

CHEMETRON
Fire Systems™

CARDOX

CO₂

Application Bulletin

CHEMETRON
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A World of Protection



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Carbon Dioxide Fire Suppression —

Cartridge-Type Dust Collectors

In the modern industrial plant where grinding, machining and other dust or particle producing equipment is being used, maintenance of a clean air environment is mandatory. If the equipment that produces the dust or particulate matter is spread out in the plant production areas, dust collectors are traditionally located at or near each piece of equipment served, rather than being part of a major centralized dust collection system. [NOTE: See Industrial Facilities Bulletin #0790 (Bag Houses) for a discussion of protecting the type of dust collector used in these larger installations.]

The smaller collectors are usually of the “cartridge” type rather than the “bag house” type. Even though they are small, a significant fire can occur, producing a serious hazard to the production in that area (and even creating a risk to the entire plant). Quick detection and clean suppression of such a fire will not only minimize damage to the collector but also eliminate the fire risk to its surroundings.

Since these collectors are relatively small, the CO₂ requirements are likewise small. The design of a proper system would be based on the requirements of National Fire Protection Standard #12, which calls for flooding the collector with CO₂ to a 75% concentration. See Figure 2 for an illustration of a typical system.

These systems usually will require one or two CO₂ cylinders piped to one or more discharge nozzles in the collection area (and sometimes into the dirty air inlet duct). If there is a damper in the inlet, it needs to be arranged to close upon operation of the CO₂ system (a damper release operated by CO₂ pressure is used as shown). And, of course, the fan is arranged to shut down upon system operation as well.

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Issued: (6/2002)

Branded: 06/2023 20230601SM

System Operation

Automatic fire detection is by rate compensated-type, heat actuated fire detector(s) installed in the outlet of the collector area (fan inlet). A manual release station is provided (or the plant PLC can be used) for use by operating personnel upon observation of a fire. Release of the system by automatic or manual means is initiated through a small system releasing control panel (containing a 24 VDC power supply with battery backup), which operates a solenoid release on the cylinder discharge head to open the CO₂ cylinder valve. The system has a provision for actuation by emergency manual release (EMR), which is used in the rare case of failure of the electrical system. A pressure switch is normally provided to ensure fan shutdown and alarm in the event of EMR operation. An audible and visual alarm will sound on actuation, at or before the time the CO₂ discharge starts. The control panel electrically supervises the releasing and alarm circuits. Contacts on the control panel are available to tie into the plant fire alarm system to indicate system actuation or trouble.

The CO₂ system equipment can be located remote from the protected collector, but location near the collector is preferable. The system can be free-standing or wall mounted.

On some systems the CO₂ cylinder, with its discharge head, control panel, manual release station, alarm horn/strobe and pressure switch is pre-assembled into a free standing unit that can be installed near the protected collector. It would be moveable as a unit if that need should arise (see Figure #1).

With the variety of dust collection equipment configurations used, Chemetron invites inquiries as to the CO₂ system design requirements for any system under study. The design of these systems rarely can be done on a cookie cutter basis. A specific design (albeit a simple one) is usually required and can be provided by the Chemetron Fire Systems Applications Engineering group or one of our trained distributors/contractors.

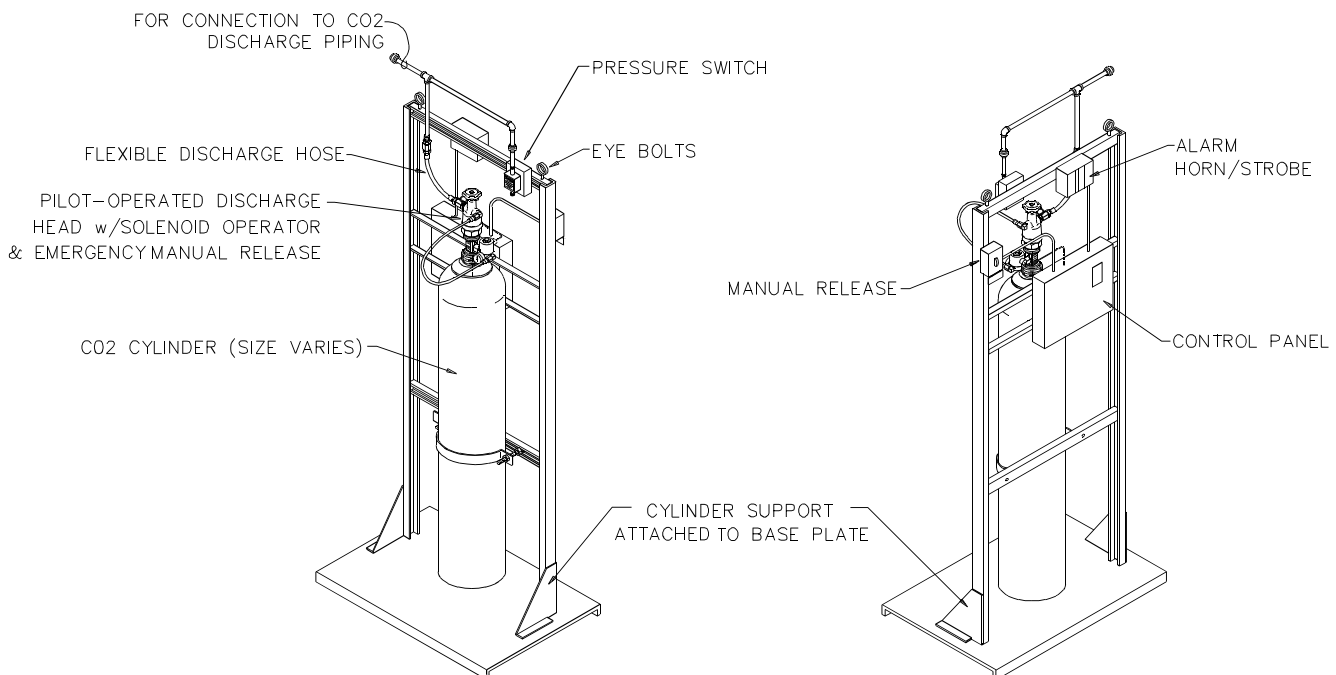


Figure #1 - Pre-Assembled High Pressure CO₂ System

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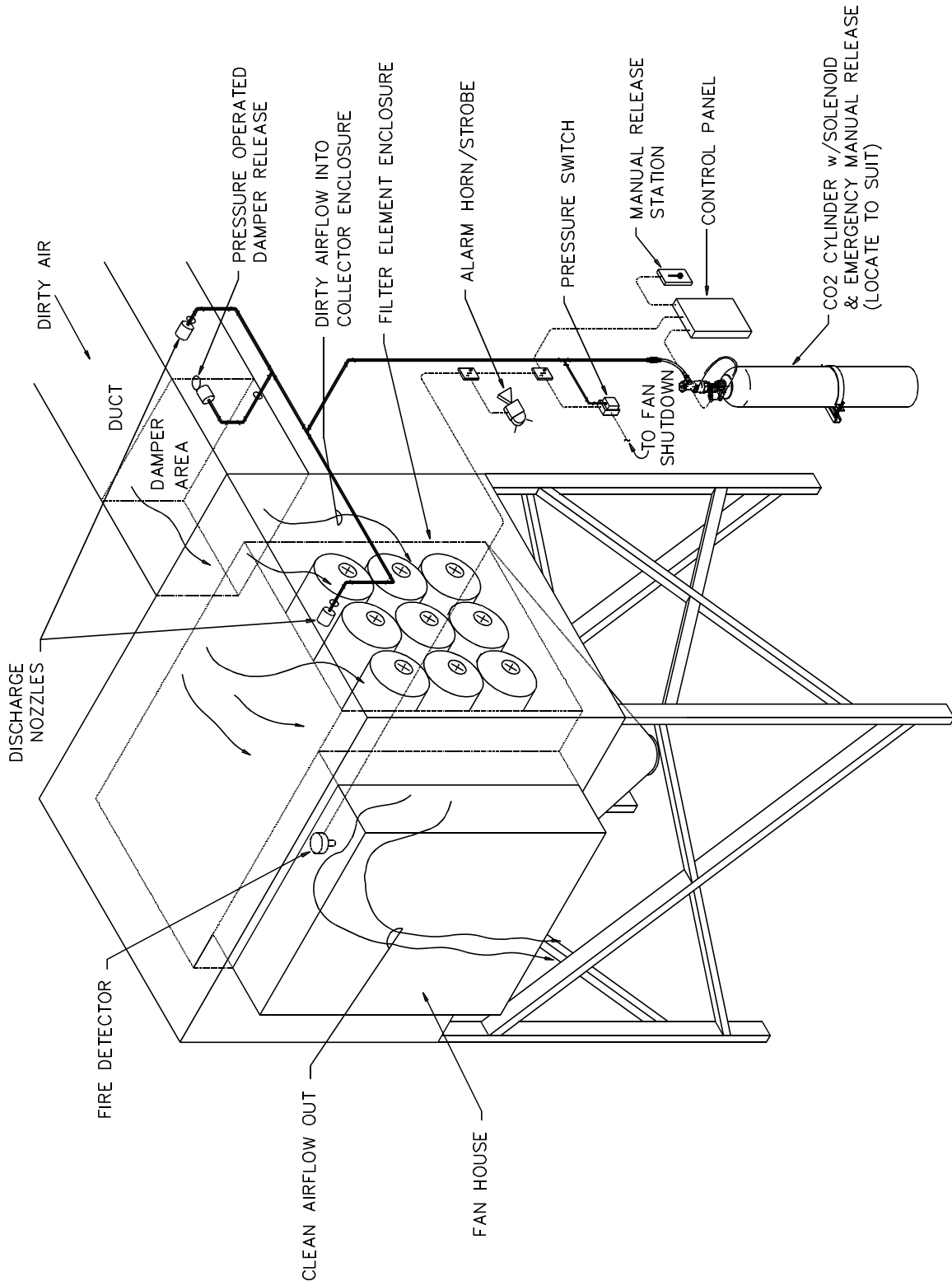


Figure #2 - Chemetron High pressure CO₂ System for Cartridge Type Dust Collector

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