Effective: November 2010

Fenwal Phoenix

675 lb. Cylinder and Valve Assembly with Nitrogen Driver Assembly P/N: 93-10067X-001

FENWAL Protection Systems
A UTC Fire & Security Company

F-93-112

FEATURES

- **Designed for "Drop-In" Replacement for Halon Retrofit Applications**
- **Well Suited for Complicated Pipe Networks and Large Area Coverage with Minimal Room for Cylinder Storage**
- **3-Inch Valve Outlet**
- **347 lb. to 675 lb. Fill Capacity**
- **Optional Liquid Level Indicator**
- **UL Listed**
- **FM Approved**

DESCRIPTION

Fenwal FM-200® Phoenix Engineered Fire Suppression Systems are Listed by the Underwriters Laboratory, Inc. (UL) and tested by Factory Mutual (FM). These systems are designed for total flooding in accordance with NFPA 2001, *Standard on Clean Agent Extinguishing Systems*. These systems have been tested to UL 2166, *Standard for Safety; Standard for Halocarbon Clean Agent Extinguishing System Units*, and other parameters established jointly by UL and FM.

The Phoenix uses a unique method for propelling the FM-200 agent from the storage cylinder, through the piping system and out of the discharge nozzles. Nitrogen gas pressure from two separate storage cylinders is introduced into the vapor space of the FM-200 cylinder at a controlled rate. This nitrogen pressure acts to propel the liquid FM-200 agent through the pipe at a higher flow rate. It can also propel the FM-200 agent farther through the pipe network allowing for the placement of storage cylinders remotely from the protected hazard.

The FM-200 Phoenix is extremely well-suited to applications involving remote agent storage and situations which limit the maximum pipe size to be used. The Phoenix is capable of using smaller pipe sizes to discharge large quantities of FM-200.

This system can be successfully applied to many existing Halon 1301 system pipe networks, providing easy retrofit of these systems to a new agent with long-term availability.

OPERATION

When a control head actuates the two nitrogen cylinder discharge valves, the nitrogen pressure actuates the agent cylinder discharge valve and pressurizes the cylinder. FM-200 liquid agent is then propelled by its own vapor pressure and the nitrogen pressure through the discharge valve and into the system pipe network. The FM-200 liquid agent travels through the system pipe network at a high flow rate.

OPERATING RANGE LIMITATIONS:

- The operating temperature range for all components used in the FM-200 Phoenix is 32°F to 130°F (0°C to 54°C)
- The agent cylinder operating temperature must be between 60°F to 80°F (16°C to 27°C) when protecting two or more separate hazards.

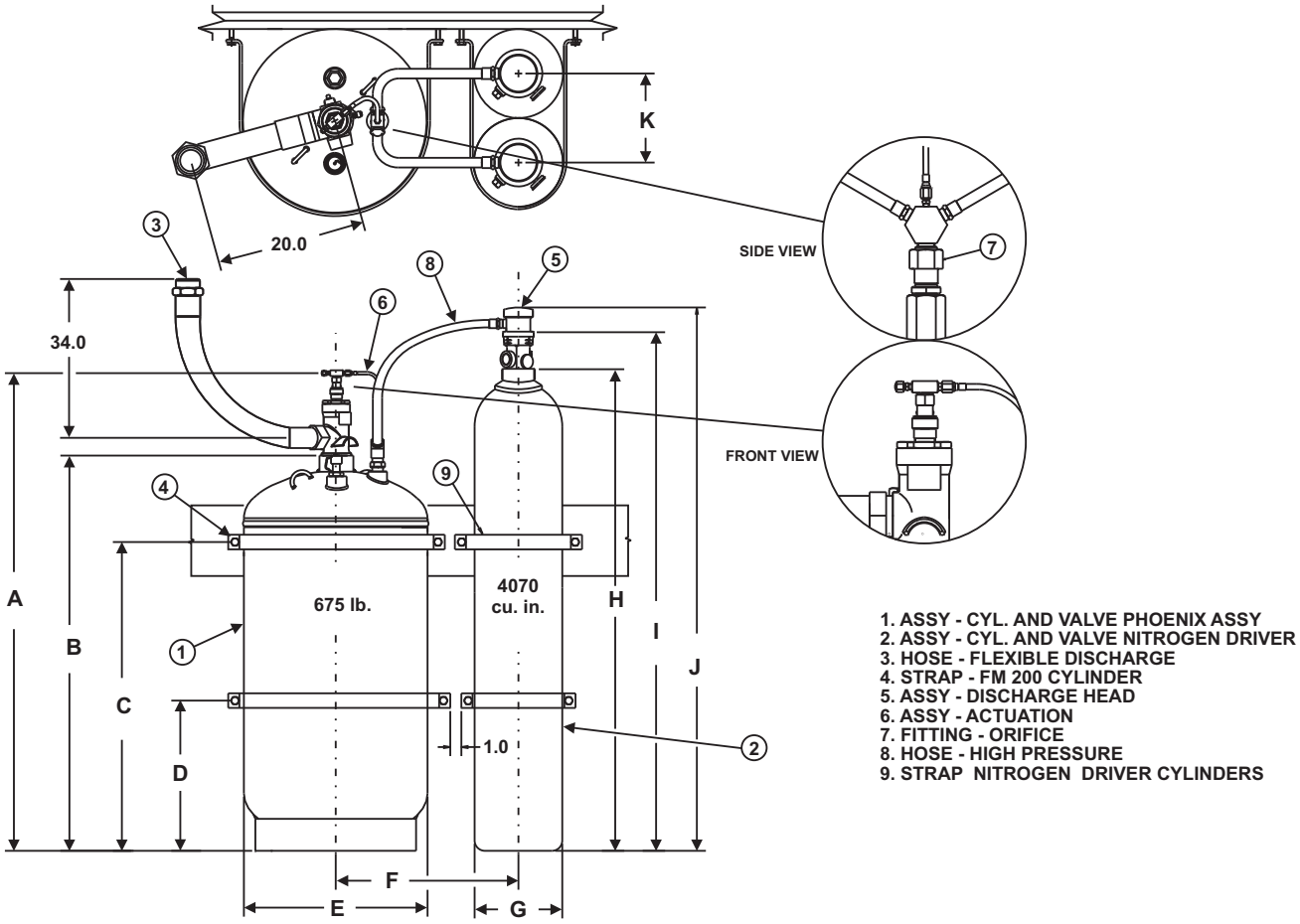

Figure 1. Nitrogen and Agent Cylinders

Table 1. Nitrogen and Agent Cylinder Dimensions, Imperial

Cylinder Part Number	A	B	C	D	E	F	G	H	I	J	K
93-10067X-001	61.00	47.40	37.00	18.00	22.00	22.00	10.55	58.00	63.22	65.25	10.55
Note: The "X" within the part numbers denotes whether a liquid level indicator is ordered with the cylinder. A one (1) is used if a LLI is needed, a five (5) is used if one is not.											

Table 2. Nitrogen and Agent Cylinder Dimensions, Metric

Cylinder Part Number	A	B	C	D	E	F	G	H	I	J	K
93-10067X-001	1549	1204	940	457	559	559	268	1473	1606	1657	268
Note: The "X" within the part numbers denotes whether a liquid level indicator is ordered with the cylinder. A one (1) is used if a LLI is needed, a five (5) is used if one is not.											

INSTALLATION

The FM-200 Phoenix Series installation is based on the requirements of NFPA 2001, *Standard on Clean Agent Extinguishing Systems*, Current Edition.

ASSEMBLY:

Both the nitrogen drivers and agent storage cylinders are to be installed in the vertical position only. The nitrogen driver is located to the immediate right apart from the agent cylinder (see Figure 1). The nitrogen driver cylinder is connected to the agent cylinder by using the nitrogen transfer components (two 1-in. nitrogen transfer hoses [P/N 06-118207-003] and a 3/4-in. NPT transfer fitting, see Figure 2). The 3/4-in. transfer fitting connects into the orifice fitting. The orifice fitting is a custom fitting that is designed to regulate the nitrogen pressure flow required for the specific system. The orifice fitting then connects into the nitrogen injector assembly to diffuse the nitrogen in a horizontal pattern.

ACTUATION:

The control head is attached to the master nitrogen driver by means of electric, cable, lever or pneumatic devices. The actuating of the second nitrogen driver and agent cylinder is done upon transfer of nitrogen from the master driver cylinder using the actuation assembly kit (P/N 06-129985-001).

Assembly includes:

- Nitrogen “Y” Transfer Fitting
- 1/8-in. Flex Loop
- 1/8-in. Flare Fitting
- 1/8-in. Branch Tee
- 1/8-in. Schrader Fitting and Cap
- Pressure Operated Control Head
- 3/4-in. Nipple (Hex)

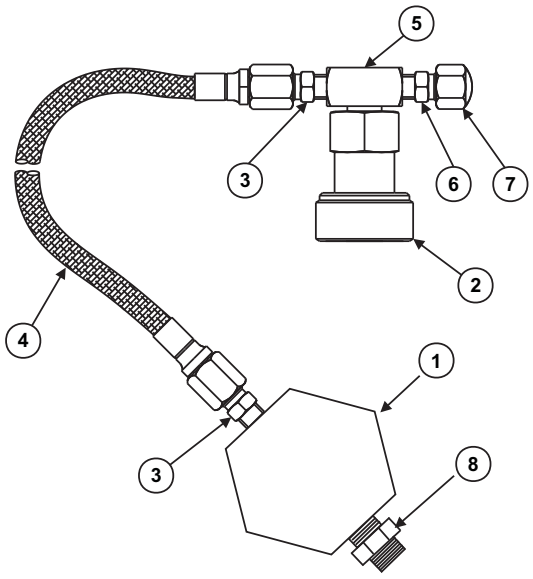

Figure 2. Nitrogen Transfer Components

MAINTENANCE

According to NFPA standards, the following inspection and/or maintenance procedure must be scheduled as listed below and performed upon the occurrence of any event, which might affect the reliability of the system.

QUARTERLY:

1. Check the weight of each agent storage container and the pressure gauges of the nitrogen drivers.
   - Nitrogen driver if the pressure is less than 1800 PSI (124 bar) at 70°F (21°C)

Note: Pressure changes with temperature.

   - The containers should be removed and carefully inspected by certified personnel.
   - The containers should then be reconditioned, recharged or replaced.
2. Check all components supporting hardware and tighten, repair or replace as required.
3. Visually check all components for evidence of physical wear and tear and take whatever action is required. Replace any component that looks like it may be damaged or worn.

SEMI-ANNUAL:

The following checks/tests should be conducted by qualified personnel:

1. Determine the weight of FM-200 in each agent cylinder by the procedure indicated in the Design, Installation, Operation and Maintenance (DIOM) Manual (P/N 93-FM200M-030).
2. Functional tests of required system devices (reference the DIOM manual).
3. All outlet piping must be cleaned and free of dirt, chips and other foreign material that may become hazardous projectiles or cause the system to become inoperative or ineffective at the time of discharge.

Table 3. Nitrogen Transfer Components Descriptions

Item No.	Qty.	Part Number	Description
1	1	06-236260-001	Nitrogen Transfer "Y" Fitting
2	1	878737	Pressure Operated Control Head
3	2	06-118191-001	Fitting Flared 1/8" x 1/4"
4	1	06-118193-001	3/16" Flexible Actuation Hose
5	1	06-118192-001	1/8" Branch Tee
6	1	263303	1/8" Schrader Valve
7	1	263304	1/8" Schrader Valve Cap
8	1	06-118330-001	3/4" Nipple

SPECIFICATIONS

Element	Agent Storage Container 93-10067X-001		Nitrogen Driver 93-104070-001	
	Imperial	Metric	Imperial	Metric
Fill Range (w/o LLI)	347 to 675 lb.	158 to 306 kg	Factory Filled to 1800 PSIG	Factory Filled to127 bar
Fill Range (w/ LLI)	347 to 675 lb.	158 to 306 kg	—	—
Height	58.5 in.	149.0 cm	62.00 in.	157.0 cm
Diameter	22.0 in.	56.0 cm	10.50 in.	26.70 cm
Internal Volume	8.68 cu. ft.	0.25 cu. m	4070 cu. in.	0.0667 cu. m
Empty Weight	362.0 lb.	164.0 kg	184.0 lb.	83.5 kg
Temperature Range	32°F to 130°F	0°C to 54°C	32°F to 130°F	0°C to 54°C

RECONDITIONING

After a system has been discharged, it is recommended that the local authorized Fenwal Distributor be contacted to recondition the system. Please reference the DIOM manual (P/N 93-FM200M-030) for the appropriate reconditioning kit.

ORDERING INFORMATION

Part Number	Description
93-10067X-001*	Agent Storage Cylinder
93-104070-001**	Nitrogen Driver

***Note:** X denotes liquid level indicator. Use a 1 in place of the X to order cylinder with LLI or a 5 to order a cylinder without an LLI. *Example:* 93-100675-001 (no LLI).

****Note:** Two are required for each 675 lb. agent cylinder.

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