FM-200 TOTAL FLOOD
FIRE SUPPRESSION SYSTEMS

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Fire Protection Products

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BULK FILLING CONTAINER
(Part No. See Table)

FM-200 fire extinguishant (HFC-227ea) is a clean, gaseous agent containing no particles or oily residues. It is produced under ISO 9002 guidelines to strict manufacturing specifications ensuring product purity. The agent leaves no residue or oily deposits on delicate electronic equipment, and can be removed from the protected space by ventilation.

The agent is thermally and chemically stable, but without the extremely long atmospheric lifetimes associated with other proposed halon replacements. The atmospheric lifetime of the clean agent has been determined to be 36.5 years. The EPA does not consider FM-200 fire extinguishant to be a long lived substance when discharged, and as such has placed no restriction on its use.

Bulk Filling Container Part No.	Container Weight kg	(lb)
570037	72.5	(160)
570038	544.0	(1200)

AGENT CONTAINER AND VALVE ASSEMBLY (Part No. See Table, page 2-3)

The container assembly consists of a container fitted with a valve and internal siphon tube, factory filled with FM-200 fire extinguishant agent, and super-pressurized with dry nitrogen to 25 bar at 21 °C (360 psi at 70 °F). Containers sharing the same manifold shall be equal in size and fill density. Containers are finished in red and are available in various sizes. A nameplate is mounted to the container displaying the agent weight, tare weight, gross weight, fill density, charge date and fill location. A low discharge pressure switch and liquid level indicator are options that may be specified when ordering.

FIGURE 2-1
AGENT CONTAINER AND VALVE ASSEMBLY
009668

Container and Valve Assembly Technical Information

Nominal working pressure:	25.0 bar at 21 °C (360 psi 70 °F)
Max. system pressure:	34.0 bar (482.6 psi)
Max. fill density	1 kg/L (62.4 lb/ft^3)
Min. fill density	0.5 kg/L (31.2 lb/ft^3)
Temperature rating	0 °C to 54 °C (32 °F to 130 °F)

DOT Technical Information

The containers are manufactured in accordance with DOT 4BW500 or 4BW450. (343 L container in accordance with DOT 4BW450 only).

	DOT 4BW500	DOT 4BW450
Hydraulic test pressure:	69.0 bar (1000 psi)	62.1 bar (900 psi)
Maximum service pressure:	34.5 bar at 21 °C (500 psi at 70 °F)	31.0 bar at 21 °C (450 psi at 70 °F)
Material:	Carbon Steel	Carbon Steel

TABLE 2-1A: DOT CONTAINER ASSEMBLY

Container		Minimum and Maximum Fills		Valve Size		Height from floor to outlet (nominal)		Diameter		Nominal Tare Weight		Equivalent Lengths	
Part No.	Nom. Vol.	kg	(lb)	mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)	m	(ft)
442872	8 L	4.0 to 8.0	(9 to 17)	25	(1)	305	(12.0)	254	(10)	14.8	(32.6)	6.1	(20)
442873	16 L	8.0 to 16.0	(18 to 35)	25	(1)	504	(19.8)	254	(10)	18.4	(40.6)	6.1	(20)
442874	32 L	16.0 to 32.0	(36 to 70)	25	(1)	836	(32.8)	254	(10)	26.1	(57.5)	6.1	(20)
442875	52 L	26.0 to 52.0	(58 to 114)	50	(2)	595	(23.5)	406	(16)	49.1	(108.3)	10.7	(35)
442876	106 L	53.0 to 106.0	(117 to 233)	50	(2)	1022	(40.2)	406	(16)	71.8	(158.3)	10.7	(35)
442877	147 L	73.5 to 147.0	(163 to 324)	50	(2)	1356	(53.3)	406	(16)	89.9	(198.2)	10.7	(35)
442878	180 L	90.0 to 180.0	(199 to 396)	50	(2)	1635	(64.3)	406	(16)	105.8	(233.2)	10.7	(35)
442879	343 L	171.5 to 343.0	(379 to 756)	80	(3)	1466	(57.7)	610	(24)	207.0	(456.0)	26.0	(85)

TABLE 2-1B: TC CONTAINER ASSEMBLY

Container		Minimum and Maximum Fills		Valve Size		Height from floor to outlet (nominal)		Diameter		Nominal Tare Weight		Equivalent Lengths	
Part No.	Nom. Vol.	kg	(lb)	mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)	m	(ft)
442882	8 L	4.0 to 8.0	(9 to 17)	25	(1)	305	(12.0)	254	(10)	14.8	(32.6)	6.1	(20)
442883	16 L	8.0 to 16.0	(18 to 35)	25	(1)	504	(19.8)	254	(10)	18.4	(40.6)	6.1	(20)
442884	32 L	16.0 to 32.0	(36 to 70)	25	(1)	836	(32.8)	254	(10)	26.1	(57.5)	6.1	(20)
442885	52 L	26.0 to 52.0	(58 to 114)	50	(2)	595	(23.5)	406	(16)	49.1	(108.3)	10.7	(35)
442886	106 L	53.0 to 106.0	(117 to 233)	50	(2)	1022	(40.2)	406	(16)	71.8	(158.3)	10.7	(35)
442887	147 L	73.5 to 147.0	(163 to 324)	50	(2)	1356	(53.3)	406	(16)	89.9	(198.2)	10.7	(35)
442888	180 L	90.0 to 180.0	(199 to 396)	50	(2)	1635	(64.3)	406	(16)	105.8	(233.2)	10.7	(35)
442889	343 L	171.5 to 343.0	(379 to 756)	80	(3)	1466	(57.7)	610	(24)	207.0	(456.0)	26.0	(85)

CONTAINER LABELS
(Part No. See Table)

The container label details the weight of FM-200 agent contained, empty weight, fill density and charge date. The label is not field replaceable.

Part No.	Description
442880	Container Label 8 L
442881	Container Label 16 L to 343 L

Technical Information

Material:	Aluminum
Adhesive:	Pre-applied 3M adhesive 9485
Certification:	UL / ULC / FM Recognized
Overall size:	241.3 mm x 165.1 mm (9.5 in. x 6.5 in.) (Part No. 442881)
	558 mm x 50.8 mm (22 in. x 2 in.) (Part No. 442880)

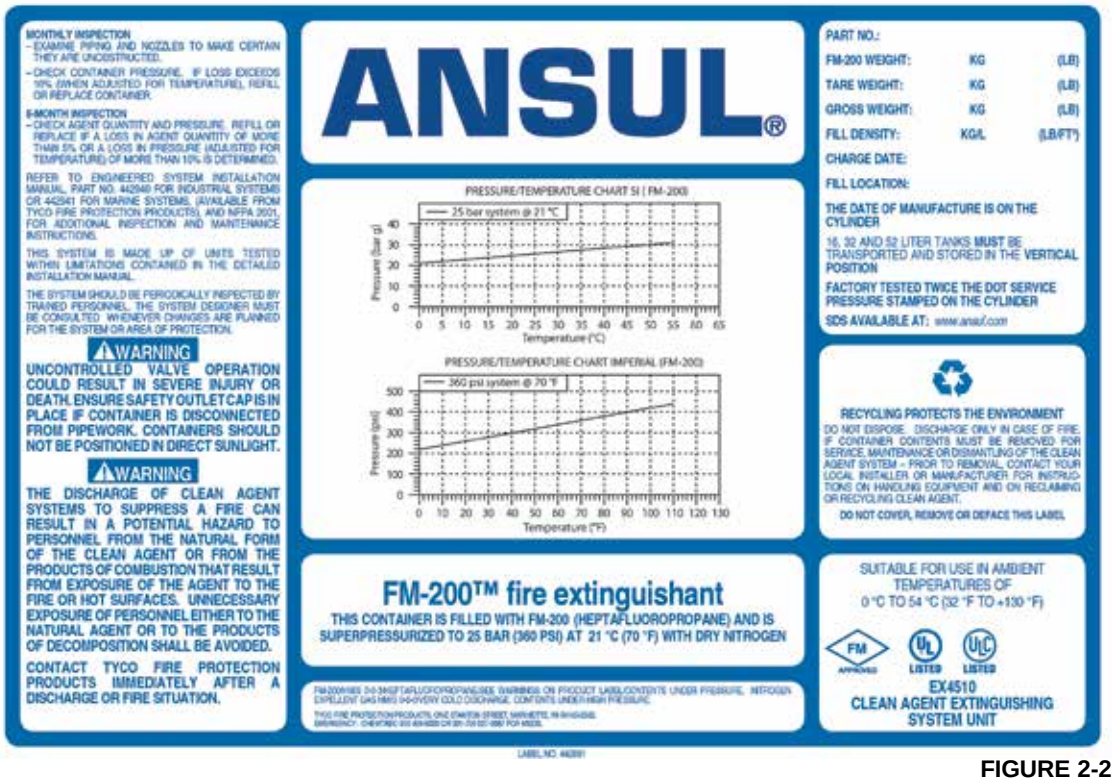


FIGURE 2-2
CONTAINER LABEL (Part No. 442881)
009669

FIGURE 2-3
8 L CONTAINER LABEL (Part No. 442880)
009670

VALVE ASSEMBLY
(Part No. See Table)

The valve assembly is factory-fitted to the container and is supplied pre-assembled with a low pressure switch (to be ordered separately), pressure gauge and burst disc.

The replacement valve assembly is available for field replacement. The 25 mm (1 in.) and 50 mm (2 in.) valve assemblies are supplied with a plug in the pressure gauge port. (Pressure gauge (Part No. 570055) must be ordered separately.) The 80 mm (3 in.) valve is supplied with the gauge factory installed. The replacement valve is 100% leak tested before it leaves the factory.

Part No.	Description
570535	25 mm (1 in.) Valve assembly
570536	50 mm (2 in.) Valve assembly
570302	80 mm (3 in.) Valve assembly

FIGURE 2-4
VALVE ASSEMBLY
009671

Technical Information

Valve Size:	25 mm (1 in.) Valve	50 mm (2 in.) Valve	80 mm (3 in.) Valve
Part No.:	570535	570536	570302
Body material:	Brass	Brass	Brass
Outlet safety cap material:	Brass	Brass	Brass
Max. system pressure:	34 bar (493 psi)	34 bar (493 psi)	34 bar (493 psi)
Outlet:	25 mm (1 in. BSPP)	50 mm (2 in. BSPP)	80 mm (3 in. Flared*)
Low pressure switch port:	1/8 in. NPT	1/8 in. NPT	1/8 in. NPT
Gauge port:	1/8 in. NPT	1/8 in. NPT	1/8 in. NPT
Actuation pressure port:	1/4 in. BSPP	1/4 in. BSPP	1/4 in. NPT
Overall size:	130 mm (L) x 62 mm (Dia) (5.12 in. (L) x 2.44 in. (Dia))	173 mm (L) x 100 mm (Dia) (6.12 in. (L) x 3.94 in. (Dia))	241 mm (L) x 129 mm (Dia) (9.50 in. (L) x 5.06 in. (Dia))
Weight:	2.96 kg (6.526 lb)	9.18 kg (20.238 lb)	18.82 kg (41.49 lb)
Equivalent length:	6.096 m (20 ft)	10.668 m (35 ft)	25.91 m (85 ft)

*3 in. NPT and Grooved Outlet adaptors are available.

BURST DISC
(Part No. See Table)

A burst disc is factory fitted to every valve assembly. It is designed to rupture when the container becomes over pressurized when subjected to temperatures above the designed storage temperature of the container.

Part No.	Description
570793 / 442781	25 mm (1 in.) and 50 mm (2 in.) Valve assemblies
570300	80 mm (3 in.) Valve assembly

FIGURE 2-5
BURST DISC
009672

Technical Information

Valve size:	25 mm (1 in.) and 50 mm (2 in.) Valve	25 mm (1 in.) and 50 mm (2 in.) Valve	80 mm (3 in.) Valve
Part No.:	570793	442781	570300
Body material:	Brass	Brass	Brass
Rating:	53.4 bar ± 5% at 50 °C (774.5 psi ± 5% at 122 °F)	53.4 bar ± 5% at 50 °C (774.5 psi ± 5% at 122 °F)	5.74 bar to 56.12 bar at 50 °C (736 psi to 814 psi at 122 °F)
Thread:	M18 x 1.00	M18 x 1.00	0.9375-16UN-3A
Hole orientation:	90° to Body	90° to Body	90° to Body
Torque:	35 N•m (25.8 ft-lb)	25 N•m (18.4 ft-lb)	81 N•m (60 ft-lb)
Overall size:	20 mm (L) x 18 mm (Dia) (0.79 in. (L) x 0.71 in. (Dia))	20 mm (L) x 18 mm (Dia) (0.79 in. (L) x 0.71 in. (Dia))	33.3 mm (L) x 18 mm (Dia) (1.3125 in. (L) x 0.71 in. (Dia))
Weight:	0.028 kg (0.062 lb)	0.028 kg (0.062 lb)	0.088 kg (0.195 lb)

PRESSURE GAUGE
(Part No. 570055)

A Pressure Gauge is factory fitted to the valve, and is field replaceable.

Technical Information

Type:	Bourdon Tube Pressure Gauge
Entry:	Back Axial
Nominal size:	Dia 40 mm (1.6 in.)
Pressure range:	0 bar to 48 bar (0 psi to 700 psi)
Connection:	1/8 in. NPT
Accuracy:	± 4% at 25 bar (360 psi)
Language:	English / Spanish
Working temperature range:	0 °C to 50 °C (32 °F to 120 °F)

FIGURE 2-6
PRESSURE GAUGE
009702

LOW PRESSURE SWITCH (Part No. 570585)

A low pressure warning switch is fitted to every container and must be ordered separately. The device continuously monitors the container pressure and in the event of the pressure dropping below the switch point, the switch operates to enable the condition to be signaled to the control panel.

This low pressure switch is a dual source component used in order to maintain the supply chain and ensure that adequate stock levels are available to fully support customers and installers.

FIGURE 2-7
LOW PRESSURE SWITCH
009673

Technical Information

Body:	Zinc plated steel and Kapton
Switch type:	Single pole, double throw (SPDT)
Switch point:	Transfers on fall at 20.3 bar (294 psi) Resets on rise at 24.1 bar (350 psi)
Tolerance:	± 0.7 bar (± 10 psi)
Proof pressure:	206.8 bar (3000 psi)
Contact reset method:	Auto resetting contacts
Connection:	1/8 in. NPT male
Electrical rating:	5 A at 24 VDC (resistive)
Electrical connection:	DIN 43650a connector with 1/2 in. NPT female conduit connection
Pin 1:	Common at atmospheric pressure
Pin 2:	Normally closed at atmospheric pressure
Pin 3:	Normally open at atmospheric pressure
Certification:	UL Recognized
LP rating:	IP65
Overall size:	104 mm (L) x 28 mm (Dia) (4.10 in. (L) x 1.12 in. (Dia))
Weight:	0.16 kg (0.35 lb)

Technical Information (Manufacturing Alternative)

Body:	Brass and anodized aluminum
Switch type:	Single pole, double throw (SPDT)
Switch point:	Transfers on fall at 20 bar (290 psi) Resets on rise at 22.8 bar (330 psi)
Tolerance:	± /-1.0 bar (± 15 psi)
Proof pressure:	413.7 bar (6000 psi)
Contact reset method:	Auto resetting contacts
Connection:	1/8 in. NPT male
Electrical rating:	5 A at 24 VDC (resistive)
Electrical connection:	DIN 43650a connector with 1/2 in. NPT female conduit connection
Pin 1:	Common at atmospheric pressure
Pin 2:	Normally closed at atmospheric pressure
Pin 3:	Normally open at atmospheric pressure
Certification:	UL Recognized
LP rating:	IP65
Overall size:	104 mm (L) x 32 mm (Dia) (4.40 in. (L) x 1.25 in. (Dia))
Weight:	0.21 kg (0.46 lb)

MOUNTING BRACKETS
(Part No. See Table)

The bracket assembly consists of a nut and bolt with two bracket half straps, (back channel must be supplied by others); approved type of Unistrut channel is series P1000T 41 mm x 41 mm (1.6 in. x 1.6 in.) or equal, to securely hold the container in position during the system discharge, two bracket assemblies are required per container. The only exceptions are the 8 L containers which only require one.

Each strap is notched for insertion into the back channel allowing the container to be properly aligned. The bracket assembly is designed to be mounted to a rigid vertical surface with the container assembly resting fully on the floor.

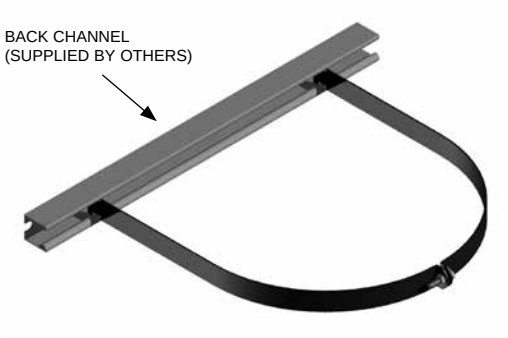


FIGURE 2-8
MOUNTING BRACKET (STRAP STYLE)
009674

Part No.	Description
570085	Mounting Bracket 8 L to 32 L
570092	Mounting Bracket 52 L to 180 L
570336	Mounting Bracket 343 L

Technical Information

Material:	Mild Steel
Finish:	Red polyester powder or black plastic powder
Mounting:	Unirax/Unistrut ch10 channel (Back channel) (Supplied by others)

Part No.	Container Size L	Container Diameter mm	(in.)	Recommended Length of Back Channel per Container mm	(in.)	Weight of Strap kg	(lb)
570085	8 to 32	254	(10)	500	(19.69)	0.30	(0.66)
570092	52 to 180	406	(16)	600	(23.60)	0.46	(1.01)
570336	343	610	(24)	900	(35.40)	0.71	(1.56)

MANUAL ACTUATOR (Part No. 570549)

The manual actuator is used to mechanically operate the system. The actuator may be fitted to the top of the valve assembly or removable electrical actuator. Inadvertent operation is prevented by a safety clip which has to be removed before activation.

FIGURE 2-9
MANUAL ACTUATOR
009675

Technical Information

Body:	Brass
Knob:	PVC (color: red)
Safety pin:	Stainless Steel
Piston rod:	Brass
Min. actuation force:	25.5 N (5.73 lbf)
Overall size:	52.0 mm (L) x 41.5 mm (Dia) (2.05 in. (L) x 1.63 in. (Dia))
Weight:	0.265 kg (0.584 lb)

PNEUMATIC ACTUATOR (Part No. 570550)

The pneumatic actuator is used to pneumatically operate the system. The actuator may be fitted to the top of the valve assembly or removable electrical actuator. Pressure from a “master” container is used to actuate the valve, with 6 mm (1/4 in. sch 40) piping or a flexible hose.

FIGURE 2-10
PNEUMATIC ACTUATOR
009676

Technical Information

Body:	Brass
Actuation pin:	Stainless Steel
Piston rod:	Brass
Pipe connection:	1/4 in. NPT female
Min. actuation pressure:	4 bar (58 psi)
Max. system pressure	34 bar (493 psi)
Max. test pressure:	56 bar (812 psi)
Overall size:	48.0 mm (L) x 41.5 mm (Dia) (1.89 in. (L) x 1.63 in. (Dia))
Weight:	0.228 kg (0.503 lb)

ELECTRICAL ACTUATOR (Part No. 570537)

The electrical actuator is mounted to the top of the container valve; 24 VDC is required for solenoid operation. The electrical actuator has a life span of 10 years from date of manufacture, which is indicated on the label. A manual actuator or pneumatic actuator may be placed on top of the electrical actuator.

FIGURE 2-11
ELECTRICAL ACTUATOR
009677

Technical Information

Body:	Mild Steel and dull Nickel
Swivel nut:	Brass
Actuation pin:	Stainless Steel
Actuation type:	Latching
Reset requirement:	Manually with reset tool supplied
Connection:	1 in. BSPP brass
Nominal voltage:	24 VDC
Nominal current:	0.25 A
Max. monitoring current:	25 mA
Manual actuation force:	50 N (11.00 lbf)
Nominal pin travel:	4.4 mm (0.17 in.)
Electrical connection:	3-Pin plug connector
Certification:	UL / ULC / FM Approved
Overall size:	104 mm (L) x 44 mm (Dia) x 89 mm (W) (4.09 in. (L) x 1.73 in. (Dia) x 3.5 in. (W))
Weight:	0.95 kg (2.09 lb)

ACTUATOR PLACEMENT INDICATOR SWITCH (Part No. 441871)

The placement indicator switch is a monitoring device designed to help ensure proper placement of the system electric actuator on the master container. The placement indicator switch design allows the device to mount directly to the electric actuator. The switch is supplied with a mounting bracket (see installation section for details).

FIGURE 2-12
ACTUATOR PLACEMENT INDICATOR SWITCH
009678

Technical Information

Housing:	Plastic
Switch:	Stainless Steel
Contacts:	Gold
Connection:	1/2 in. - 14 NPSM
Nominal voltage:	24 VDC
Nominal current:	0.4 A
Electrical connection:	1/2 in. conduit connection with terminal screw
Certification:	UL / ULC / FM Approved
Overall size:	89 mm (L) x 45 mm (W) x 19 mm (D) (3.5 in. (L) x 1.75 in. (W) x 3/4 in. (D))
Weight:	0.11 kg (0.25 lb)

AUTOPULSE CONTROL SYSTEM

The AUTOPULSE Control System is designed to monitor fixed fire hazards. The control system can automatically actuate the fire suppression system after receiving an input signal from one or more initiating devices, i.e., manual pull station or detector. The control system incorporates an internal power supply, on-line emergency batteries, and solid state electronics. Refer to Detection and Control manual for additional information.

FIGURE 2-13
AUTOPULSE EQUIPMENT
009679

AUTOMAN II-C RELEASING DEVICE
(Part No. See Table)

The AUTOMAN II-C Releasing Device consists of a metal enclosure which contains a spring-loaded puncture pin release mechanism, an actuation cartridge, electrical circuitry, and an input/output terminal strip for making electrical connections. The AUTOMAN II-C releasing device provides automatic pneumatic actuation of the FM-200 System. When wired to an AUTOPULSE Control System, it will provide supervised electric detection and release. It also provides manual actuation using the strike button on the release. When an AUTOPULSE Control System is used, manual actuation is accomplished using an electric manual pull station.

The AUTOMAN II-C releasing device requires an LT-30-R Nitrogen cartridge for system actuation. Cartridge must be ordered separately.

Part No.	Description
17728	AUTOMAN II-C Releasing Device
5373	LT-30-R Nitrogen Cartridge (Ordered Separately)
26310	Cocking Lever (Ordered Separately)
17728	AUTOMAN II-C, Releasing Device, 24VDC
31492	AUTOMAN II-C, Releasing Device, Explosion-Proof, 24VDC
35620	AUTOMAN II-C, Releasing Device, Weather-Proof, 24VDC
35623	AUTOMAN II-C, Releasing Device, Explosion/Weather-Proof, 24VDC

FIGURE 2-14
AUTOPULSE EQUIPMENT
009680

FLEXIBLE DISCHARGE HOSE
(Part No. See Table)

FM-200 agent container installations may be connected to the system by means of a flexible discharge hose. This enables containers to be disconnected for maintenance or recharge without dismantling other container mountings, manifold connections and pipework, etc. The flexible discharge hose is provided with a swivel fitting at the inlet.

Part No.	Description	Dimension A mm	(in.)	Dimension B mm	(in.)
570539	25 mm (1 in.) Hose	405.0	(15.9)	81.5	(3.2)
570538	50 mm (2 in.) Hose	520.0	(20.5)	126.0	(5.0)

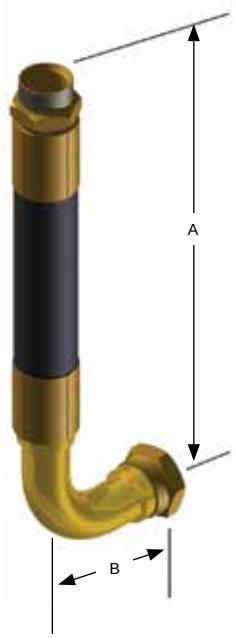


FIGURE 2-15
FLEXIBLE DISCHARGE HOSE
009681

Technical Information

	25 mm (1 in.)	50 mm (2 in.)
Hose size:		
Hose construction:	Twin steel wire braided oil resistant seamless synthetic rubber core	Twin steel wire braided oil resistant seamless synthetic rubber core
Connection material:	Zinc Passivated Mild Steel	Zinc Passivated Mild Steel
Connections:	25 mm (1 in. NPT) straight fixed male 25 mm (1 in. BSPP) 90° female swivel union	50 mm (2 in. NPT) straight fixed male 50 mm (2 in. BSPP) 90° female swivel union
Max. bend angle:	15° at 0 °C (32 °F)	15° at 0 °C (32 °F)
Max. system pressure:	34 bar (493 psi)	34 bar (493 psi)
Test Pressure	132 bar (1915 psi)	120 bar (1740 psi)
Weight:	1.25 kg (2.76 lb)	3.90 kg (8.60 lb)
Equivalent length:	3.14 m (10.3 ft)	5.36 m (17.6 ft)

DISCHARGE HOSE/CHECK VALVE ASSEMBLY (Part No. 69841)

The discharge hose/check valve assembly combines the elbow, hose, check valve, and swivel coupling for connection to the valve discharge outlet and the discharge manifold. The check valve provides the range for a 40 mm (1 1/2 in.) height adjustment.

FIGURE 2-16
80 mm (3 IN.) DISCHARGE HOSE/ CHECK VALVE ASSEMBLY
009682

Technical Information

Hose:	Double braid Stainless Steel
Elbow:	Stainless Steel
Valve swivel nut:	Stainless Steel
Check valve swivel nut:	Cadmium-plated Mild Steel
Check valve body:	Cadmium-plated Mild Steel
Check valve seal and seat:	Brass
Spring:	Stainless Steel 2.84 kg (6.27 lb)
Max. system pressure:	34 bar (493 psi)
Test pressure:	51.7 bar (750 psi)
Overall size (minus check valve):	619 mm (L) x 254 mm (W) (24.37 in. (L) x 10.00 in. (W))
Weight:	20.50 kg (45.20 lb)
Equivalent length:	15.85 m (52 ft)

DISCHARGE HOSE (Part No. 69990)

The discharge hose is used with the 3 in. NPT single container adaptor and 90° elbow to connect the container valve outlet to the distribution piping in single container systems. The hose is constructed of corrugated stainless steel tubing with stainless braid cover.

FIGURE 2-17
80 mm (3 IN.) DISCHARGE HOSE
009683

Technical Information

Hose construction:	Double braid Stainless Steel
Max. system pressure:	34 bar (493 psi)
Test pressure:	51.7 bar (750 psi)
Min. bend radius:	460 mm (18 in.)
Overall size:	406 mm (L) x 76 mm (Dia) (15.98 in. (L) x 2.99 in. (Dia))
Weight:	3.00 kg (6.61 lb)
Equivalent length:	1.55 m (5.1 ft)

UNION ADAPTORS
(Part No. See Table)

The union adaptor is used to easily assemble or disassemble the rigid pipework to the container valve outlet.

Part No.	Description
570557	25 mm (1 in.) Union Adaptor
570558	50 mm (2 in.) Union Adaptor

FIGURE 2-18
25 mm (1 IN.) AND 50 mm (2 IN.) UNION ADAPTOR
009684

Technical Information

Material: Steel

Plating: Zinc plated and passivated

25 mm (1 in.) Union Adaptor

Joint type: 1 in. BSPP swivel cone (hydraulic) x 1 in. NPT fixed female

Overall size: 63.5 mm (L) x 44 mm (W) (2.5 in. (L) x 1.73 in. (W))

Weight: 0.35 kg (0.77 lb)

Equivalent length: 0.18 m (0.6 ft)

50 mm (2 in.) Union adaptor

Joint type: 2 in. BSPP swivel cone (hydraulic) x 2 in. NPT fixed female

Overall size: 81 mm (L) x 88 mm (W) (3.19 in. (L) x 3.46 in. (W))

Weight: 1.07 kg (2.36 lb)

Equivalent length: 0.37 m (1.2 ft)

SINGLE CONTAINER ADAPTORS
(Part No. See Table)

When a single 343 L container is being used without a manifold, two adaptors are available for connection from the valve outlet to rigid pipe. The adaptor is available in either NPT or grooved.

Part No.	Description
69470	3 in. Flared to 3 in. NPT
69471	3 in. Flared to 3 in. Grooved

FIGURE 2-19
80 mm (3 IN.) VALVE SINGLE CONTAINER ADAPTOR
009685

Technical Information

Body: Cadmium-plated mild steel

3 in. Flared to 3 in. NPT

Overall size: 115 mm (L) x 102 mm (W) (4.51 in. (L) x 4.00 in. (W))

Weight: 2.84 kg (6.27 lb)

Equivalent length: 0.55 m (1.8 ft)

3 in. Flared to 3 in. Grooved

Overall size: 72 mm (L) x 102 mm (W) (2.82 in. (L) x 4.00 in. (W))

Weight: 1.95 kg (4.30 lb)

Equivalent length: 0.55 m (1.8 ft)

MANIFOLD CHECK VALVE – 25 mm (1 IN.) ASSEMBLY (Part No. See Table)

The function of the check valve is to prevent loss of suppression agent during discharge from an outlet, should a container have been removed. The check valve is installed between the flexible discharge hose and the manifold.

Manifold check valves are available in two sizes: 25 mm and 50 mm (1 in. and 2 in.).

Part No.	Description
570566	25 mm (1 in.) Manifold Check Valve
570568	50 mm (2 in.) Manifold Check Valve

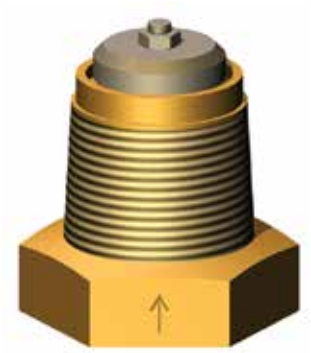


FIGURE 2-20
MANIFOLD CHECK VALVE
009686

Technical Information

Check valve:	25 mm (1 in.)	50 mm (2 in.)
Part No.:	570566	570568
Body material:	Brass	Brass
Stem material:	Stainless Steel	Stainless Steel
Spring material:	Stainless Steel	Stainless Steel
Bottom plate material:	Brass	Brass
Top plate material:	Stainless Steel	Stainless Steel
Seal material:	Nitrile	Nitrile
Inlet connection thread:	25 mm (1 in. NPT) Female	50 mm (2 in. NPT) Female
Outlet connection thread:	40 mm (1 1/2 in. NPT) Male	65 mm (2 1/2 in. NPT) Male
Overall size:	54 mm (L) x 52.4 mm (W) (2.13 in. (L) x 2.06 in. (W))	73 mm (L) x 83 mm (W) (2.87 in. (L) x 3.25 in.(W))
Equivalent length:	0.40 m (1.3 ft)	6.66 m (21.8 ft)
Max system pressure:	34 bar (493 psi)	34 bar (493 psi)
Test pressure:	79 bar (1145 psi)	79 bar (1145 psi)
Weight:	0.63 kg (1.39 lb)	1.60 kg (3.53 lb)

ACTUATION ISOLATOR (Part No. 56803)

The actuation isolator is only required for use with 343 L containers installed in a main and reserve fire suppression system.

Application and Description

Due to the many variables associated with the application and installation of check valves in manifolded, multi-container systems, it is not always possible to ensure that the check valves are pressure tight when flow is reversed. This can cause a problem on main/reserve systems because the main discharge pressure can escape through the common manifold to the discharge port of the reserve master container valve. Since the slave actuation port of the master container receives the same pressure as the discharge port, it is possible for the reserve slave containers to be accidentally actuated. Two isolators must always be used because the reserve system can also act as the main system.

The Actuation Isolator must be used in both the main and reserve systems when each system is composed of more than one container (whenever a master/slave arrangement is used). The isolator installs into the actuation port of both master container valves. The isolator rubber sleeve seals against the valve piston and prevents discharge pressure from entering the slave actuation line. Only when the master valve actuates, moving the piston away from the rubber sleeve, is pressure allowed through the isolator into the slave actuation line.

The installation of main and reserve actuation isolators as described above is required; variations of the installation will not be accepted.

The isolator is constructed of stainless steel, brass, and shock-resistant plastic. The inlet and outlet connections are 1/4 in. NPT.

FIGURE 2-21
ACTUATION ISOLATOR
009688

Technical Information

Material:	Stainless Steel / Brass / Plastic
Connection:	1/4 in. NPT
Max. working pressure:	34 bar (493 psi)
Dimensions:	59 mm x 8 mm (2 5/16 in. x 1/2 in.)

ACTUATION HOSE
(Part No. See Table)

The 1/4 in. stainless steel actuation hose is used to connect the 1/4 in. actuation line to the pneumatic actuator located on the container discharge valve. The hose can be used when the actuation line is rigid 1/4 in. pipe and fittings or from the actuation pressure port on the master container to the pneumatic actuators on the slave containers. The hose has a 1/4 in. NPT male thread on one end and a 7/16-20 JIC female thread on the other end. A male adaptor (either Part No. 32338 or 570342) is required with this hose.

Part No.	Description
73597	406 mm (16 in.) Actuation hose
415142	813 mm (32 in.) Actuation hose
430815	1067 mm (42 in.) Actuation hose

FIGURE 2-22
1/4 IN. ACTUATION HOSE
009700

Technical Information

Outer sheath:	Stainless Steel braided
Inner sheath:	PTFE
Max. working pressure:	68.9 bar (1000 psi)
Min. bend radius:	60 mm at 0 °C (2.4 in. at 32 °F)
Connections:	Zinc Passivated Mild Steel 2 x 1/4 in. NPT male swivel x 7/16 - 20 female swivel

FEMALE ACTUATION HOSE
(Part No. 32336)

The 1/4 in. stainless steel, female actuation hose is used to connect the actuation line compression tees between each agent container. The hose has the same thread, 7/16-20 JIC, as the compression tees.

FIGURE 2-23
FEMALE ACTUATION HOSE
009701

Technical Information

Outer sheath:	Stainless Steel braided
Inner sheath:	PTFE
Max. working pressure:	68.9 bar (1000 psi)
Min. bend radius:	60 mm at 0 °C (2.4 in. at 32 °F)
Connections:	Zinc Passivated Mild Steel 2 x 7/16 - 20 female swivel

MALE ACTUATION CONNECTOR (Part No. 32338)

The male connector is used to connect the 1/4 in. female actuation hose to rigid 1/4 in. actuation fittings and also the pneumatic actuator. The connector has a 7/16-20 JIC thread for connecting to the actuation hose and a 1/4 in. NPT thread for connecting to the actuation piping and pneumatic actuator.

FIGURE 2-24
MALE ACTUATION CONNECTOR

Technical Information

Material:	Brass
Connection:	7/16-20 JIC x 1/4 in. NPT
Max. working pressure:	350 bar (5076 psi)

MALE ADAPTOR (Part No. 570342)

The male adaptor is required to attach the 1/4 in. actuation hose to the master container actuation port. When using the male adaptor on the master container actuation port, a 1/4 in. pipe coupling must be used between the adaptor and the male hose thread.

FIGURE 2-25
MALE ADAPTOR

Technical Information

Material:	Steel, Zinc Passivated
Connection:	1/4 in. NPT x 1/4 in. BSPP
Max. working pressure:	350 bar (5076 psi)

MALE ACTUATION TEE (Part No. 31811)

The male actuation tee is used to connect multiple actuation hoses together. The actuation tee has a 7/16-20 JIC thread for connecting to the female actuation hose and a 1/4 in. NPT thread for connecting to the pneumatic actuator on the container discharge valve.

FIGURE 2-26
MALE TEE
009691

Technical Information

Material:	Steel, Zinc Passivated
Connection:	7/16-20 JIC x 7/16-20 JIC x 1/4 in. NPT
Max. working pressure:	350 bar (5076 psi)

MALE ACTUATION ELBOW (Part No. 31810)

The male actuation elbow is used to connect the actuation hose to a single or last container in a multiple container system. The elbow connects between the hose and the pneumatic actuator on the valve. The elbow has a 7/16-20 JIC thread for connecting to the hose and a 1/4 in. NPT thread for connecting to the pneumatic actuator on the container discharge valve.

FIGURE 2-27
MALE ELBOW
009692

Technical Information

Material:	Brass
Connection:	7/16-20 JIC x 1/4 in. NPT
Max. working pressure:	450 bar (6527 psi)

DISCHARGE PRESSURE SWITCH (Part No. 437900)

The discharge pressure switch is activated by pressure from the agent during discharge and can be used to signal to a control panel that the system has actually discharged. The discharge pressure switch latches on operation and has a reset plunger. The discharge pressure switch is supplied with a 3/8 in. NPT Male x 1/4 in. NPT Female adaptor. For connection to an actuation hose, a 1/4 in. BSPP x 1/4 in. NPT Male adaptor (Part No. 32338) is required and should be ordered separately.

Technical Information

Housing:	C.R. Steel (Painted red)
Body:	Forged Brass
Switch point:	2.8 bar rising (40 psi)
Tolerance:	± 0.7 bar (± 10 psi)
IP rating:	IP65
Electrical connection:	1/2 in. and 3/4 in. conduit knockouts with #6-32 UNC terminal screws
Pressure connection:	3/8 in. NPT Female
Adaptor:	3/8 in. NPT Male x 1/4 in. NPT Female
Min. actuation pressure:	3.4 bar (50 psi)
Max. operating pressure:	200 bar (2900 psi)
Electrical ratings:	10A 250V AC 15A 125V AC 3/4 HP, 250V AC 1, 2, or 3-phase
Switch configuration:	Three pole, double throw (3PDT)
Installation environment:	Non-corrosive / indoor
Overall size:	114 mm (L) x 114 mm (H) x 67 mm (W) (4.49 in. (L) x 4.49 in. (H) x 2.64 in. (W))
Weight:	1.0 kg (2.20 lb)

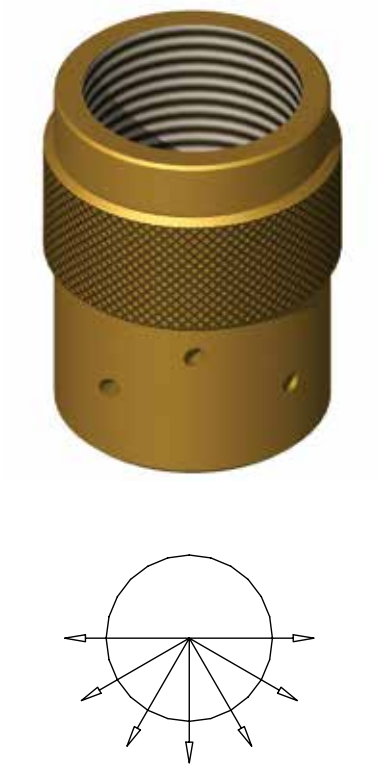
FIGURE 2-28
DISCHARGE PRESSURE SWITCH
009693

DISCHARGE NOZZLE
(Part No. See Table, page 2-23)

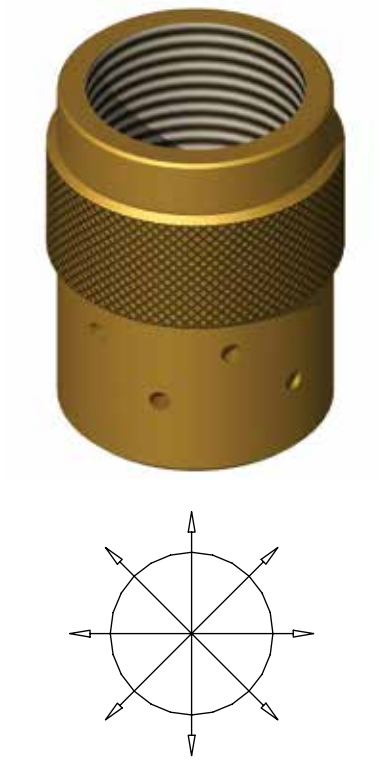
FM-200 fire extinguishant agent is distributed within the protected area by the discharge nozzle which is sized to ensure the correct flow of agent for the risk. Nozzles are available with seven port (180°) or eight port (360°) horizontal discharge patterns. Ports are drilled in 0.1 mm increments to the specified system design. Nozzles are supplied in Brass or Stainless Steel.

Technical Information

Material:	Brass / Stainless Steel
Thread type:	NPT
Drill incrementation:	0.1 mm
Nozzle type:	7 Port 180° / 8 Port 360°
Orientation:	Pendant / Upright



180° NOZZLE PATTERN (7 PORTS)



360° NOZZLE PATTERN (8 PORTS)

FIGURE 2-29
7 AND 8 PORT NOZZLES BRASS CONFIGURATION
009694/006139(180) / 009695/006139(360)

DISCHARGE NOZZLE (Continued)

TABLE 2-2: DISCHARGE NOZZLES

BRASS

Part No.	Nozzle Size		Length		Diameter		Weight		Thread Type
	mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)	
442910	10	(3/8)	33.5	(1.32)	25.0	(0.98)	0.10	(0.22)	NPT
442911	15	(1/2)	41.0	(1.61)	29.0	(1.14)	0.15	(0.33)	NPT
442912	20	(3/4)	47.0	(1.85)	34.5	(1.36)	0.21	(0.46)	NPT
442913	25	(1)	52.0	(2.05)	41.3	(1.63)	0.27	(0.60)	NPT
442914	32	(1 1/4)	62.0	(2.44)	50.0	(1.97)	0.41	(0.90)	NPT
442915	40	(1 1/2)	68.0	(2.68)	60.0	(2.36)	0.46	(1.01)	NPT
442916	50	(2)	89.0	(3.50)	76.0	(2.99)	0.83	(1.83)	NPT

STAINLESS

Part No.	Nozzle Size		Length		Diameter		Weight		Thread Type
	mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)	
442920	10	(3/8)	33.5	(1.32)	25.0	(0.98)	0.10	(0.22)	NPT
442921	15	(1/2)	41.0	(1.61)	29.0	(1.14)	0.15	(0.33)	NPT
442922	20	(3/4)	47.0	(1.85)	34.5	(1.36)	0.21	(0.46)	NPT
442923	25	(1)	52.0	(2.05)	41.3	(1.63)	0.27	(0.60)	NPT
442924	32	(1 1/4)	62.0	(2.44)	50.0	(1.97)	0.41	(0.90)	NPT
442925	40	(1 1/2)	68.0	(2.68)	60.0	(2.36)	0.46	(1.01)	NPT
442926	50	(2)	89.0	(3.50)	76.0	(2.99)	0.83	(1.83)	NPT

Note: When ordering, specify 7 Port (180°) or 8 Port (360°) and Drill sizes in millimeters (from calculation program).

ROSETTE
(Part No. See Table)

A rosette is a plastic trim ring used to reinforce the penetration of a nozzle into the hazard area. It is drilled for the system piping through ceilings or walls, and attaches directly to the discharge nozzle. A rosette is used to enhance the look of a discharge nozzle installation and is available in 7 sizes, one for each nozzle size.

Part No.	Nozzle Size mm	(in.)	Diameter mm	(in.)
570171	10	(3/8)	56	(2.20)
570172	15	(1/2)	60	(2.39)
570174	20	(3/4)	71	(2.80)
570175	25	(1)	76	(3.00)
570176	32	(1 1/4)	90	(3.54)
570178	40	(1 1/2)	97	(3.80)
570179	50	(2)	110	(4.32)

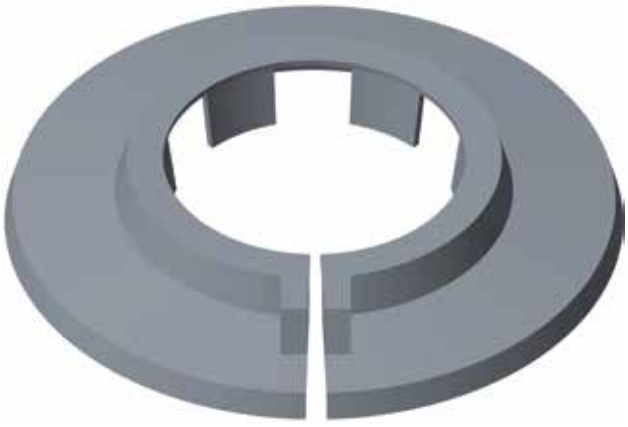


FIGURE 2-30
ROSETTE
009696

PRESSURE TRIP
(Part No. 5156)

The pressure trip is connected to the 1/4 in. actuation piping from the AUTOMAN II-C release. By either pneumatic or manual actuation, the pressure trip can release spring or weight powered devices to close doors and windows, open fuel dump valves, close fire dampers or close fuel line valves. The pressure trip is constructed of brass with two 1/4 in. NPT fittings for connection to actuation piping. The link on the pressure switch is released either pneumatically, by nitrogen pressure from the cartridge in the AUTOMAN II-C release, or manually, by use of the pull ring. The link then releases the device which performs the auxiliary functions.

Operating pressure must be a minimum of 5.2 bar (75 psi) with a maximum load of 31.7 kg (70 lb).

NOTICE

The pressure trip must not be installed in the agent discharge piping.

FIGURE 2-31
PRESSURE TRIP
009696

Technical Information

Body:	Brass
Spring:	Stainless Steel
Pull ring:	Stainless Steel
Pressure ports:	1/4 in. NPT
Mounting holes:	7.1 mm (0.281 in.) Dia.
Min. operating pressure:	5.2 bar (75 psi)
Max. load at 5.2 bar (75 psi):	31.7 kg (70 lb)
Overall size:	95 mm (L) x 76 mm (W) (3.75 in. (L) x 3 in. (W))

SAFETY VENT VALVE (Part No. 15677)

The safety vent valve is used to relieve the nitrogen pressure in the actuation line after the system has been actuated by an AUTOMAN II-C release. After agent discharge, pulling the ring on the vent valve can relieve the pressure in the line.

Technical Information

Body:	Brass
Spring:	Stainless Steel
Pull ring:	Stainless Steel
Inlet:	1/4 in. Male
Set point:	18.3 bar (265 psi)
Max. Installation torque:	27 N•m (20 ft-lb)
Overall size:	50.8 mm (L) x 17.5 mm (W) (2 in. (L) x 0.69 in. (W))

FIGURE 2-32
SAFETY VENT VALVE
009697

DOOR NOTICE
(Part No. See Table)

A door notice is required at each entrance of the hazard area to advise personnel that they are entering a protected area.

Part No.	Concentration
442927	Greater than NOAEL (unoccupied spaces only)
442928	Less than NOAEL

FIGURE 2-33
DOOR NOTICE (GREATER THAN NOAEL)
009703

FIGURE 2-34
DOOR NOTICE (LESS THAN NOAEL)
009704

Technical Information

Material: 2 mm (0.08 in.) Craylon
Finish: Gloss, scratch resistant
Overall Size: 210 mm (L) x 210 mm (W)
(8.25 in. (L) x 8.25 in. (W))

MANUAL RELEASE NOTICE
(Part No. 442929)

A notice should be located at each manual release position.

FIGURE 2-35
MANUAL RELEASE SIGN
009705

Technical Information

Material: 2 mm (0.08 in) Craylon
Finish: Gloss, scratch resistant
Overall Size: 212 mm (L) x 75 mm (W)
(8.25 in. (L) x 3.00 in. (W))

LIQUID LEVEL INDICATOR DEVICE
(Part No. See Table)

The liquid level indicator device is used to measure the level of liquid agent in 106 L, 147 L, 180 L, and 343 L containers. The weight of the agent in the container is determined by converting the level measurement into a weight measurement using the Liquid Level Indicator charts in Appendix C starting on page 10-49. The operating temperature range for the liquid level measuring device is 0 °C to 54 °C (32 °F to 130 °F).

The liquid level is found by lifting the measuring tape from inside the tube to the end (or approximately 75 mm (3 in.) above the anticipated liquid level) and slowly lowering the tape until a magnetic interlock with the float is felt. The tape will then remain in the up position, allowing a reading at the top of the housing. This measurement is accomplished without removing the container from the fire suppression system.

The device must be installed in an empty container assembly before filling, the liquid level measuring device must be ordered as a separate line item. (The 343 L container includes the measuring device pre-fitted and does not require separate order.)

Part No.*	Description	Approximate Length mm	(in.)	Weight kg	(lb)
570277	106 L	814	(32)	1.13	(2.49)
570278	147 L to 343 L	1093	(43)	1.52	(3.36)

***Note**: Liquid level indicator is not available for 8 L to 52 L containers.

Technical Information

Mounting thread: 1.3125-12UN-2A
Stem material: Brass
Mounting material: Brass
Float material: ECCO

FIGURE 2-36
LIQUID LEVEL INDICATOR DEVICE
009698

TYPICAL MANIFOLD SYSTEM

Typical two container system complete with electrical actuation, manual actuator, discharge pressure switch, low pressure switches, flexible connections, distribution pipework and nozzles.

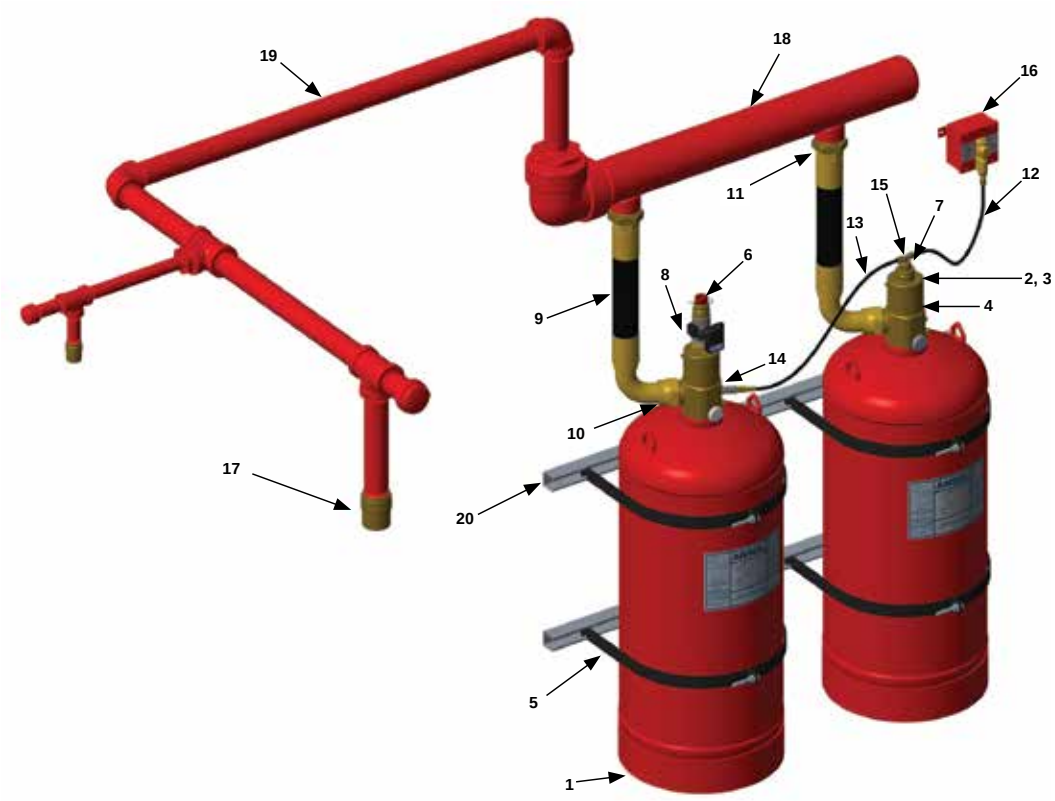


FIGURE 2-37
TYPICAL MANIFOLD SYSTEM
009699

Item No.	Description	Page Reference
1	Container	2-2
2	Container Valve	2-5
3	Burst Disc	2-6
4	Low Pressure Switch	2-8
5	Mounting Brackets	2-9
6	Manual Actuator	2-10
7	Pneumatic Actuator	2-10
8	Electrical Actuator	2-11
9	Flexible Discharge Hose	2-14
10	Union Adaptor	2-16
11	Manifold Check Valve	2-17

Item No.	Description	Page Reference
12	Actuation Hose	2-19
13	Female Actuation hose	2-19
14	Male Adaptor and Male Actuation Connector	2-20
15	Male Actuation Tee	2-20
16	Discharge Pressure Switch	2-21
17	Discharge Nozzle	2-22
18	Manifold (supplied by others)	6-4
19	Pipe and Fittings (supplied by others)	6-8
20	Back Channel (supplied by others)	6-3

NOTES: