MODEL's CT-9KW, CT-18KW, CT-28KW & CT-56KW

MODULAR CARBON DIOXIDE

PRESSURE BUILD VAPORIZER

OPERATION MANUAL

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PLEASE READ

CARBO TECH CARBON DIOXIDE PRESSURE BUILD VAPORIZERS ARE NOT COMPLEX EQUIPMENT. HOWEVER, KNOWLEDGE OF THE HAZARDS ASSOCIATED WITH CARBON DIOXIDE SYSTEMS IS ESSENTIAL FOR SAFE INSTALLATION AND OPERATION ON THE UNIT.

THE INFORMATION PROVIDED IN THIS MANUAL IS INTENDED TO BE USED BY A QUALIFIED CARBON DIOXIDE EQUIPMENT TECHNICIAN.

WE STRONGLY SUGGEST THAT ONLY QUALIFIED PERSONNEL INSTALL AND MAINTAIN THIS EQUIPMENT.

REFER TO THE APPROPRIATE COMPRESSED GAS ASSOCIATION PAMPHLET FOR THE PROPER MATERIALS USED IN THE INSTALLATION OF CARBON DIOXIDE EQUIPMENT.

REFER TO THE NATIONAL ELECTRIC CODE AND CONSULT A QUALIFIED ELECTRICIAN FOR PROPER ELECTRICAL SUPPLY AND HOOKUP.

CAUTION: THIS EQUIPMENT IS OPERATED UNDER HIGH PRESSURE. "EXERCISE EXTREME CAUTION".

CAUTION: THIS EQUIPMENT IS OPERATED UNDER HIGH VOLTAGE. "EXERCISE EXTREME CAUTION".

CAUTION: IT IS IMPERATIVE THAT LINE SAFETIES BE INSTALLED BETWEEN BLOCK VALVES.

CAUTION: CARBON DIOXIDE EQUIPMENT SHOULD ALWAYS BE INSTALLED IN WELL VENTILATED AREAS.

DISCLAIMER

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CARBON DIOXIDE PRESSURE BUILD VAPORIZERS

GENERAL

Carbo Tech carbon dioxide pressure build vaporizers are designed for low maintenance operation. A typical units consists of an insulated pressure vessel, an immersion type electric heating element and necessary controls and piping. The units liquid inlet should be connected to a bulk carbon dioxide storage receiver. The return line must be connected to the receiver's vapor outlet. The unit is automatically controlled by means of a pressure switch. The switch operates off the receivers vapor pressure and is field connected by means of a 1/4" copper line. In a normal operating mode, the unit is de-energized as long as the internal pressure in the receiver is above 250 psig. If the pressure falls below 250 psig the pressure switch activates a magnetic contactor and the elements become energized. Liquid carbon dioxide from the receiver is vaporized and returned to the top of the receiver. When enough liquid is vaporized to raise the pressure to 260 psig the unit will de-energize.

APPLICATION

There are many applications where a carbon dioxide pressure build vaporizer would be required. These would include most vapor use applications and many large liquid use applications. These locations often have a bulk carbon dioxide receiver installed. Removal of modest quantities of vapor or large quantities of liquid will result in a pressure drop in the receiver. Most arbon dioxide receivers are designed to operate at temperatures above -20 F and 200 psig. Therefore a means must be provided to keep the pressure above 200 psig. The pressure build vaporizer is designed to handle this requirement.

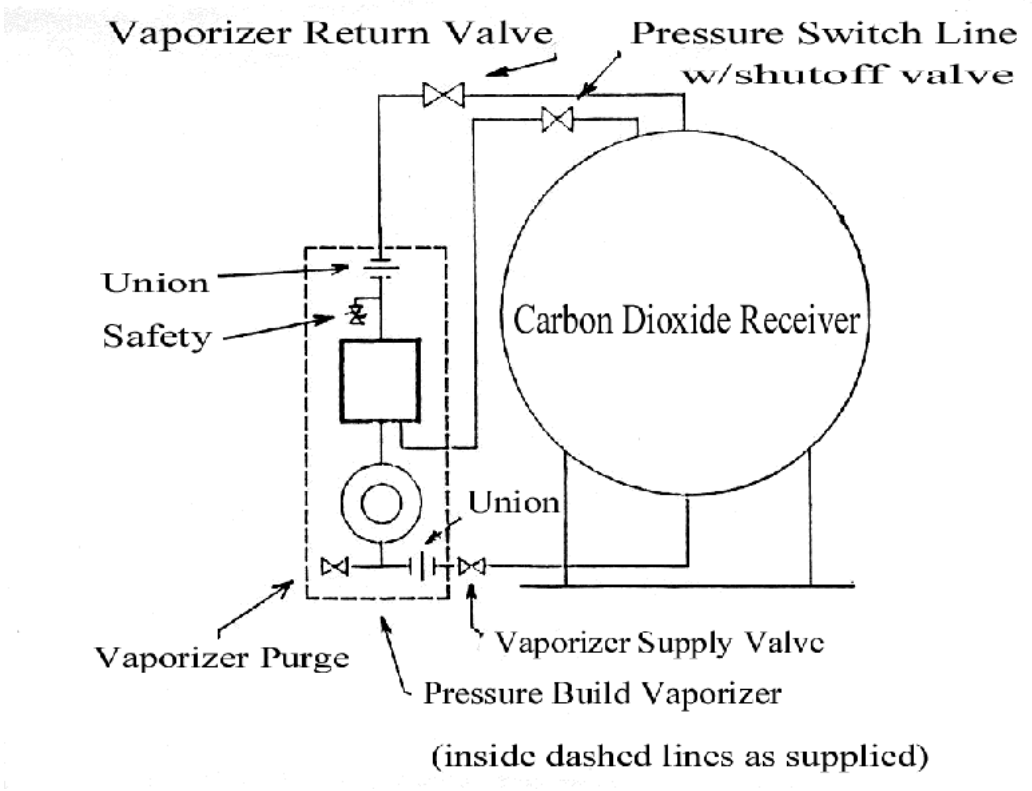
OPERATION

The units's operation is completely automatic. It will energize any time the pressure is below 250 psig and shut off at 260 psig. The unit is protected by two high temperature cutouts. They are factory set at 35 degrees F. Liquid carbon dioxide is vaporized by the heating elements and returns to the top of the storage receiver via the vaporizer return line. The electrical pressure switch senses the pressure in the receiver and controls the operation of unit accordingly.

INSTALLATION

PIPING AND VALVES

The unit should be installed along side the carbon dioxide storage receiver or inside the control cabinet. The unit should be placed as low and near the supply and return lines as possible. Supply and return lines should be as straight as possible without traps. The liquid supply line should comes off the lowest point possible on the receiver without an internal or external trap. The liquid supply line must be a minimum of 1" (25.4 mm) schedule 80 A106-B pipe (or equivalent type K copper). The return line must be a minimum of 1-1/2" (38.1 mm) schedule 80 A106-B pipe (or equivalent type K copper). A ball valve must be installed in the inlet and return lines. The valve used should be rated for 600 psig (41.4 bar) and have materials compatible with carbon dioxide. The liquid in and vaporizer return lines should be leak tested and insulated with a minimum of 1" (25.4mm) of urethane. The pressure switch needs to be connected to the low pressure side of the receivers instrument piping or to a vapor outlet on the receiver. It is not necessary to insulate this line. A sketch showing a typical installation follows:



INSTALLATION CONTINUED

ELECTRICAL

This unit comes wired and ready to operate. CONSULT A QUALIFIED ELECTRICIAN FOR PROPER HOOK UP OF THIS EQUIPMENT. A disconnect switch should be installed near the unit. Note: The unit is factory wired per your voltage requirements for either 230 or 460 volt 3 phase. Confirm that the unit is wired correctly for your requirements by checking the voltage tag on the electrical enclosure. If it is determined that a wiring change is necessary, please refer to the wiring drawing. The heating elements and the control voltage transformer both must be rewired. Amp loads of the various model pressure build vaporizer are listed below.

CT-9KW	***9,000 Watts @ 230 Volts, 3 Phase, 60 Hz - 23 Amps***
	12,000 Watts @ 460 Volts, 3 Phase, 60 Hz - 15 Amps
CT-18KW	***18,000 Watts @ 230 Volts, 3 Phase, 60 Hz - 45 Amps***
	24,000 Watts @ 460Volts, 3 Phase, 60 Hz - 30 Amps
CT-28KW	***28,000 Watts @ 230 Volts, 3 Phase, 60 Hz - 70 Amps***
	28,000 Watts @ 460Volts, 3 Phase, 60 Hz - 35 Amps
CT-56KW	***56,000 Watts @ 230 Volts, 3 Phase, 60 Hz - 148 Amps***
	56,000 Watts @ 460Volts, 3 Phase, 60 Hz - 70 Amps

PRESSURIZATION OF THE VAPORIZER

Upon completion of the installation process, slowly open the vaporizer return valve. This will pressurize the vaporizer with vapor. Check the unit for leaks (sometimes small leaks can develop due to rough handling during shipment) and repair if necessary. CAUTION: NEVER ATTEMPT TO REPAIR A LEAK UNDER PRESSURE. The vaporizer purge valve may be used to depressurize the vaporizer.

INITIAL STARTUP

Insure that the power is turned off. Slowly open the vaporizer return valve and pressurize the vaporizer. Close the vaporizer return valve and open the vaporizer purge valve. This procedure should be repeated several times to remove any trapped air form the lines and vessel. Slowly open the vaporizer return valve (full open), open the vaporizer liquid supply valve. In a matter of a few moments the unit will be flooded with liquid carbon dioxide. Open the vapor supply to the pressure switch. The unit is now ready to operate. The pressure switch is factory set at 250 psig on (17.24 bar) and 260 psig off (17.93 bar). Slight control adjustments may be necessary due to the rough handling the unit receives in shipment. They can be checked with the power off using a carbon dioxide cylinder to pressurize the switch. Monitor the contact operation and adjust if necessary. The high temperature cutouts are factory set at 35 degrees F (1.67 degrees C). Check the setting and adjust if necessary. Turn on the power. Monitor its operation for several days to insure proper operation.

MAINTENANCE

Product impurities tend to collect in the bottom of pressure build vaporizers. There are several reasons, one of which is that it is the lowest point in the system. Another is the heating of carbon dioxide tends to separate impurities from the liquid. Therefore it is necessary to purge the vaporizer weekly. The purging process is a follows: At the end of the last working day of the week turn the electric power to the vaporizer off. Close the vaporizer liquid supply valve. Leave the system in this configuration all weekend. Upon returning to work Monday morning close the vaporizer return valve and open the vaporizer purge valve. All the impurities will be blown out of the unit along with a small amount of carbon dioxide. Once this process is complete close the vaporizer purge valve, slowly open the vaporizer return valve to full open position, open the vaporizer liquid supply valve and turn on the power.
CAUTION: DO NOT DEVIATE FROM THIS SEQUENCE.

FEATURES AND SPECIFICATIONS

Pressure vessel built to the ASME code specs.

525 psig (36.2 bar) working pressure

Nema 3R electrical enclosure

2000 lb (137.9 bar) forged steel fittings minimum

Built to requirements of the National Electric Code

UL listed electrical components

Durable electric immersion heating elements

1-1/2" (38.1 mm) Urethane insulation on pipe

Minimum of screwed fittings to lower leak potential

Aluminum jacket over insulation

Supplied with 1" (25.4 mm) purge valve

Safety set at 450 psig (31.03 bar)

Schedule 80 A-106 pipe

2" (50.8 mm) Urethane insulation on vessel

DIAGNOSTIC SECTION

NOTE: DISCONNECT THE MAIN POWER BEFORE OPENING THE ELECTRICAL CABINET. MOST TROUBLE SHOOTING CAN BE ACCOMPLISHED BY QUALIFIED PERSONNEL USING A MULTIPURPOSE VOLT-AMP METER WITH THE POWER OFF.

TROUBLE	***PROBABLE CAUSE:***	***REMEDY:***
Vaporizer will not energize	*-No power*	*-Check power*
	-Defective control voltage transformer	*-Replace as required*
	-Defective control voltage fuse	*-Replace as required*
	-Defective high temperature control	*-Replace as required*
	-High temperature cutout set too low	*-Reset to 35 degrees F (1.67 degrees C)*
	-Improperly wired	*-Check & rewire as required*
	-Defective contactor coil	*-Replace as required*
Unit energizes but short cycles	*-Liquid supply valve closed or not fully open*	*-Open valve*
	-Vapor return valve closed or not fully open	*-Open valve*
	-Defective pressure switch	*-Replace as required*
	-High temperature set too low	*-Reset to 35 degrees F (1.67 degrees C)*
	-Vaporizer vessel full of impurities	*-Purge as required*

NEW MODULAR PRESSURE BUILD VAPORIZERS
LIMITED WARRANTY

CARBO TECH WARRANTS TO THE ORIGINAL PURCHASER THAT THE VAPORIZER WILL BE FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP IN NORMAL USE AND SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF INVOICE. THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

THIS LIMITED WARRANTY COVERS FAILURES DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP. IT DOES NOT COVER FAILURES DUE TO DAMAGE WHICH OCCUR IN SHIPMENT OR OF FAILURE WHICH RESULT FROM ACCIDENTS, MISUSE, ABUSE, NEGLECT, MISHANDLING, MISAPPLICATION, ALTERATION, FAULTY INSTALLATION, MODIFICATION OR DAMAGE ATTRIBUTABLE TO ACTS OF GOD.

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