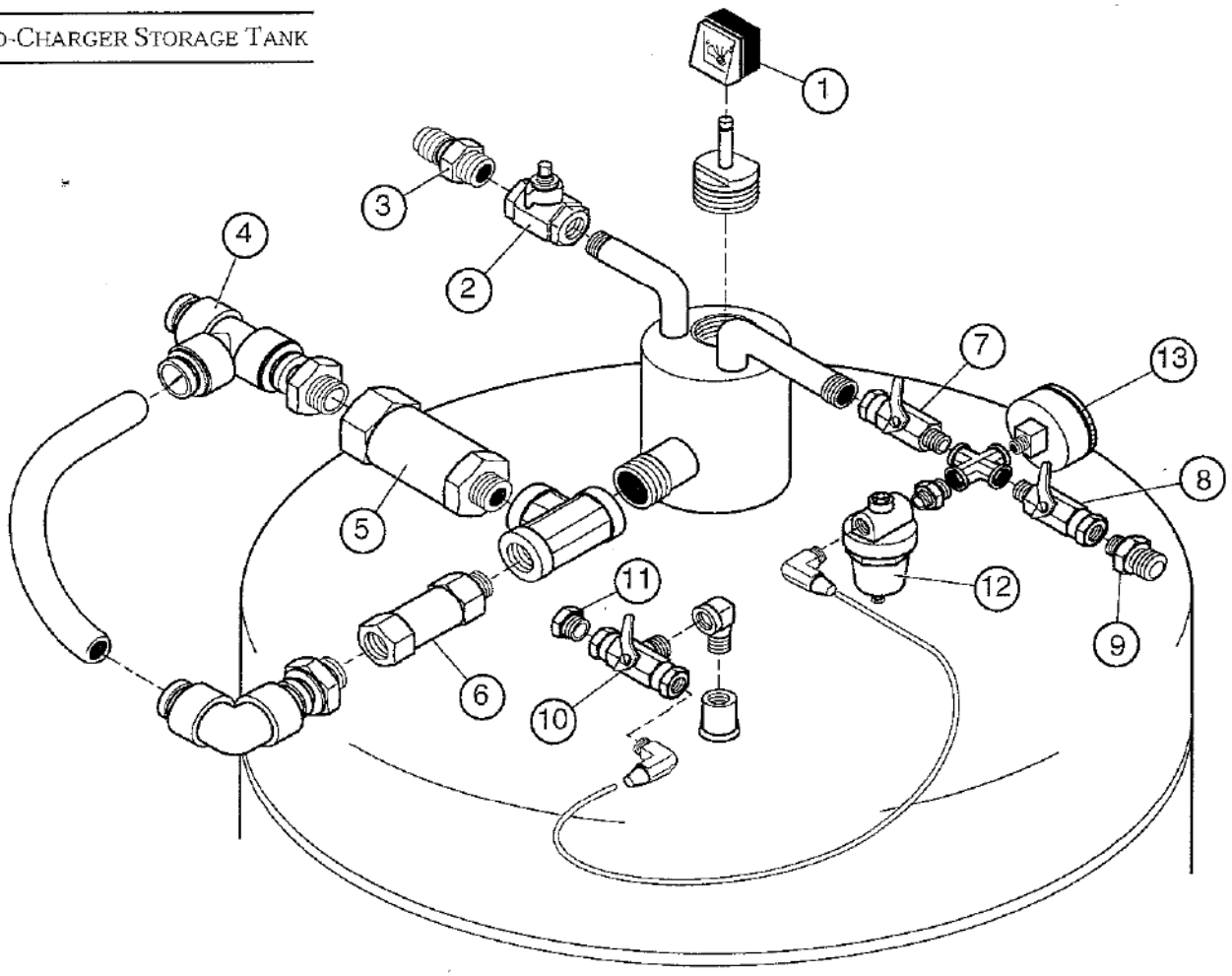
The Carbo-Charger storage tank is protected from damage due to excessive pressure by a primary and secondary relief device that vents outside into the fill box.

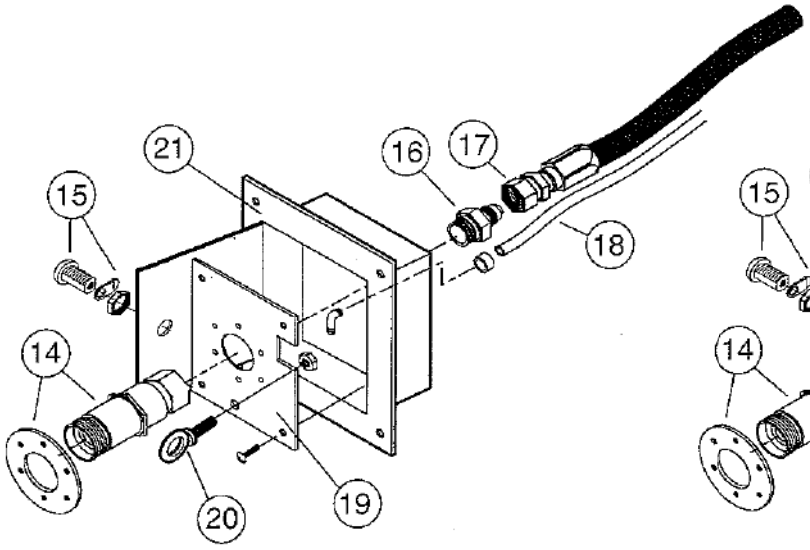
| SPECIFICATIONS | CARBO-CHARGER |
|---|---|
| **Dimensions** | |
| Diameter (in.) | 20 |
| Height (in.) | 47 |
| Empty Weight (lbs.) | 200 |
| Filled Weight (lbs.) | 370 |
| Gross Capacity (liters) | 128 |
| Storage Capacity, Liquid (lbs.) | 300 |
| Gas Use Regulator Connection | 1/4" MPT CGA 320 fitting |
| Fill Connection | 3/4" Quick Coupler |
| Vent Connection | 5/8" ODT |
| **Rates and Pressures** | |
| $CO_2$ Delivery Rate (continuous) | 1.0 lbs. $CO_2$/hour * |
| Peak Flow Rate | 3.0 lbs. $CO_2$/hour |
| Evaporation Rate | 2.0 lbs./day |
| Maximum Allowable Working Pressure | 300 psig |
| Primary Relief Valve Setting | 300 psig |
| Secondary Relief Device Setting | 450 psig |
| **Design Criteria** | |
| Design Specifications | ASME |
| Fill System | Lo-Loss Single Line Filling |
| Insulation Type | Super Insulation / High Vacuum |
| Liquid Level Gauge | Roto-Cal |
| Vacuum Jacket Material | "Ultra Coat"Carbon Steel |
| Inner Vessel Material | Stainless Steel |
| Fill Box Design | Flush or Surface Mounted |
| Basic Design | Flat Base |

* Approximately 133 drinks per hour respectively.

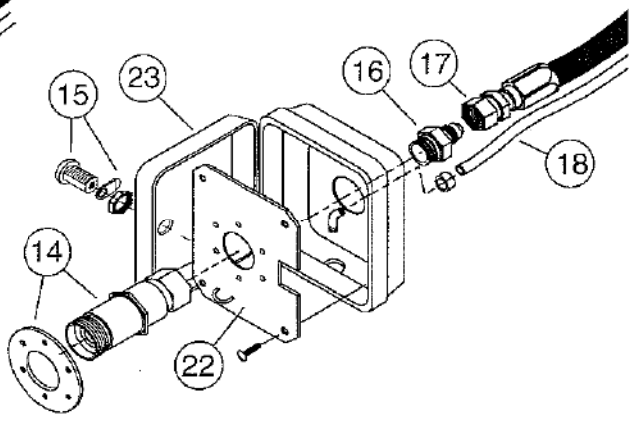
# III Parts Identification

CARBO-CHARGER STORAGE TANK




FLUSH MOUNT FILL BOX




SURFACE MOUNT FILL BOX

# Parts Identification III

| ITEM NO. | PART NO. | DESCRIPTION | QTY | FUNCTION |
|---|---|---|---|---|
| 1 | 20-1348-9 | Roto-Cal Gauge | 1 | Shows liquid $CO_2$ level. |
| 2 | 17-1461-1 | Ball Valve (3/8" FPT) | 1 | Emergency liquid shut-off |
| 3 | 11-1011-2 | Connection (3/8" MPT x 5/8" ODT - 45° flair) | 1 | Liquid hose connection |
| 4 | 10486462 | Connector (1/2" MPt x 1/2" ODT x 1/2" ODT) | 1 | Vent hose connector |
| 5 | 18-1125-2 | Relief Valve (1/2"MPT x 1/2 FPT (300 psi) | 1 | Protects inner vessel. |
| 6 | 18-1206-2 | Relief Valve (450 psi) | 1 | Protects inner vessel. |
| 7 | 17-1616-2 | Ball Valve (1/4" MPT x 1/4" FPT) | 1 | Isolates pressure building valve. |
| 8 | 17-1616-2 | Ball Valve (1/4" MPT x 1/4" FPT) | 1 | On/Off valve for gas supply |
| 9 | 40-1058-2 | Brass Fitting | 1 | Used to attach gas use regulator. |
| 10 | 17-1943-2 | Diverter Ball Valve (1/4" FPT x 1/4" FPT x 1/4" MPT) | 1 | Isolates pressure builder and cleans out pressure building line. |
| 11 | 12-1110-2 | Hex Head Plug 1/4" MPT) | 1 | Plugs clean out port. |
| 12 | 21-1003-2 | Pressure Building Regulator (125 psi) | 1 | Regulates tank operating pressure. |
| 13 | 20-1517-9 | Pressure Gauge (0-400 psi) | 1 | Indicates storage tank pressure. |
| 14 | 13-1248-2 | Fill Connection Valve | 1 | Connection for distributor fill hose |
| 15 | 10521627 | Lock Assembly | 1 | Locks fill box. |
| 16 | 11-1118-2 | Connector | 1 | Connects fill hose to valve. |
| 17 | 37-1109-7 | Fill Hose | 1 | Transfers liquid $CO_2$ from fill box to tank. |
| 18 | 28-1172-6 | Vent Hose | 1 | Transfer vent gas from tank to fill box. |
| 19 | 10503517 | Flush Box plate | 1 | Holds fill connector valve. |
| 20 | 09-5238-4 | Eyelet | 1 | Locks delivery hose. |
| 21 | 91-1113-9 | Flush Mount Box | 1 | Mounts into outside wall. |
| 22 | 55-0322-1 | Surface Box Plate | 1 | Holds fill connection valve. |
| 23 | 56-1749-9 | Surface Mount Box | 1 | Mounts on outside wall. |

**COMPONENT DESCRIPTION**

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

Gas is supplied to the customer's final line regulator and beverage equipment through the Final Line Connection (Item 9) which is mounted directly to the Carbo-Charger unit. This regulator maintains the proper line pressure for carbonation. The regulator's outlet pressure gauge shows the pressure in the carbonation equipment. Normal operating pressure is between 90-120 psi. In many cases additional regulators may be added after this regulator to supply other functions, such as Bag-in-Box pumps or syrup drive systems. Consult with the suppliers of that equipment for proper pressure recommendations.

The Control Valves for the Carbo-Charger system are factory set and should not be adjusted. The Pressure Building Valve (Item 12) controls the operating pressure of the storage tank and has a set pressure of 125 psi. It delivers liquid $CO_2$ to an internal pressure building coil if the tank pressure is low, and puts the evaporated gas back into the tank to raise the pressure.

The filling of the storage tank with liquid $CO_2$ is controlled by two valves, the Fill Connection Valve (Item 14) located in the filling station and the Emergency Shut-Off Valve (Item 2) on the tank.

The pressure vessel inside the Carbo-Charger storage tank is designed to the ASME Section 8, Division 1 Pressure Vessel Code. It has two Safety Relief Devices (Items 5 & 6) that protect it from overpressurization. These devices are vented outside the building into the fill box. The main relief valve (Item 5) may vent during a filling operation.

The Carbo-Charger storage tank pressure is shown on the Pressure Gauge (Item 13).

The Liquid Level Gauge (Item 1) is a dial gauge that indicates the amount of liquid $CO_2$ in the storage tank.

# IV Operation

## TANK OPERATING FACTS

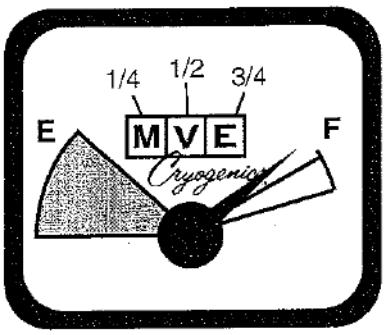
1. Normal tank operating pressure (gauge on tank) is between 110-150 psi.
2. Tank pressure may be as high as 300 psi after delivery.
3. Line pressure (gauge on regulator) is normally 90-100 psi.
4. Frost near bottom of tank is normal during periods of high $CO_2$ draw, ie. lunch hour rush and dinner rush.
5. If frost appears continuously, there is a leak in the beverage system or it is on $CO_2$ drive.
6. Amount of $CO_2$ in tank is determined by reading the level gauge mounted on the top center of the storage tank.
7. If in an emergency it is necessary to shut the $CO_2$ supply off, turn the gas supply On/Off valve (Item 8) to the OFF position.

## OPERATING INSTRUCTIONS

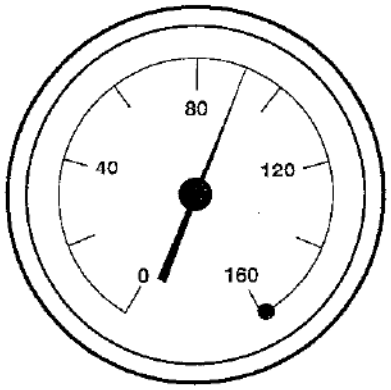
The Carbo-Charger bulk $CO_2$ system requires no adjustments under normal operating conditions. However, the following checks should be taken:

### Store Opening

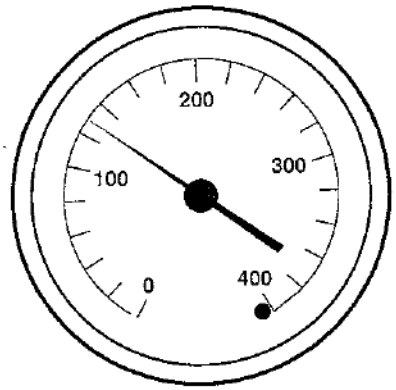
1. Check contents (gauge on the top center).




2. Check supply pressure gauge on the regulator. (Should read 90-100 psi.)




3. Check vessel pressure (gauge on the tank). Reading varies – usually less than 150 psi, could be as high as 300 psi after a fill.)



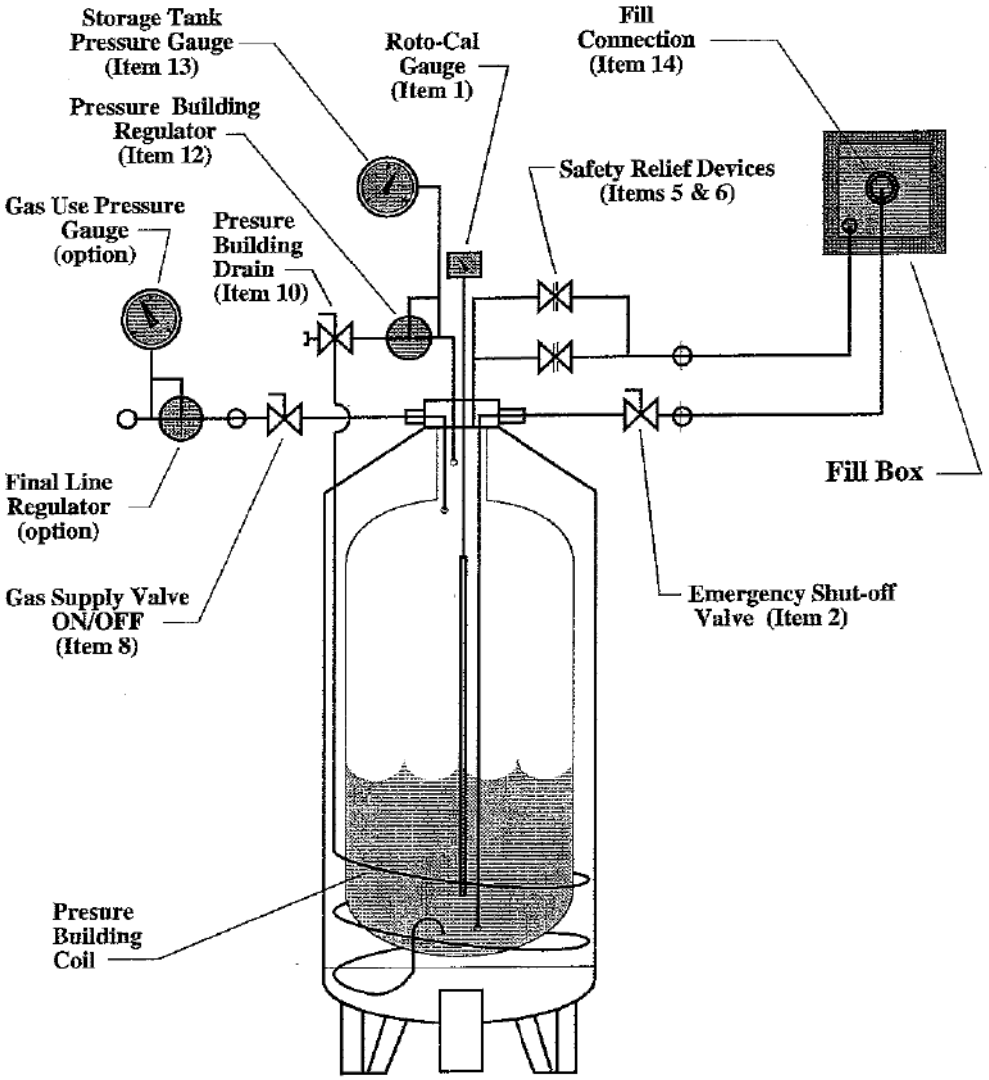

Note: If it is necessary to stop the flow of $CO_2$ out of the tank, turn gas On/Off valve (Item 8) to the off position. The supply pressure gauge should show 0 psig and the gas flow should stop.

Note: The Carbo-Charger $CO_2$ tank is equipped with an emergency liquid shut-off valve (Item 2). Access to this valve is provided using a hole on top of the shroud. Use a pliers to turn the stem.

# Troubleshooting V

| PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Drinks flat | Out of $CO_2$ | Check gauge on top of tank. If empty, contact $CO_2$ supplier for delivery. |
| | Final line regulator set too low. | 1. Pressure gauge on regulator should show 90-110 psi.<br>2. If too low, adjust by turning knob clockwise.<br>3. If drinks are still flat, then contact service agent. |
| | Kink or obstruction in $CO_2$ line. | Inspect line for kinks or obstruction. |
| | Large $CO_2$ leak. | 1. Listen for leaking gas.<br>2. Inspect line for holes. |
| | Tank pressure too low. | Pressure gauge on tank should be 100-300 psi. If less than 100, then contact service agent. |
| | Drink temperature too warm. | See manual for beverage system or call service agent. |
| | Beverage system malfunction. | Contact service agent. |
| Frost on side of tank near bottom. | High $CO_2$ consumption caused by lunch or dinner rush. | None required. Frost will disappear when volume drops. |
| | Leak in beverage system, figals or bag in box. | If frost appears early in morning or continuously, then system has a leak and service agent must be contacted. |
| Hissing coming from tank. | Safety relief valve functioning properly. | Check gauge on the tank, if reading is 280 psi or higher, then device is functioning properly. |
| | Safety relief valve opening too early. | Check reading of the tank gauge. If pressure is less than 280 psi then relief valve opens too early. Contact service agent. |
| | Leak in fill hose. | 1. Ventilate area to reduce $CO_2$ concentration.<br>2. Use pliers or adjustable wrench to close emergency liquid shut-off (Item 2). Grip small rectangular piece and turn so flat sides are parallel to front of tank. |
| Tank won't fill. | Emergency liquid shut-off valve (Item 2) on fill line closed. | Open valve using pliers or adjustable wrench. |
| | Tank pressure above 180 psi because it was just filled. | None. |
| | Blockage in line. | Contact service agent. |

# VI System Parts and Service




**Service and Maintenance**

The Carbo-Charger system is designed to be automatic and only requires the adjustment of the final line regulator .

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

Use only MVE replacement parts.

Contact MVE:

Technical Service Department
1-800-253-1769
Customer Service Department
1-800-247-4446

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