


**PYROTRONICS SERIES H
HALON 1301 SYSTEM CONTAINERS AND VALVES**

Pyr-A-Lon[®] 1301

Cylinder and Valve Assemblies

ENGINEER AND ARCHITECT SPECIFICATIONS

SERIES H-8, 15, 30, 60, 125, 250, 350

- Seven sizes with incremental fill
- High flow rate valve
-  and ULC listed and F.M. approved



8 lb.



15 lb.



30 lb.



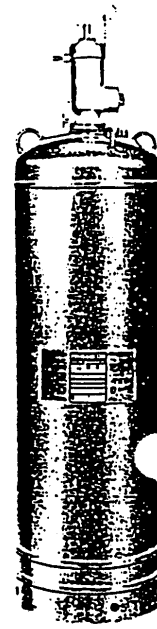
60 lb.



125 lb.



250 lb.



350 lb.

Description

Seven cylinder sizes are available: 8, 15, 30, 60, 125, 250 and 350 lb. capacities. They can be filled incrementally as shown below:

Cylinder Sizes Lbs. (kg)	Allowable Fill Lbs.	Increments Lbs.	Dimensions		
			Height* In. (cm)	Diameter In. (cm)	
8 (3.6)	4- 8	1	27 (68.6)	4 1/2 (11.4)	
15 (6.8)	9- 15	1	28 3/4 (72.1)	6 (15.2)	
30 (13.6)	20- 30	5	29 3/4 (72.7)	8 (20.3)	
60 (27.2)	35- 60	5	34 (111.8)	8 (20.3)	
125 (56.7)	65-125	5	45 1/4 (114.5)	12 3/4 (32.4)	
250 (113.4)	130-250	5	51 1/4 (130.7)	16 (40.6)	
350 (158.8)	255-350	5	65 3/4 (166.7)	16 (40.6)	

*From bottom of cylinder to top of hand lever arc

All sizes are charged with halon 1301 and pressurized with nitrogen to 360 psig at 70°F. They are manufactured, tested, and marked in accordance with D.O.T. specifications: 4BA500 for the 8, 15, 30 and 60 lb. sizes and 4BW500 for the 125, 250 and 350 lb. sizes. The latter three sizes are fitted with lifting lugs for convenience in handling.

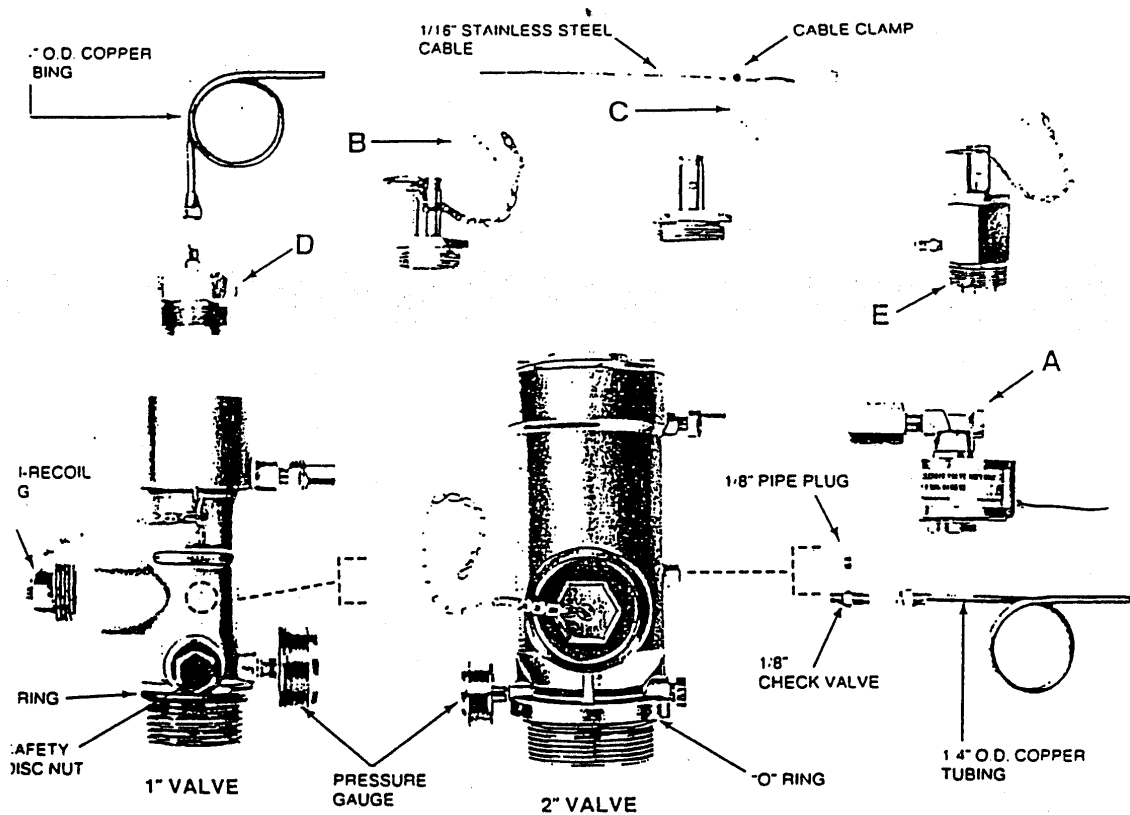
All cylinder and valve assemblies except the 350 lb. size are furnished with

an internal siphon tube having a curved lower end which permits mounting either vertically or horizontally.

Cylinder bracketing is available for either vertical or horizontal mounting.

Cylinder Valves

The 8, 15, 30, and 60 lb. size cylinders use a valve with a one inch pipe outlet; the 125, 250 and 350 lb. sizes use a valve with a two inch pipe outlet. Both valves are of a pressure-seated high flow rate design in order to meet the rapid discharge time specified in NFPA 12A. Both have a body, a brass piston with resilient seat, a pressure releasing pilot check assembly for manual and pressure actuation, a safety disc assembly, pressure gauge, and a connection port with built-in check valve for attachment of an electric solenoid valve for electrical actuation. Actuation of pilot check or electric solenoid valve relieves the pressure above the piston and permits the piston to travel upward, thus fully opening the valve and permitting the halon 1301 to discharge through the outlet. The outlet is fitted with an anti-recoil plug which is a safety device to prevent movement of the cylinder in the event of discharge while the cylinder is not connected to the piping system and the cylinder is not securely fastened to a solid structure.



Slave Controls

The one inch and two inch size valves are threaded to accept the same of valve controls described below:

Electric Solenoid Valve

The solenoid valve is normally closed and opens upon electric energy being applied, thus relieving the pressure above the valve piston and causing the master valve to open. The solenoid valve has a swivel nut for mechanical connection to the cylinder valve. For electrical connection it is furnished with 24 inch pigtailed wires which are led through flexible metallic conduit to allow convenient removal of the solenoid valve from the cylinder valve when servicing.

Manual Control Head - Local

Turning the actuating lever through 90 degrees causes a piston to depress and open the pilot check on the valve and releases halon pressure above the valve piston.

Manual Control Head - Remote

Remote actuation as the local manual, except the lever is controlled remotely by a 1/16 inch diameter stainless steel pull cable enclosed in 1/2 inch E.M.T. with corner pulleys at each change in direction. The cable terminates in a remotely located pull box.

Pressure Actuator

The pressure actuator replaces the local and remote control heads on the valve. It contains a piston of sufficient area to provide the necessary force to open the pilot check when pressure from the halon discharge of a master cylinder is applied through 1/2 inch tubing or 1/4 inch or 3/8 inch piping. The pressure actuator is used on pressure operated (slave) cylinders which are operated simultaneously with the control (master) cylinder.

One master cylinder can be used to pressure operate up to a maximum of ten slave cylinders. If more than ten cylinders are to be pressure operated,

additional master cylinders can be used or slave cylinders may have their pressure actuation outlet port utilized, with the addition of a 1/8 inch check valve to connect to and actuate an additional ten slave cylinders. In the latter case, the slave cylinder with its outlet port so utilized becomes a master cylinder in respect to the slave cylinders it actuates.

All cylinder valves have a pressure actuation outlet port. It opens into the same space as the valve outlet and is under pressure only while the valve is discharging. The port has a 1/8 inch pipe thread and is fitted with a pipe plug, which is removed when the port is to be used, and replaced with the 1/8 inch check valve. The tubing or pipe is connected to the outlet of the check valve and run to the pressure actuators on the slave cylinders.

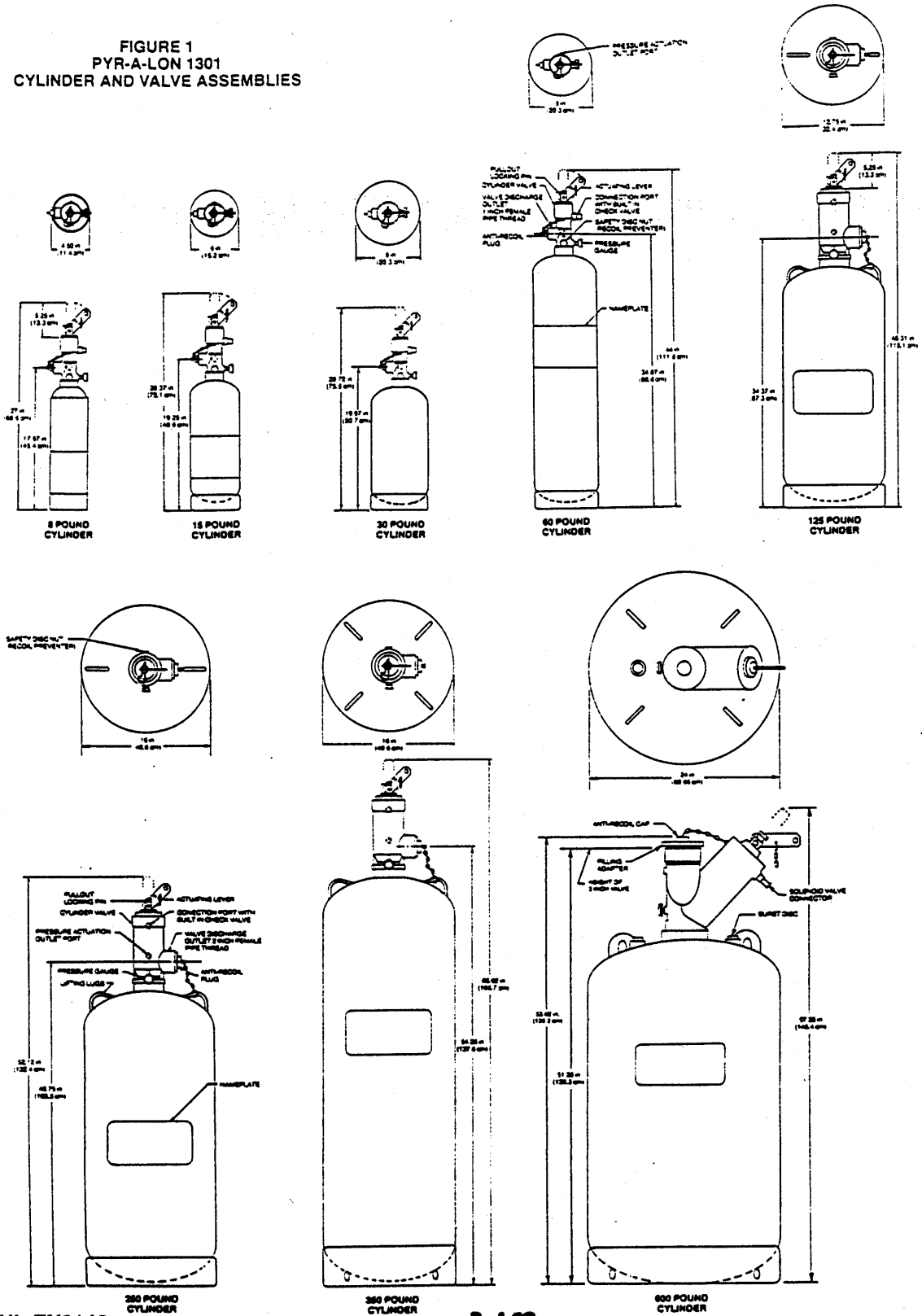
E. Combination Pressure Actuator and Manual Control

A special pressure actuator is also available to which either a local or remote type manual control head can be attached. It is used when both pressure actuation and manual control is required for the same cylinder.

Approximate Weights Fully Charged

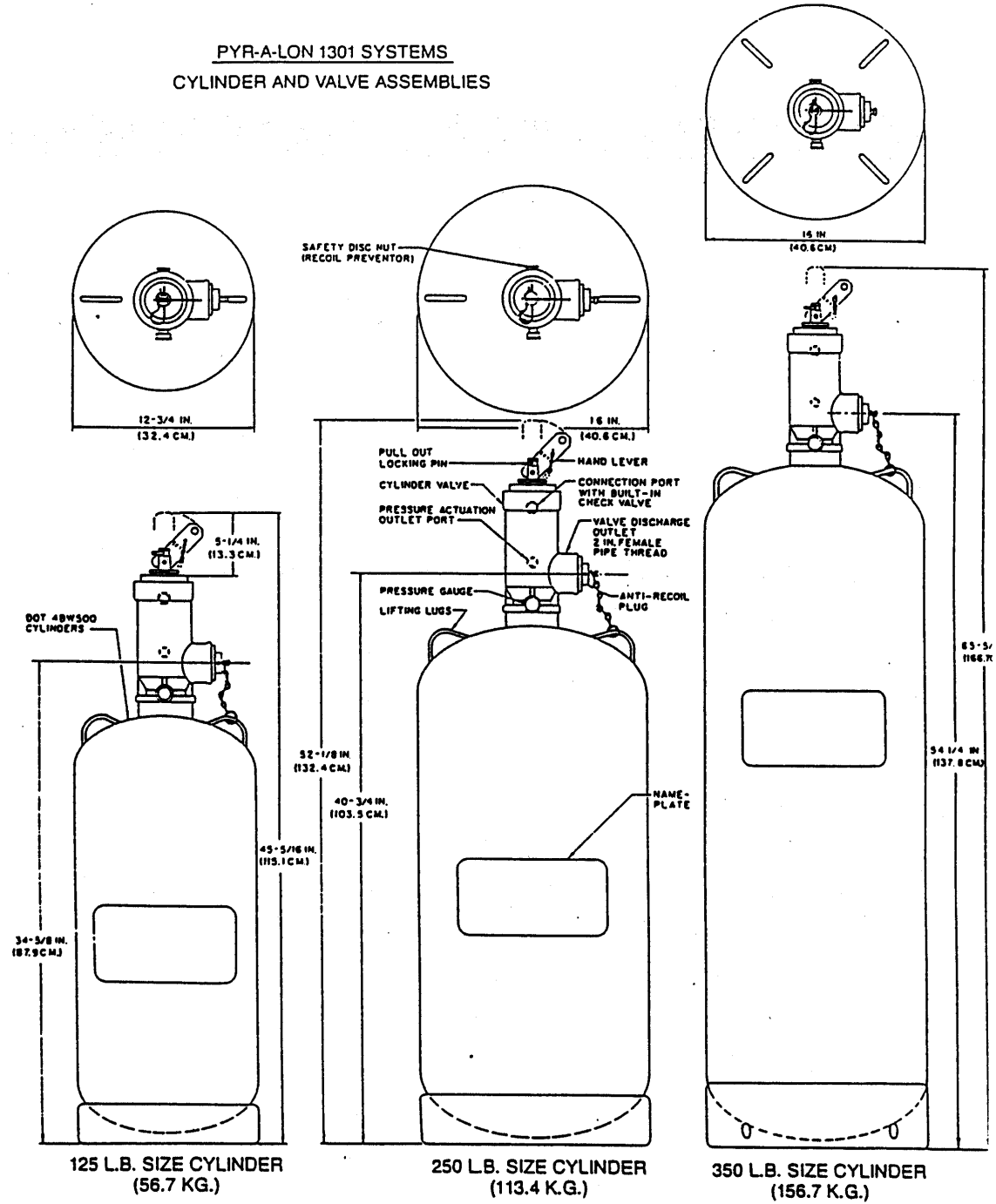
Cylinder Size	Weight
8 lb.	23.5 lbs. (10.7 KG)
15 lb.	35 lbs. (15.9 KG)
30 lb.	59 lbs. (26.8 KG)
60 lb.	106 lbs. (48.1 KG)
125 lb.	275 lbs. (124.7 KG)
250 lb.	450 lbs. (204.1 KG)
350 lb.	555 lbs. (251.7 KG)

**FIGURE 1
PYR-A-LON 1301
CYLINDER AND VALVE ASSEMBLIES**



UL EX3140

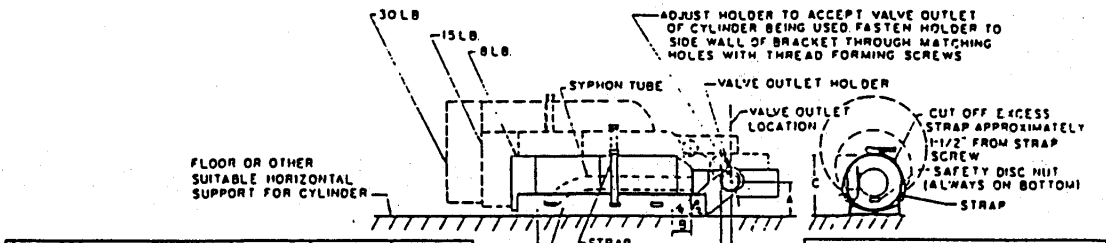
PYR-A-LON 1301 SYSTEMS
CYLINDER AND VALVE ASSEMBLIES



125 L.B. SIZE CYLINDER
(56.7 KG.)

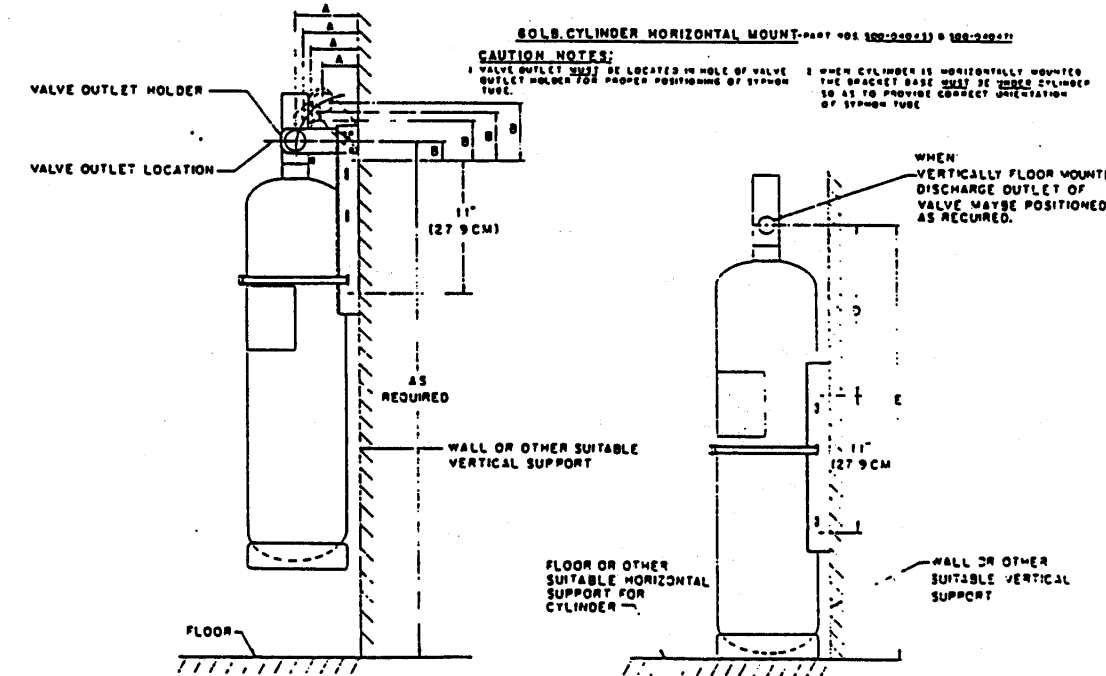
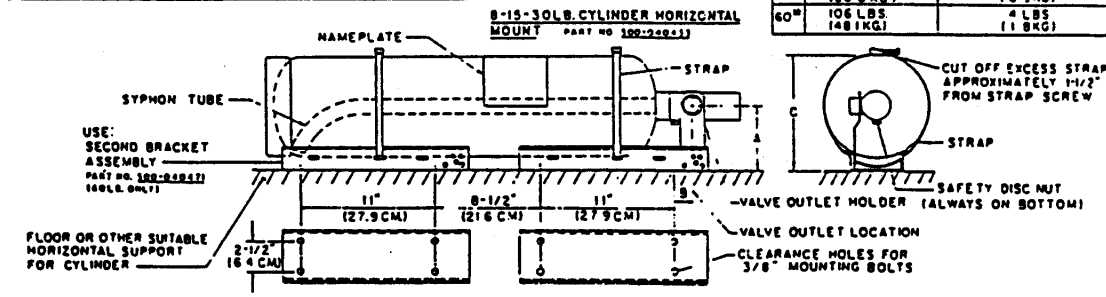
250 L.B. SIZE CYLINDER
(113.4 K.G.)

350 L.B. SIZE CYLINDER
(156.7 K.G.)



CYLINDER SIZE	A	B	C	D	E
8LB.	3 IN (7.6 CM)	5 IN (12.7 CM)	5-1/2 IN (14 CM)	4 IN (10.2 CM)	17-7/8 IN (45.4 CM)
15LB.	4-1/16 IN (10.3 CM)	4-1/16 IN (10.3 CM)	7 IN (17.8 CM)	5-1/2 IN (14 CM)	19-1/4 IN (48.9 CM)
30LB.	5-3/16 IN (13.5 CM)	1-3/8 IN (3.5 CM)	9-3/16 IN (23.3 CM)	5-1/2 IN (14 CM)	19-3/32 IN (50.7 CM)
60LB.	5-5/16 IN (13.9 CM)	1-3/8 IN (3.5 CM)	9-3/16 IN (23.3 CM)	4 IN (10.2 CM)	34-7/8 IN (88.6 CM)

APPROXIMATE WEIGHTS	
CYLINDER FULLY CHARGED	BRACKET ASSEMBLES FOR HORIZONTAL INSTALLATION
8" 23-1/2 LBS (10.7 KG)	2 LBS (0.9 KG)
15" 35 LBS. (15.9 KG)	2 LBS. (0.9 KG)
30" 59 LBS. (26.8 KG)	2 LBS (0.9 KG)
60" 106 LBS. (48.1 KG)	4 LBS (1.8 KG)



CAUTION NOTES:

- 1 VALVE OUTLET MUST BE LOCATED IN HOLE OF VALVE OUTLET HOLDER FOR PROPER POSITIONING OF SYPHON TUBE.
- 2 WHEN CYLINDER IS HORIZONTALLY MOUNTED THE BRACKET BASE MUST BE UNDER CYLINDER SO AS TO PROVIDE CORRECT ORIENTATION OF SYPHON TUBE.

8-15-30-60LB. CYLINDER VERTICAL WALL MOUNT PART NO. 100-24053
8-15-30-60LB. CYLINDER VERTICAL FLOOR MOUNT PART NO. 100-24057

INTRODUCTION

Pyr-A-Lon 1301 Engineered Systems are custom engineered fire suppression systems designed in accordance with NFPA 12A. Pyr-A-Lon 1301 Engineered Systems are listed by Underwriters Laboratories, Inc. and Underwriters Laboratories of Canada, and are approved by Factory Mutual Research Corporation. The instructions in this manual comply with the limitations and requirements established by those listings and approvals.

The extinguishing agent used in Pyr-A-Lon 1301 Engineered Systems is Halon 1301. Exactly how Halon 1301 extinguishes fire is not known; it has been termed a "chain breaking agent," meaning that it acts to break the chain reaction of the combustion process. Halon 1301 is chemically known as CBrF_3 (bromotrifluoromethane); it is super-pressurized with dry nitrogen to 360 psig to provide rapid discharge and mixing.

The National Fire Protection Association has established a concentration of 5 percent Halon in air as being sufficient for most flame extinguishment. Refer to the **SYSTEM DESIGN** section (page 14) and NFPA 12A for a thorough explanation of concentration requirements for various hazards. In accordance with NFPA 12A, paragraphs 2-1.1.3 and 2-1.1.4, the following restrictions on concentrations must be followed.

Concentration	Restrictions
4-7%	No restrictions on use
Between 7% and 10%	Can be used in unoccupied areas or in normally occupied areas where evacuation can be accomplished within 1 minute. Areas with a 10% concentration should be evacuated immediately upon discharge of agent.
Between 10% and 15%	Not to be used in normally occupied areas. Can be used in normally <i>unoccupied</i> areas if evacuation can be accomplished within 30 seconds. Where this evacuation cannot be accomplished, provisions must be made to prevent inhalation by personnel.
More than 15%	Provisions must be made to prevent inhalation by personnel.

CAUTION: Halon 1301 is not effective on the following materials:

1. Chemical compounds or mixtures such as gunpowder or cellulose nitrate which supply their own oxygen.
2. Reactive metals such as sodium, potassium, magnesium, titanium, zirconium, uranium, and plutonium.
3. Metal hydrides.
4. Chemicals capable of undergoing auto-thermal decomposition (hydrazine and certain organic peroxides, for example).

Although Halon 1301 vapor has a low toxicity, its decomposition products can be hazardous. Decomposition takes place on exposure to flame or hot surfaces at about 900°F. The main decomposition products are hydrogen fluoride (HF), hydrogen bromide (HBr), bromine (Br_2), and small amounts of carbonyl fluoride (COF_2) and carbonyl bromide (COBr_2).

The amount of Halon 1301 that will decompose while extinguishing a fire depends on the size of the fire, the concentration of Halon vapor, and the length of time Halon vapor is in contact with the flame or with heated surfaces. With small fires and rapid extinguishment, there is little decomposition; with large fires or slow extinguishment, there is a lot of decomposition. Rapid detection and immediate discharge at a high rate are therefore desirable so as to keep decomposition products at a minimum

level. For further information on the toxicity of Halon 1301 and its decomposition products, see Appendix A, 1-6.1, of NFF Standard No. 12A.

SYSTEM COMPONENTS

Pyr-A-Lon 1301 Engineered Systems can be supplied with 15, 30, 60, 125, 250, 350, and 600 pound cylinders that are pressurized with dry nitrogen, at 70°F, to 360 psi.

The cylinders are charged as follows:

Cylinder	Fill Increment	Total Fill Weights
8 pound	1 pound	4-8 pounds (FM sets minimum fill at 5 pounds)
15 pound	1 pound	9-15 pounds
30 pound	5 pounds	20-30 pounds
60 pound	5 pounds	35-60 pounds
125 pound	5 pounds	65-125 pounds (FM sets minimum fill at 75 pounds)
250 pound	5 pounds	130-250 pounds (FM sets minimum fill at 150 pounds)
350 pound	5 pounds	255-350 pounds
600 pound	5 pounds	355-615 pounds

A Pyr-A-Lon 1301 Engineered System consists of a cylinder assembly, valve assembly, and whatever hardware is shown in Figure 1 necessary for that particular system. The operating temperature range of all hardware in a Pyr-A-Lon 1301 Engineered System is -40°F to 130°F.

CYLINDER AND VALVE ASSEMBLIES

The dimensions of all eight cylinder and valve assemblies are shown in Figure 1. All cylinders are manufactured, tested, and marked in accordance with Title 49 of the Code of Federal Regulations.*

Three valve sizes are used: 1 inch, 2 inch, and 3 inch (See Figure 2, page 3). The 1 inch valve is used on the 8, 15, 30, and 60 pound cylinders; the 2 inch valve is used on the 125, 250, and 350 pound cylinders; the 3 inch valve is used on the 600 pound cylinder. The valves are of high-flow-rate design to provide the rapid discharge required by NFPA 12A.

The 1, 2, and 3 inch valves are pressure-seated types that have a brass body, a brass piston with an elastomer seal, pressure-releasing pilot check assembly for manual and/or pneumatic actuation, a burst disc assembly (1 and 2 inch sizes), and a pressure gauge. The valves can be fitted with an electric solenoid valve for electric actuation.

Actuation of the pilot check or electric solenoid relieves the pressure above the piston and allows the piston to travel upward in the bore of the valve. This action fully opens the valve, permitting Halon to discharge through the outlet.

MANIFOLD

The system manifold is considered part of the discharge piping and is covered in the **SYSTEM INSTALLATION** section (page 39) of this manual. In all systems using selector valves, the manifold must be fitted with a manifold safety that is comprised of a body with 3/4 inch male pipe thread, a safety disc, washer, and safety disc nut. Should liquid Halon be trapped in the manifold, it will be released before excessive pressure develops due to high temperatures.

*Title pertains to DOT-4BW-500 and 4BA-500 cylinder specifications.

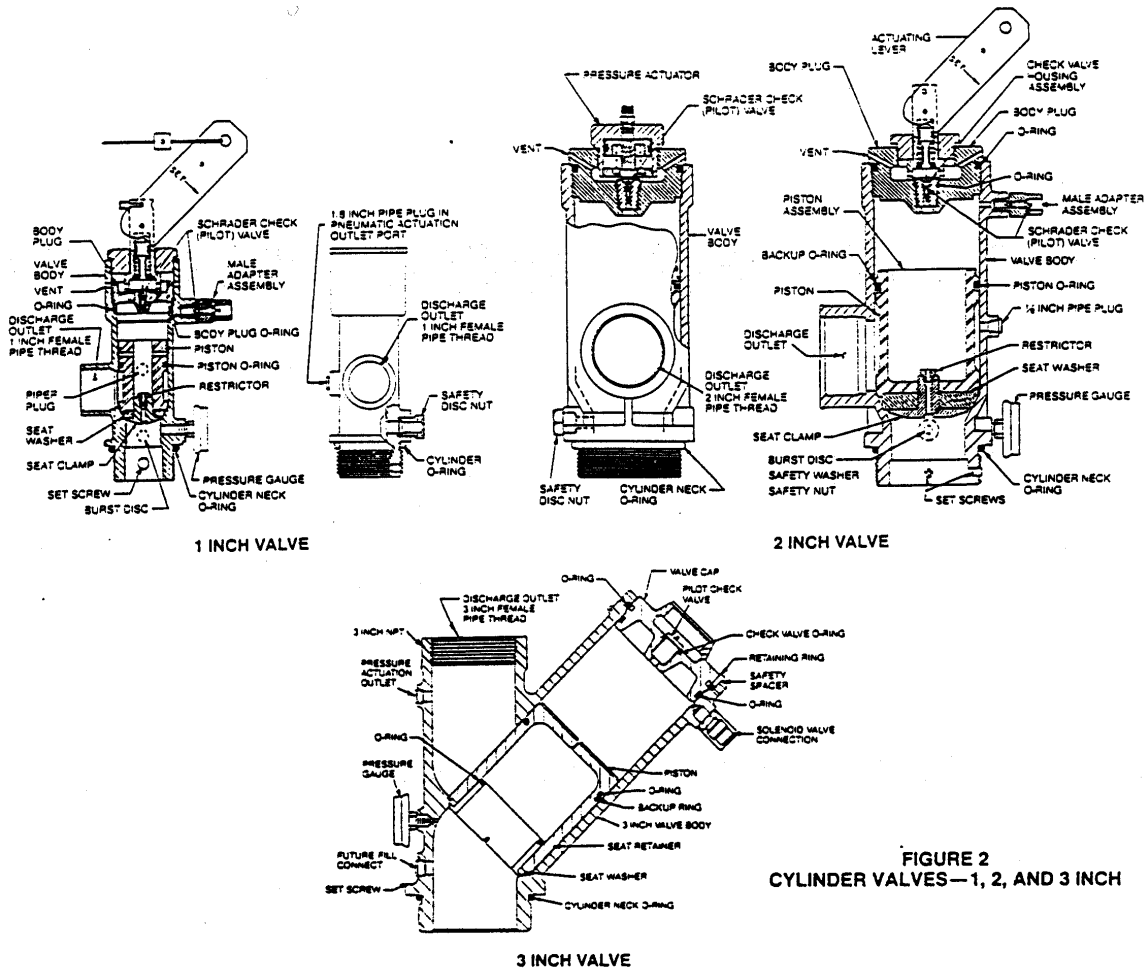


FIGURE 2
CYLINDER VALVES—1, 2, AND 3 INCH

SIPHON TUBE

All 8, 15, 30, and 60 pound cylinders are fitted with a siphon tube having a curved lower end that permits the cylinders to be mounted vertically (upright) or at any angle between vertical and horizontal. The current production of 125 and 250 pound cylinders, which have the letter H under the discharge outlet, are also fitted with curved siphon tubes that permit them to be mounted vertically or at any angle between vertical and horizontal. Earlier produced 125 and 250 pound capacity cylinders, without the identifying H on the valve, have curved siphon tubes of different shapes which affect the discharge characteristics to the extent that the cylinders cannot be mounted at an angle less than 10 degrees from a horizontal position.

The inlet of the siphon tube is installed in the cylinder valve in line with the valve safety disc nut. The cylinder, when mounted horizontally or at an angle, must always be installed with the safety disc nut down, so that the valve outlet is in a horizontal position. (Refer to the SYSTEM INSTALLATION section, page 39, of the manual for details.)

The 350 and 600 pound cylinders are fitted with straight siphon tubes. They must only be mounted vertically.

CYLINDER BRACKETS

Vertical, angled, or horizontal mountings of the four smaller size cylinders is provided by the use of one basic group of bracketing

parts used in selective combinations. Refer to the SYSTEM INSTALLATION section (page 39) for details. A special mounting assembly for the 125 and 250 cylinder assemblies that bear the H identification is used for a horizontal installation. There is also an earlier version of a horizontal mounting assembly that is used for cylinder assemblies with the old type siphon tube. When the 125, 250, 350, and 600 pound cylinders are mounted in an upright position, a wall mounting bracket is used. It consists of a mounting channel and a cylinder strap.

CYLINDER ACTUATING CONTROLS

(See Figure 3)

There are five types of controls used for actuating valves of Pyr-A-Lon cylinders: 1) electric solenoid, 2) local manual mechanical control, 3) remote manual mechanical control, 4) pneumatic control, and 5) manual-pneumatic combination control (See Figure 3). For Pyr-A-Lon systems with more than one cylinder, these controls need only be located on one cylinder. The cylinder with the controls is designated the master cylinder. Any additional cylinders in the system may be operated as slave cylinders by using actuators powered by the pneumatic actuation outlet port of the master cylinder.

Electric Solenoid

The solenoid valve is normally closed. When electrical energy is applied to the solenoid valve, it opens. This relieves the pressure above the cylinder valve piston and opens the cylinder valve.

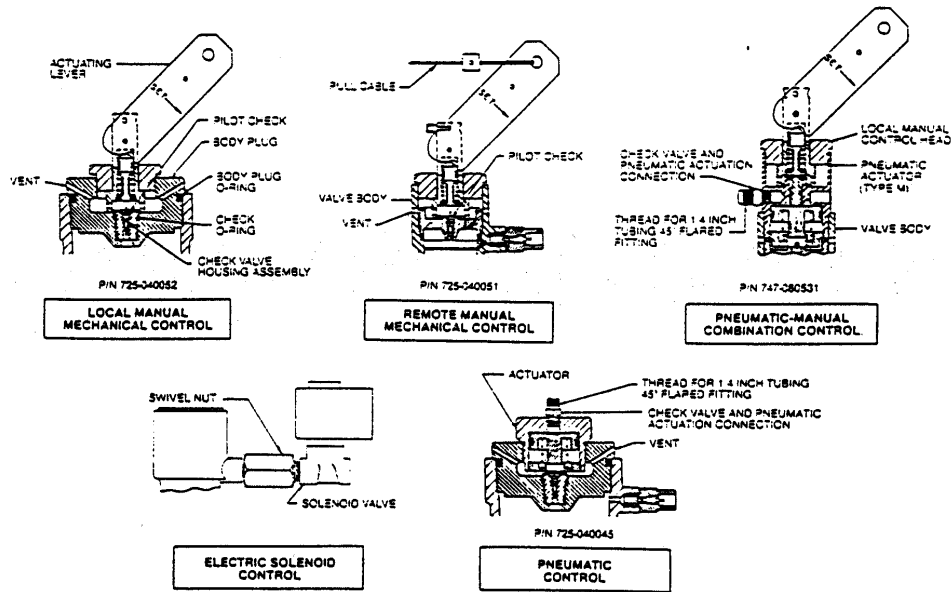


FIGURE 3
ACTUATION CONTROLS

The solenoid valve is equipped with 24 inch wire leads that are connected to a junction box near the valve. A typical cylinder valve with a solenoid actuator valve is shown in Figure 4. The solenoid valve is fitted with a swivel nut that allows field installation or removal of the solenoid from a 1 or 2 inch valve. Figure 5 shows the solenoid valve assembly with a knurled adapter for use with the 3 inch cylinder valve. Removal of the solenoid valve assembly is often required during recharging or servicing of the cylinder. Solenoid valves are available with 6 VDC, 24 VDC, and 120 VAC coils in explosion-proof housings for Class 1 and 2 locations.

The entire control circuit and the solenoid coils are under constant supervision. Any break in the circuit will result in a trouble signal at the control panel. The panel can be arranged to operate upon actuation of any of the following types of detectors that are compatible and UL listed or FM approved.

- Fixed Temperature Thermals
- Rate of Rise Thermals
- Ionization Smoke Detectors
- Photoelectric Smoke Detectors
- Rate Compensated Thermals
- Infrared Detectors
- Ultraviolet Detectors
- Manual Electric Stations

Or, any combination of the above

Pyrotronics recommends that actuation of a Pyr-A-Lon system be made by detection, involving two detectors or two zones of detectors (cross zoning). This prevents the system from being actuated by a transient condition that causes only one detector to operate. Other types of alarm panels can be used to actuate the system if they are UL listed or FM approved for that purpose and are electrically compatible. Consult Pyrotronics for information on detection systems which can be used with Halon extinguishing systems.

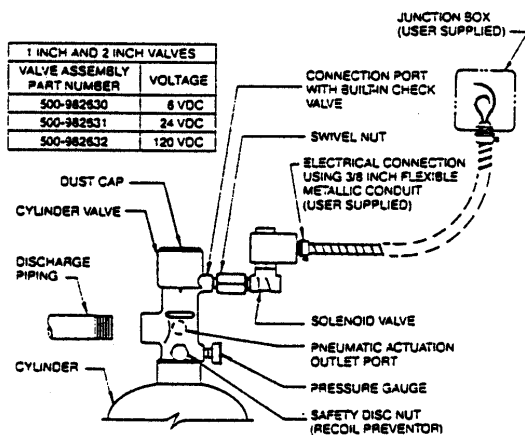


FIGURE 4
CYLINDER VALVE WITH
ELECTRIC SOLENOID ACTUATION

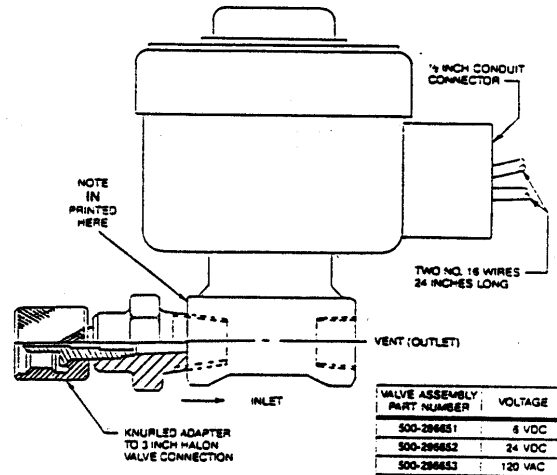
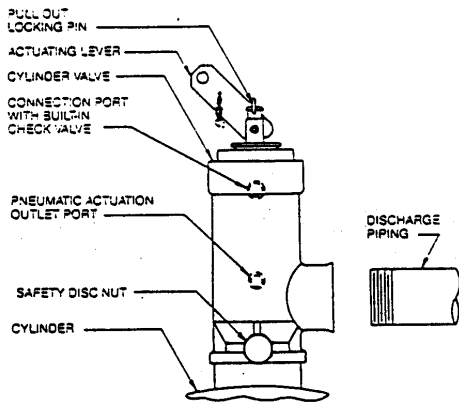


FIGURE 5
3 INCH SOLENOID VALVE
ASSEMBLY



**FIGURE 6
CYLINDER VALVE WITH
LOCAL MANUAL MECHANICAL ACTUATION**

Note: For FM approval, any electric solenoid control system must also have manual mechanical control.

Local Manual Mechanical Control

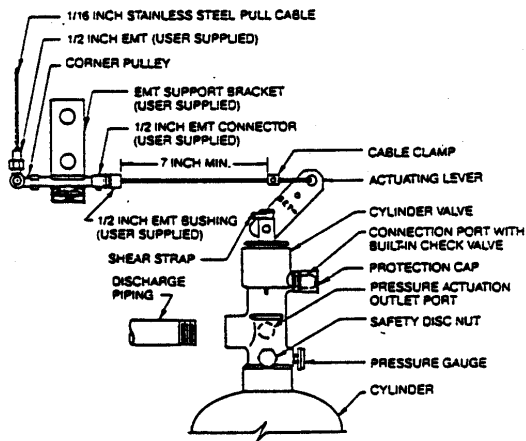
(P/N 725-040052)

The local manual mechanical control (or actuator) is threaded into the top of the cylinder valve. The valve is actuated by moving the actuating lever of the mechanical control through 90°. The movement causes the actuation pin to depress. That opens the pilot check on the cylinder valve. The open pilot check, in turn, releases the pressure above the piston, allowing the cylinder valve to open fully. See Figures 3 (page 4) and 6. Manually operated selector valves are controlled locally by moving the ball valve handle through 90°.

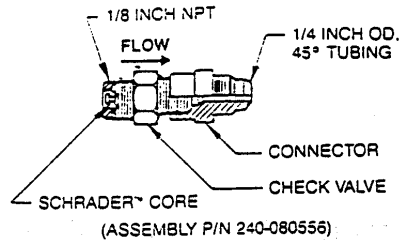
Remote Manual Mechanical Control

(P/N 725-040051)

This control actuates in the same manner as the local mechanical manual control, except that the lever is controlled remotely by a 1/16-inch-in-diameter stainless steel pull cable enclosed in a half-inch EMT, with corner pulleys at each change-in-direction



**FIGURE 7
CYLINDER VALVE WITH REMOTE
MANUAL MECHANICAL CONTROL**



**FIGURE 8
CHECK VALVE (FOR PNEUMATIC CONTROL)**

location. The cable terminates in a remotely located pullbox. See Figures 3 (page 4) and 7.

Pneumatic Control

(P/N 725-040045)

A pressure actuator pneumatic control can replace the manual control on a cylinder valve. The control contains a piston large enough to provide the necessary force to open the pilot check when the Halon discharge pressure from a master cylinder or from another source is applied. This pressure is routed through 1/4 inch tubing, 1/4 inch pipe, or 1/8 inch pipe connected to a 1/8 inch check valve that is fitted into the master cylinder valve pressure actuation outlet port. See Figures 8 and 48 (page 49). The pressure actuator can operate the slave cylinders through the master cylinder pneumatic actuation outlet port. A maximum of ten pressure actuators for slave cylinders can be used with each master cylinder. See also the SYSTEM INSTALLATION section (page 39) and Figures 3 (page 4), 9, and 48 (page 49).

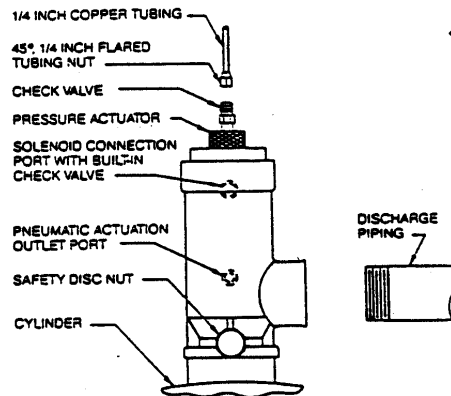
Pneumatic-Manual Combination Control

(P/N 747-080531)

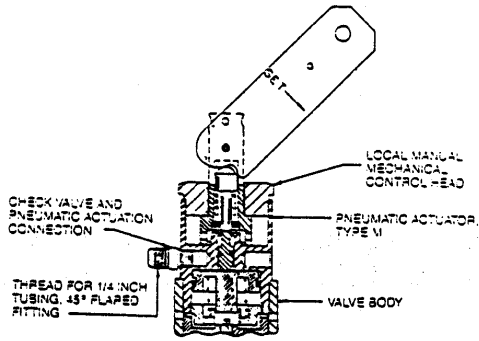
A special pressure actuator (Type M) can be used to have a pneumatic control and also either a local or a remote manual mechanical control on a cylinder valve. See Figures 3 (page 4) and 10.

NOZZLES

Three basic Type E nozzle sizes are available for use with Pyr-A-Lon 1301 Engineered Halon Systems – 3/8 inch, 1 inch, and 1½ inch sizes. Each basic size can be supplied as a 180° or 360° nozzle. See Figure 11. The nozzles are custom drilled to provide



**FIGURE 9
CYLINDER VALVE
WITH PNEUMATIC CONTROL**



1 INCH VALVE WITH TYPE M PRESSURE ACTUATOR AND LOCAL MANUAL CONTROL HEAD

FIGURE 10
CYLINDER VALVE WITH PNEUMATIC-MANUAL COMBINATION CONTROL

the amount of Halon flow needed according to the piping system and nozzle flow rate calculations. Nozzle usage and limitations are described in the SYSTEM DESIGN section (page 14) and the SYSTEM INSTALLATION section (page 39) of this manual.

The 3/8 inch size nozzles are also available as duct nozzles (Type D); they are used for installations in ducts or in cabinets. They are identical to the 3/8 inch standard nozzles (Type E) except for a straight pipe thread machined on the neck of the nozzles. A standard set of 3/4 inch conduit locknuts are fitted to the thread for locking the nozzles to the sheet metal duct or cabinet. See Figure 12 (page 7). All nozzle sizes are available in brass.

MANIFOLD CHECK VALVES

Pyr-A-Lon 1301 System check valves utilize a poppet design that minimizes flow restriction of the system manifold. The valves are manufactured entirely of stainless steel. See the SYSTEM INSTALLATION section (page 39). These check valves are available in 1, 2, and 3 inch sizes; see Figure 13 (page 7).

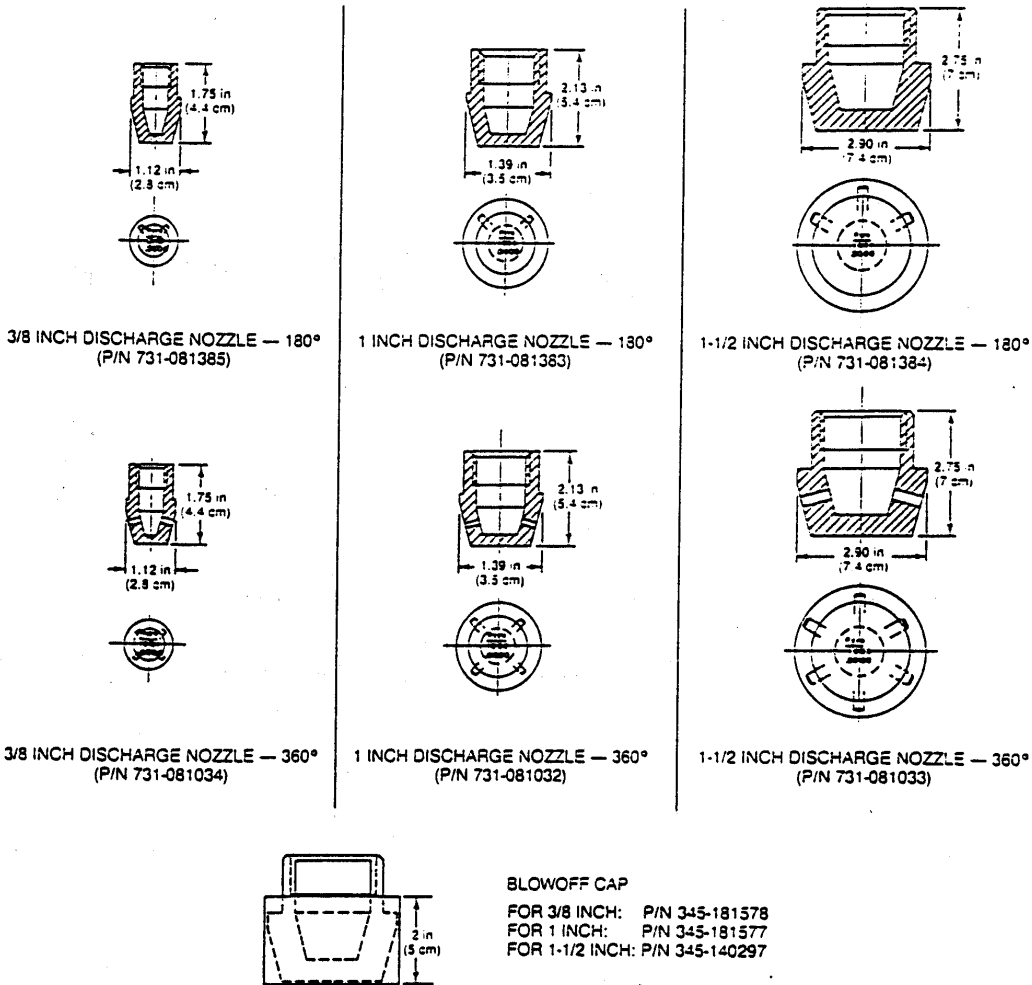


FIGURE 11
TYPE E NOZZLE AND BLOWOFF CAPS