

GENERAL INFORMATION

Chemetron High Pressure Carbon Dioxide fire extinguishing systems provide protection for a variety of industrial applications. High Pressure CO₂ systems consist of four basic components and their associated accessories.

- Storage / Distribution Components
- Completer Kits
- Control Panels
- Detection and Alarm Devices

FEATURES

- 1** The storage/distribution components consist of the cylinders and valves, support and racking components, and discharge nozzles.
- 2** The Primary Completer Kit includes a pilot discharge head, pilot solenoid, pilot connection kit, discharge hose, warning sign, and manual operating instruction plate. The Slave Completer Kit includes a slave discharge head and discharge hose.
- 3** The control panel monitors the detection and actuation devices and includes timers to delay the discharge, allowing for safe departure from the protected space.
- 4** The detection and alarm devices are the external components that provide audible or visual signals to alert occupants of pending problems or the possible need to evacuate the protected space prior to discharge.

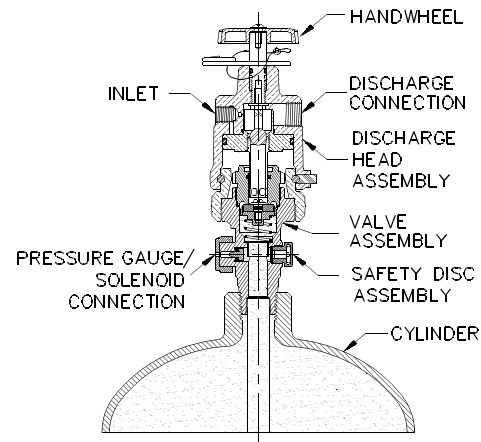
Carbon dioxide systems can be designed for total flooding and local application protection. The guidelines contained in the National Fire Protection Association Standard on Carbon Dioxide (NFPA 12) and OSHA standards, as well as state and local requirements should be followed for either design. A total flooding system can be defined as injecting CO₂ into a room, area or compartment that has the structural integrity to retain the agent once it has been discharged. The minimum concentration requirement for total flooding systems is 34% by volume. This minimum concentration is suitable for a wide range of ordinary combustibles and flammable liquids. Higher concentrations may be required for specific flammable liquids and/or hazards that may become deep seated. The local application method requires that CO₂ be applied to the surface of the protected hazard for a specified time period that insures the fire condition has been controlled.

HIGH PRESSURE CO₂ EQUIPMENT DESCRIPTION

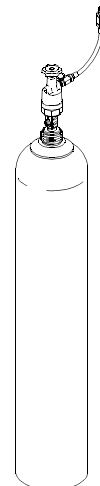
CYLINDER AND VALVE ASSEMBLY

The cylinders that are used to store CO₂ are spun steel containers manufactured to DOT Specification 3AA-1800 or 3AAA-1800 or higher. They are available in five different capacities - 25 lb. (12 kg), 35 lb. (16 kg), 50 lb. (23 kg), 75 lb. (34 kg) and 100 lb. (45 kg) sizes. Each cylinder is stamped with a serial number and hydrostatic test date. They also come equipped with a steel cap for the physical protection of the cylinder valve during shipment and handling.

The standard cylinder assembly is composed of a cylinder, rigid siphon tube, and valve. It is designed for vertical mounting only.



Cylinder Valve & Discharge Head (Pilot)



Pilot



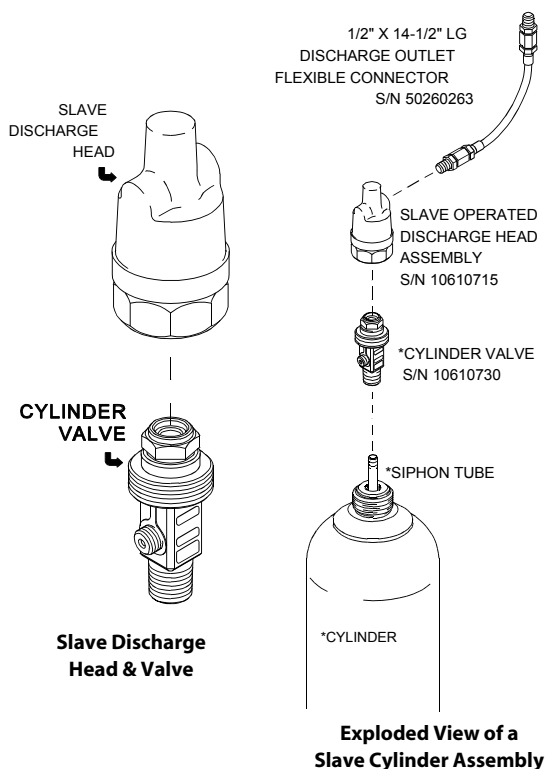
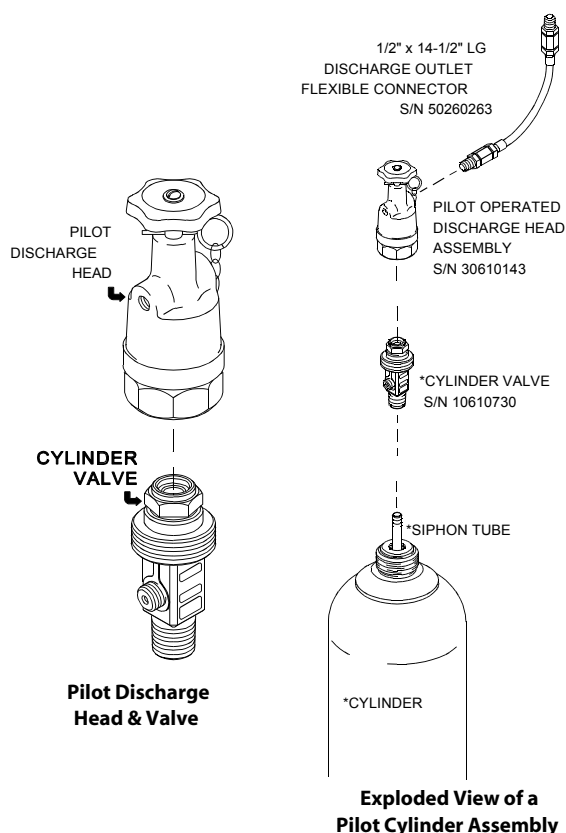
Slave

Cyl Size	Stock Number (Standard Assemblies)	Filled Cylinder Weight (1) Lb (Kg)	Cylinder Assy Dimensions			
			Height (2)		Diameter	
			in	cm	in	cm
25#	10481493	87 (39)	29-5/8	75.25	8-1/2	21.59
35#	10481494	121 (55)	39-1/2	100.33	8-1/2	21.59
50#	10480202	154 (70)	55-1/4	140.34	8-5/8	21.91
75#	10480203	216 (98)	60-1/4	153.04	9-5/16	23.65
100#	10480204	291 (132)	62-1/4	158.12	10-5/8	26.99

(1) Cylinder weights are approximate.

(2) Height is top of cylinder valve to bottom of cylinder, ± 1/2".

OPTION: Winterized cylinder assemblies (90% CO₂ fill pressurized with Nitrogen to 1050 PSI at 70°F) are available in all cylinder sizes.



* Part of Cylinder Assembly

A Cylinder: The steel cylinders are manufactured to the requirements of the U.S. Department of Transportation (DOT) for compressed gas storage, specification 3AA-1800 or 3AAA-1800 or higher.

B Siphon Tube: A 3/4" (19 mm) threaded stainless steel tube with a wall thickness of .035" (.89 mm) extends from the cylinder valve down to the bottom of the cylinder.

C Cylinder Valve: A pressure operated cylinder valve consisting of a forged brass body with an external disc carrier and seat disc held in the normally closed position by a spring and cylinder pressure. The valve has been designed to take advantage of a 7 to 1 seat to piston ratio, which assures consistent operation. The body is designed with multiple threaded connections which accommodate the discharge head and cylinder. In addition, the following connections are provided:

1 Safety Disc (S/N 50610624): A frangible safety disc is required for connection to the valve body and serves as a pressure relief device to protect the cylinder and personnel in case of excessive internal pressure. The disc is designed to rupture when it is exposed to pressures between 2850 and 3000 psi (16,203 to 20,685 kPa) created by high temperatures.

2 Fill Check (S/N 30610033): The filling port contains a check valve type device that also serves as a connection for the attachment of a solenoid pilot valve, as well as a port to fill the cylinders. The threads for attachments are .825-14NGO-RH-EXT (CGA No. 320).

D Discharge Head: Each cylinder requires the addition of a discharge head to open its valve. The discharge head is attached to the cylinder by means of a swivel nut that engages the threads of the valve. Three different types of discharge heads can be used:

- a) pilot operated type with handwheel for manual operation
- b) pilot operated type without handwheel
- c) pressure operated type

Each of the three types includes an internal operating piston connected to a hollow stem that is used to upset the cylinder seat disc when operated, which allows the agent to exit. A stainless steel ball check at the top of the stem provides a safety feature to prevent excessive loss of carbon dioxide from the manifold if the system is discharged during servicing.

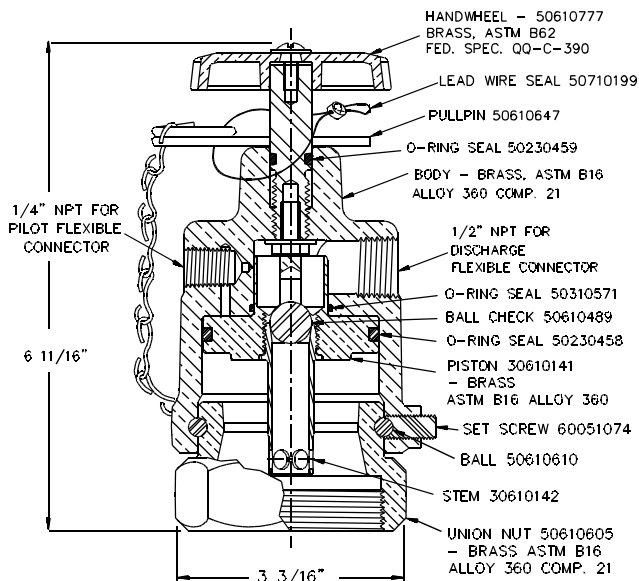
COMPLETER KIT - PRIMARY

Two types of completer kits that contain the necessary components required to make the cylinder functional are available.

Description	Completer Kits	
	Primary 20480483	Slave 20480484
	Quantity	Quantity
Pilot cylinder hose kit	1	0
Solenoid valve	1	0
Warning sign	1	0
1/2" Discharge hose	1	1
Instruction sign	1	0
Pilot discharge head	1	0
Slave discharge head	0	1
If cylinders are used in a Main/Reserve system, order decals: Main Decal - S/N 50360753 Reserve Decal - S/N 50360752		

PILOT OPERATED HEAD WITH HANDWHEEL

Stock Number 30610143



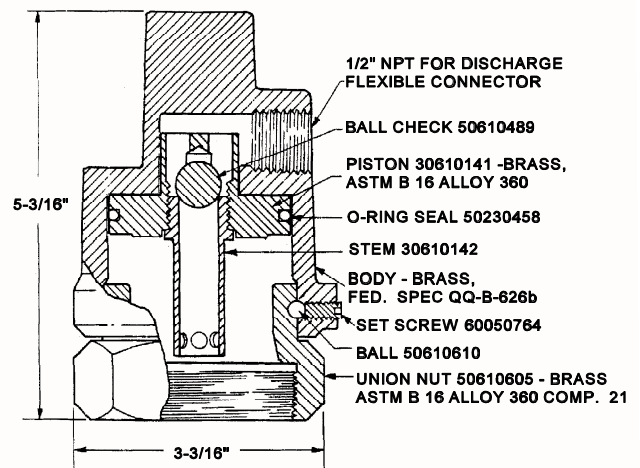
This discharge head is designed with a 1/4" (6 mm) NPT connection for pilot pressure entry to the top of an internal piston for valve operation. It is used on the actuation cylinders. This head also operates when pressure from the manifold is applied to the piston. It contains an internal vent opening to prevent the accumulation of pressure on the piston when leakage occurs through the solenoid valve to prevent accidental discharge.

The discharge head is also provided with a handwheel for manual operation, which is independent of a need for electric power. The handwheel is turned counterclockwise for operation. The NFPA 12 Standard on Carbon Dioxide requires that when three or more cylinders are used, two pilot discharge heads are needed to open the remaining cylinders.

PRESSURE OPERATED DISCHARGE HEAD

Stock Number 10610715

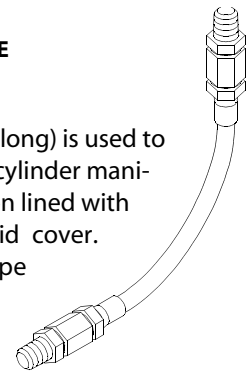
This head contains the same features as the pilot head; however, it does **not** have a handwheel and lacks the pilot connection port. It is operated by manifold pressure that accumulates in the discharge outlet during pilot cylinder operation.



FLEXIBLE CONNECTOR - DISCHARGE

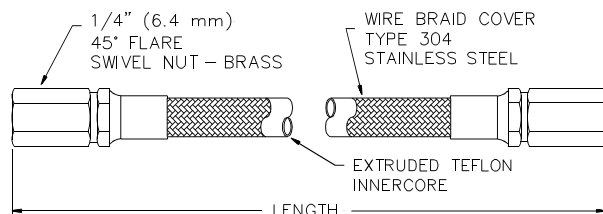
Stock Number 50260263

A 1/2" (13 mm) braided hose (14 1/2" long) is used to connect each discharge head to a cylinder manifold or outlet pipe. The hose is Teflon lined with an outer stainless steel wire braid cover. There are 1/2" (13 mm) male pipe thread connections on one end. One end also contains a union joint for easy make-up without twisting, while the other has a coupling with male adapter for easy installation.



FLEXIBLE PILOT HOSES

Lengths of 3/16" (5 mm) braided hose are used to interconnect the solenoid valves to the pilot port on each discharge head. They are Teflon lined with an outer stainless steel braided cover. There is a 1/4" (6 mm) swivel flare connection at each end.

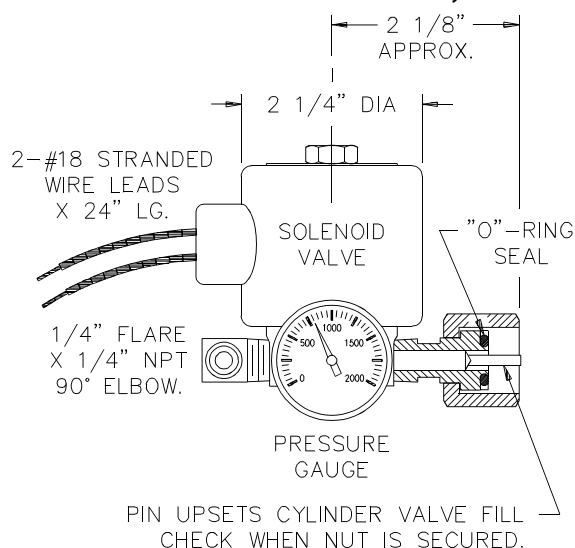


Flexible Pilot Hose

Stock Number	Description
10260260	3/16 in. (5 mm) Connector 16 in. (40.6 cm) long
10260267	3/16 in. (5 mm) Connector 20 in. (50.8 cm) long
10260303	3/16 in. (5 mm) Connector 28 in. (71.1 cm) long

SOLENOID PILOT VALVE

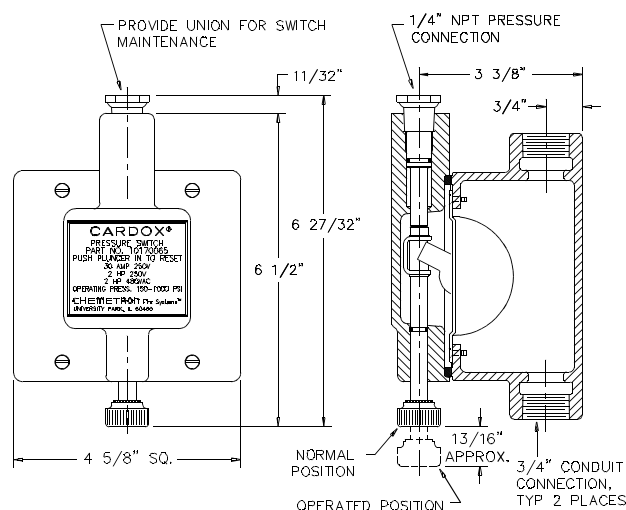
A solenoid pilot valve assembly includes a pressure gauge and adapter with swivel nut. The adapter has an O-ring sealed connection for attachment to the cylinder valve.



Stock Number	Description
20610015	Solenoid pilot valve assembly 120V-60Hz/24 VDC
20610168	Explosionproof Solenoid pilot valve assembly 24 VDC

PRESSURE SWITCH

An optional pressure switch is used in the system to implement the shut down of power to various items of equipment, such as fans, and for annunciation and alarm purposes. Pressure switches are available in both weatherproof and explosionproof models.



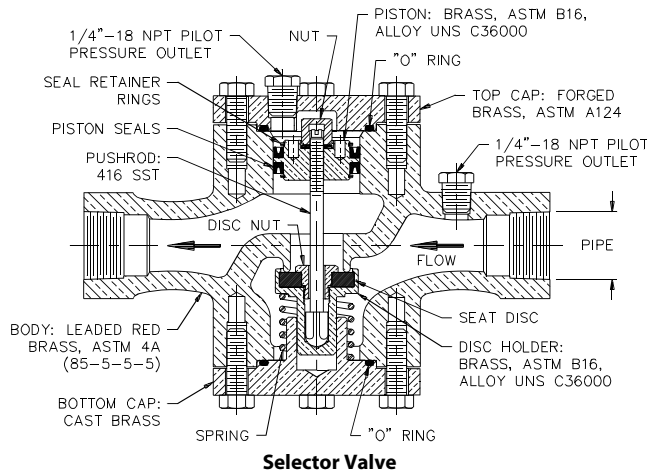
Stock Number	Description
10170089	2 Pole Pressure Switch <i>indoor use only</i>
70170229	Explosionproof 3 Pole Pressure Switch
10170065	4 Pole Pressure Switch <i>weatherproof</i>

SELECTOR VALVES (DIRECTIONAL)

Selector or directional valves can be provided to use a single group of cylinders to protect multiple areas or hazards. When used, the valves act as blocking devices directing the flow of CO₂ to the protected space requiring CO₂. The valve sizes available range from 1/2" (13 mm) to 4" (102 mm) outlet sizes.

All valves are provided with a screwed inlet and outlet connection with the exception of the 3" and 4" valves, which have a flanged connection on both.

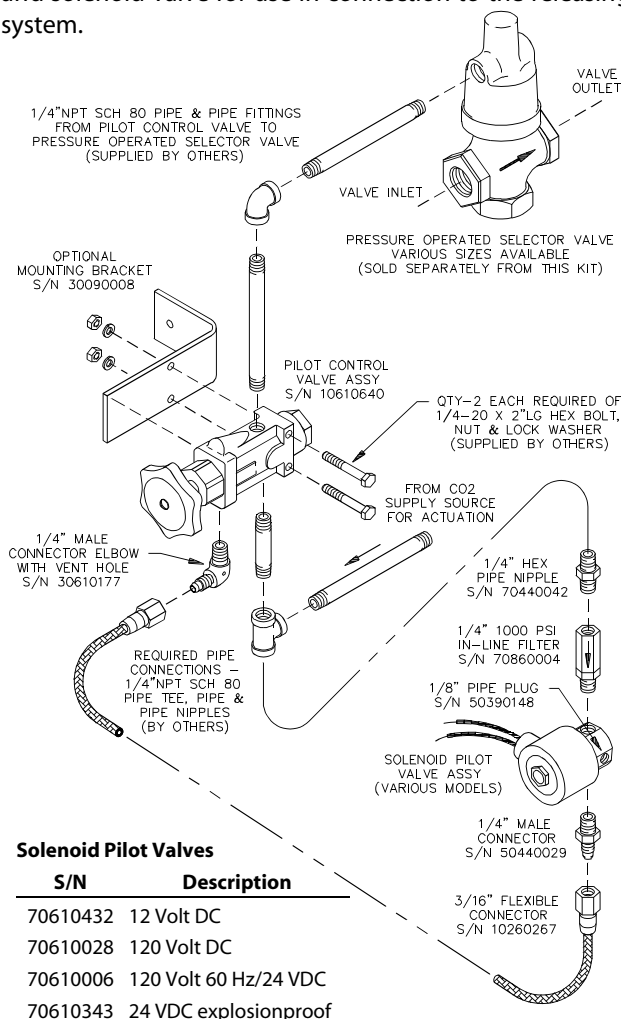
Stock Number	Description
30610047	.5 in. (13 mm) Selector valve
30610048	.75 in. (19 mm) Selector valve
10610371	1 in. (25 mm) Selector valve
10610369	1.5 in. (38 mm) Selector valve
10610370	2 in. (51 mm) Selector valve
10610733	3 in. (76 mm) Selector valve
10610734	4 in. (102 mm) Selector valve



ACTUATION KIT

Stock Number 20480482

The selector valves require the addition of an actuation kit and solenoid valve for use in connection to the releasing system.



Solenoid Pilot Valves

S/N	Description
70610432	12 Volt DC
70610028	120 Volt DC
70610006	120 Volt 60 Hz/24 VDC
70610343	24 VDC explosionproof

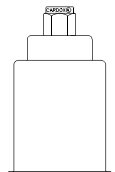
CYLINDER RACK

The cylinder rack consists of various lengths of channel, straps and miscellaneous bolts. The number of straps and channel pieces vary with the quantity of cylinders required. It is shipped unassembled.

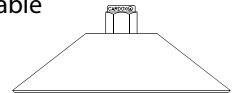
NOZZLES

Several types of nozzles are used in the design of carbon dioxide systems. Each nozzle is designed for a specified purpose.

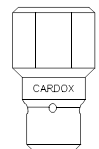
A **Spot** type nozzle is available in both a 4" (10 cm) and 5½" (14 cm) diameter shell. This nozzle design can be used for both total flooding and local application systems.



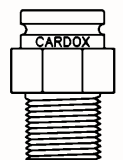
A **Wide Angle** type nozzle is available with a 6 in. (15 cm) or 10 in. (25 cm) diameter shell. This nozzle design is only used for total flooding systems; typically high ceiling applications.



A **Radial** type nozzle is available from 1/4" to 2" sizes. This nozzle design is only used for total flooding application systems.



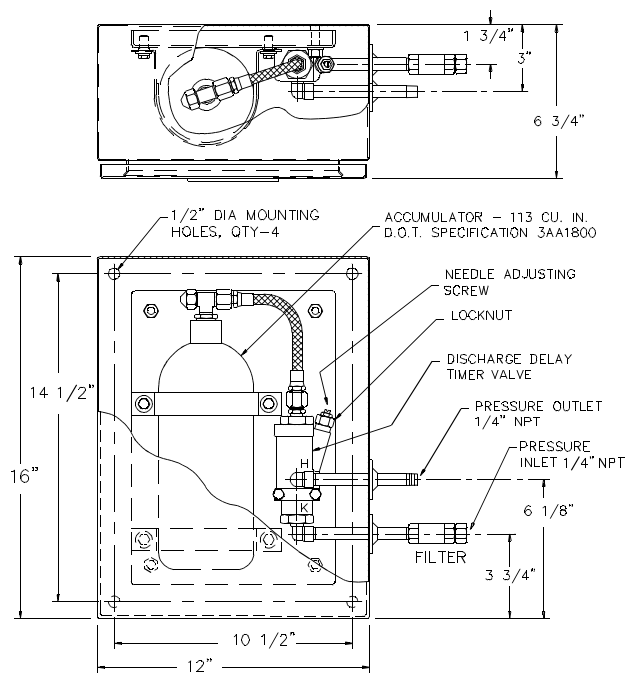
Orifice type nozzles are available for ducts and small enclosures. This nozzle design is only used for total flooding application systems. Orifice nozzles can be supplied with spring cap covers to prevent dirt and debris from clogging the nozzle.



PNEUMATIC DISCHARGE DELAY TIMER

Stock Number - 10100947

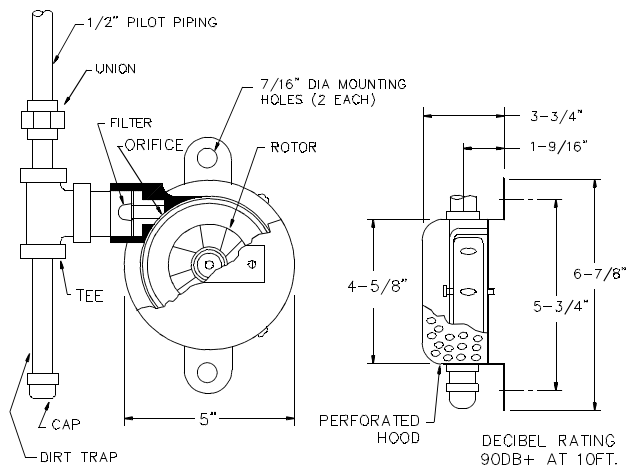
A pressure operated mechanical timer is available to delay the discharge of carbon dioxide into an area until evacuation has been accomplished. The delay has a minimum setting of 5 seconds and a maximum setting of 90 seconds. During the discharge delay period, pressure operated sirens are used to provide audible warning of an impending carbon dioxide discharge in the area, allowing for safe departure from the protected space.



Pneumatic Discharge Delay Timer

Discharge Delay Timer Notes:

1. Stock units are factory set for 22 seconds delay. To increase time delay, turn needle clockwise.
2. Limit of adjustment: 5 seconds minimum to 90 seconds maximum.
3. Enclosure material: 16 ga. Carbon steel, painted with red epoxy enamel.



CO₂ Siren - S/N 70030380

PHYSICAL/CHEMICAL PROPERTIES

Carbon dioxide (CO₂) is a colorless, tasteless, odorless gas that is found naturally in our atmosphere in relatively small quantities of about 0.03% by volume. It is an important gas because it is part of the basic life cycle in nature.

CO₂ is 1.5 times heavier than air and extinguishes fire by reducing the concentration of oxygen in the air to the point where combustion can no longer take place.

Chemical Formula CO₂
Molecular Weight 44.01
Specific Gravity 1.53
Specific Volume CO₂
Gas 60EF 8.56 cu.ft./lb.
Gas 70EF 8.73 cu.ft./lb.
Density Formula CO₂
Liquid: +1.7EF 300 psi gauge 63.36 lb./cu.ft.
Liquid: +70.0EF 839 psi gauge 47.35 lb./cu.ft.
Critical temperature (highest temperature at which CO₂ can exist as a liquid) +87.8EF

SAFETY CONSIDERATIONS

When discharged in the required fire extinguishing concentrations, carbon dioxide can create risks or hazards to personnel, such as suffocation and reduced visibility. Safeguards, such as both audible and visual alarms, shall be provided for areas protected by carbon dioxide extinguishing systems. It is also recommended that personnel training and self-contained breathing apparatus be provided for rescue purposes.

The Chemetron Carbon Dioxide Safety Manual and the Material Safety Data Sheet (MSDS) covering carbon dioxide provide additional information. Both should be read and understood prior to working with CO₂.

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