System Components

This section describes the individual components that comprise a complete system. Some items are optional depending on the application, and are indicated as such.

FM-200® Container

The container assembly consists of a container fitted with a valve and internal syphon tube, factory filled with FM-200®, and super-pressurised with dry nitrogen to 25 bar @ 21 °C (360 psi @ 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 fixed to the container displaying the agent weight, tare weight, gross weight, fill density, charge date and fill location.

Figure 1 - FM-200® Container

Technical Information

The 4.5, 8, 16, 32, 52, 106, 147 and 180 litre containers are manufactured in accordance with DOT 4BW500 or 4BW450, the 343 litre container in accordance with DOT 4BW450 and the 40, 67.5 and 80 litre containers in accordance with DOT 3AA 580.

Material:	Carbon Steel
4BW500	
Hydraulic test pressure:	69.0 bar (1000 psi)
Working Pressure:	34.5 bar (500 psi)
4BW450	
Hydraulic test pressure:	62.1 bar (900 psi)
Working Pressure:	31.0 bar (450 psi)
3AA580	
Hydraulic test pressure:	70.0 bar (1015 psi)
Working Pressure:	40.0 bar (580 psi)
Paint Specification:	Red epoxy polyester or red polyester powder coated

The 8, 16, 32, 52, 106 and 147 litre containers are also available manufactured in accordance with EN 13322-1.

Material:	Carbon Steel
Hydraulic test pressure:	40.0 bar (580 psi)
Working Pressure:	34.5 bar (500 psi)
Paint Specification:	Red epoxy polyester or red polyester powder coated

Table 4: DOT Container details.

Part No. (Nominal Volume)	Minimum and Maximum Fills kg	(lbs)	Valve Size mm	(in)	Height from floor to outlet (nominal) mm	(in)	Diameter mm	(in)	Nominal Tare Weight kg	(lbs)
303.205.026 (4.5 litre)	2.3 to 4.5	(5 to 10)	25	(1″)	280	(11″)	178	(7″)	7.7	(17)
303.205.015 (8 litre)	4.0 to 8.0	(9 to 18)	25	(1″)	304	(12″)	254	(10″)	14.8	(32.6)
303.205.016 (16 litre)	8.0 to 16.0	(18 to 35)	25	(1″)	502	(19.8″)	254	(10″)	18.4	(40.6)
303.205.017 (32 litre)	16.0 to 32.0	(35 to 71)	25	(1″)	833	(32.8″)	254	(10″)	26.1	(57.5)
303.205.030 (40 litre) *	20.0 to 40.0	(44 to 88)	50	(2″)	1352	(53.2″)	227.2	(9″)	52.2	(115)
303.205.018 (52 litre)	26.0 to 52.0	(58 to 115)	50	(2″)	596	(23.5″)	406	(16″)	49.1	(108.3)
303.205.031 (67.5 litre) *	33.8 to 67.5	(75 to 149)	50	(2″)	1526	(60″)	265	(10.4″)	81.6	(180)
303.205.032 (80 litre) *	40.0 to 80.0	(88 to 176)	50	(2″)	1685	(66.3″)	276	(11″)	95.3	(210)
303.205.019 (106 litre)	53.0 to 106.0	(117 to 234)	50	(2″)	1021	(40.2″)	406	(16″)	71.8	(158.3)
303.205.020 (147 litre)	73.5 to 147.0	(162 to 324)	50	(2″)	1354	(53.3″)	406	(16″)	89.9	(198.2)
303.205.021 (180 litre)	90.0 to 180.0	(198 to 397)	50	(2″)	1634	(64.3″)	406	(16″)	105.8	(233.2)
303.205.022 (343 litre)	171.5 to 343	(378 to 756)	80	(3″)	1466	(57.7″)	610	(24″)	207	(456)

* For UL Listed Systems Only (Not FM Approved)

Table 5: TPED Container details.

Part No. (Nominal Volume)	Minimum and Maximum Fills kg	(lbs)	Valve Size mm	(in)	Height from floor to outlet (nominal) mm	(in)	Diameter mm	(in)	Nominal Tare Weight kg	(lbs)
303.205.045 (8 litre)	4.0 to 8.0	(9 to 18)	25	(1″)	304	(12″)	254	(10″)	17.4	(38.4)
303.205.046 (16 litre)	8.0 to 16.0	(18 to 35)	25	(1″)	502	(19.8″)	254	(10″)	23.4	(51.6)
303.205.047 (32 litre)	16.0 to 32.0	(35 to 71)	25	(1″)	833	(32.8″)	254	(10″)	27.5	(60.6)
303.205.048 (52 litre)	26.0 to 52.0	(58 to 115)	50	(2″)	596	(23.5″)	406	(16″)	68.7	(151.5)
303.205.049 (106 litre)	53.0 to 106.0	(117 to 234)	50	(2″)	1021	(40.2″)	406	(16″)	88.8	(195.8)
303.205.050 (147 litre)	73.5 to 147.0	(162 to 324)	50	(2″)	1354	(53.3″)	406	(16″)	108.8	(239.9)

Table 4a: DOT Container - valve equivalent lengths.

Part No. (Nominal Volume)	Equivalent Lengths (m)
303.205.026 (4.5 litre)	6.096
303.205.015 (8 litre)	6.096
303.205.016 (16 litre)	6.096
303.205.017 (32 litre)	6.096
303.205.030 (40 litre)	10.668
303.205.018 (52 litre)	10.668
303.205.031 (67.5 litre)	10.668
303.205.032 (80 litre)	10.668
303.205.019 (106 litre)	10.668
303.205.020 (147 litre)	10.668
303.205.021 (180 litre)	10.668
303.205.022 (343 litre)	25.91

Table 5a: TPED Container - valve equivalent lengths.

Part No. (Nominal Volume)	Equivalent Lengths (m)
303.205.045 (8 litre)	6.096
303.205.046 (16 litre)	6.096
303.205.047 (32 litre)	6.096
303.205.048 (52 litre)	10.668
303.205.049 (106 litre)	10.668
303.205.050 (147 litre)	10.668

Valve Assembly

The container valve is the result of extensive research and development and incorporates many unique safety features. The valve assembly is factory-fitted to the container and is supplied pre-assembled with a low pressure switch (to be ordered seperately), pressure gauge and burst disc.

Figure 3 - Valve Assembly

25 mm (1") Valve Assembly
Part No. 302.209.001

50 mm (2") Valve Assembly
Part No. 302.209.002

80 mm (3") Valve Assembly
Part No. 302.205.002

Technical Information

25 mm (1") Valve

Body Material:	Brass CZ 121
Outlet Anti-Recoil Cap Material:	CZ122
Max. Working Pressure:	34 bar (493 psi)
Outlet:	25mm (1" BSPP)
Low Pressure Switch Port:	1/8" NPT
Gauge Port:	1/8" NPT
Pilot Pressure Port:	1/4" BSPP
Solenoid Adaptor Port:	1/8" NPT
Overall Size:	130mm (L) x 62mm (Dia) (5.12" (L) x 2.44" (Dia))
Weight:	2.96 kg (6.526 lbs)
Equivalent Length:	6.096 m (20 ft)

50 mm (2") Valve

Body Material:	Brass CZ 121
Outlet Anti-Recoil Cap Material:	CZ122
Max. Working Pressure:	34 bar (493 psi)
Outlet:	50mm (2"BSPP)
Low Pressure Switch Port:	1/8" NPT
Gauge Port:	1/8" NPT
Pilot Pressure Port:	1/4" BSPP
Solenoid Adaptor Port:	1/8" NPT
Overall Size:	173mm (L) x 100mm (Dia) (6.12" (L) x 3.94" (Dia))
Weight:	9.18 kg (20.238 lbs)
Equivalent Length:	10.668 m (35 ft)

80 mm (3")Valve

Material:	Brass UNS36000
Max. Working Pressure:	34 bar (493 psi)
Outlet:	80mm (3" Flared*)
Low Pressure Switch Port:	1/8" NPT
Gauge Port:	1/8" NPT
Pilot Pressure Port:	1/4" NPT
Solenoid Adaptor Port:	None
Overall Size:	241mm (L) x 129mm (Dia) (9.50" (L) x 5.06" (Dia))
Weight:	18.82 kg (41.491 lbs)
Equivalent Length:	25.91 m (85 ft)

*Outlet adaptors are available for 3" NPT, BSP and grooved.

Principle of Operation

The FM-200® valve is a high-flow-rate device specially designed for use in fire systems. Operation is by means of a pressure-differential piston. Container pressure is used within the valve to create a positive force on the piston, sealing the valve closed. Operation of the valve occurs when the upper chamber is vented faster than the 'make up device' in the shuttle can replace the pressure. Thereby allowing, the shuttle to be forced up, and free flow of FM-200® from the valve. Upper chamber pressure is released by the electrical, mechanical or pneumatic actuator.

The valve incorporates the following features:

- A pressure operated safety release device (burst disc).
- Main outlet, fitted with anti-recoil cap.
- A connection for a pneumatic, mechanical or electrical actuator, fitted with safety cap.
- A connection for an electrical solenoid.
- A connection for the pneumatic actuation port.

Burst Disc

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

Figure 4 - Burst Disc

Burst Disc for 25 mm (1") Valve
Part No. 20915

Burst Disc for 50 mm (2") Valve
Part No. 20915

Burst Disc for 80 mm (3") Valve
Part No. 15330

Technical Information

25 mm (1") Valve & 50 mm (2") Valve

Body:	Brass CZ 121
Rating:	53.4 bar (774.5 psi) @ 50 °C (122 °F)
Thread:	M18 x 1.00
Hole Orientation:	90° to Body
Torque:	35 Nm (25.8 lbs.ft)
Overall Size :	20mm (L) x 18mm (Dia) (0.79" (L) x 0.71" (Dia))
Weight:	0.028 kg (0.062 lbs)

80 mm (3")Valve

Body:	Brass UNS-C36000
Rating:	52 bar (760 psi) @ 50 °C (122 °F)
Thread:	0.9375-16UN-3A
Hole Orientation:	90° to Body
Torque:	68 Nm (50 lbs.ft)
Overall Size :	33.3mm (L) x 18mm (Dia) (1.3125" (L) x 0.71" (Dia))
Weight:	0.088 kg (0.195 lbs)

Low Pressure Switch (Standard Open On Fall)

A low pressure warning switch is fitted to every container and must be ordered seperately. The device continuously monitors the container pressure and in the event of the pressure dropping below 20 bar (290 psi) the switch operates to enable the condition to be signalled to a control unit.

Figure 5 - Low Pressure Switch (Part No. 304.205.006)

Technical Information

Body:	Hermetically sealed Stainless Steel
Switch Type:	Normally Open at Atmospheric Pressure
Switch Point:	Open on Fall at 20 bar (290 psi) Close on Rise at 24.1 bar (350 psi)
Tolerance:	+/-0.7 bar (± 10 psi)
Proof Pressure:	345 bar (5003 psi)
Electrical Housing:	Epoxy Sealed terminals
Connection:	Brass 1/8" NPT
Max. Current:	2.9 A
Voltage Range:	5-28 v dc
Electrical Connection:	0.9m (3ft) x 2 Core Cable
Certification:	UL Recognised
IP Rating:	IP65
Wire Leads:	1.82 m (6 ft)
Overall Size:	38mm (L) x 16mm (Dia) (1.50" (L) x 0.63" (Dia))
Weight:	0.087 kg (0.192 lbs)

Low Pressure Switch (Special Close On Fall)

A low pressure warning switch is fitted to every container and must be ordered seperately. The device continuously monitors the container pressure and in the event of the pressure dropping below 20 bar (290 psi) the switch operates to enable the condition to be signalled to a control unit.

Figure 6 - Low Pressure Switch (Part No. 305.209.005)

Technical Information

Body:	Hermetically sealed Stainless Steel
Switch Type:	Normally Closed at Atmospheric Pressure
Switch Point:	Close on Fall at 20 bar (290 psi) Open on Rise at 24.1 bar (350 psi)
Tolerance:	+/-0.7 bar (± 10 psi)
Proof Pressure:	345 bar (5003 psi)
Electrical Housing:	Epoxy Sealed terminals
Connection:	Brass 1/8" NPT
Max. Current:	2.9 A
Voltage Range:	5-28 v dc
Electrical Connection:	0.9m (3ft) x 2 Core Cable
Certification:	UL Recognised
IP Rating:	IP65
Wire Leads:	1.82 m (6 ft)
Overall Size:	38mm (L) x 16mm (Dia) (1.50" (L) x 0.63" (Dia))
Weight:	0.087 kg (0.192 lbs)

Low Pressure Switch (Alternate - Transfer On Fall - Option #1)

A low pressure warning switch is fitted to every container and must be ordered seperately. The device continuously monitors the container pressure and in the event of the pressure dropping below 20.3 bar (294 psi) the switch operates to enable the condition to be signalled to a control unit.
This low pressure switch is the primary supply, (option #1), of 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 7 - Alternate Low Pressure Switch (Part No. 305.209.007) Option #1

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" NPT Male
Electrical Rating:	5 A at 24 v dc (Resistive)
Electrical Connection:	DIN 43650A Connector with 1/2" NPT Female Conduit Connection
Certification:	UL Recognised
IP Rating:	IP65
Overall Size:	104mm (L) x 28mm (Dia) (4.10" (L) x 1.12" (Dia))
Weight:	0.16 kg (0.35 lbs)

Low Pressure Switch (Alternate - Transfer On Fall - Option #2)

A low pressure warning switch is fitted to every container and must be ordered seperately. The device continuously monitors the container pressure and in the event of the pressure dropping below 20 bar (290 psi) the switch operates to enable the condition to be signalled to a control unit.
This low pressure switch is the secondary supply, (option #2), of 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 8 - Alternate Low Pressure Switch (Part No. 305.209.007) Option #2

Technical Information

Body:	Brass and Anodised Aluminium
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" NPT Male
Electrical Rating:	5 A at 24 v dc (Resistive)
Electrical Connection:	DIN 43650A Connector with 1/2" NPT Female Conduit Connection
Certification:	UL Recognised
IP Rating:	IP65
Overall Size:	104mm (L) x 32mm (Dia) (4.40" (L) x 1.25" (Dia))
Weight:	0.21 kg (0.46 lbs)

Fixing Brackets

The bracket assembly consists of one back channel and a nut and bolt with two bracket half straps. To securely hold the container in position during the system discharge, two bracket assemblies are required per container. The only exceptions are the 4.5 and 8 litre 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 9 - Fixing Bracket (Strap Style)

Technical Information

Material: Mild Steel
Coating: Black Polyethylene powder-Plascoat LDPE
Mounting: Unistrut Channel
Weight: 0.34 kg (0.75 lbs) (Part No. 311.205.020)
0.30 kg (0.66 lbs) (Part No. 311.205.013)
0.46 kg (1.01 lbs) (Part No. 311.205.014)
0.28 kg (0.62 lbs) (Part No. 311.205.021)
0.30 kg (0.66 lbs) (Part No. 311.205.017)
0.34 kg (0.75 lbs) (Part No. 311.205.018)
0.71 kg (1.56 lbs) (Part No. 311.205.019)

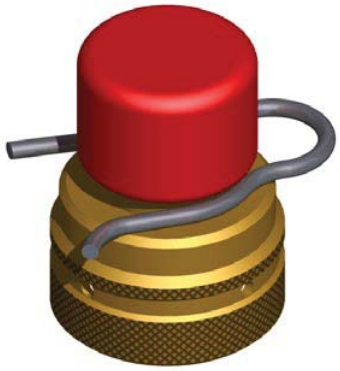
Part Number	Container Size	Length of Back Channel mm (in)
311.205.020	4.5 litre 178 mm dia. (7″)	400 (15.75″)
311.205.013	8, 16, 32 litre 254 mm dia. (10″)	500 (19.69″)
311.205.014	52, 106, 147, 180 litre 406 mm dia. (16″)	600 (23.6″)
311.205.021*	40 litre (Seamless) 227 mm dia. (9″)	400 (15.75″)
311.205.017*	67.5 litre (Seamless) 265 mm dia. (10.4″)	400 (15.75″)
311.205.018*	80 litre (Seamless) 276 mm dia. (11″)	400 (15.75″)
311.205.019	343 litre 610 mm dia. (24″)	693 (27.3″)

* For UL Listed Systems Only (Not FM Approved)

Manual Actuator

The manual actuator is used to mechanically operate the system at the container position and is 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 10 - Manual Actuator (Part No. 304.209.002)



Technical Information

Body:	Brass CZ 121
Knob:	PVC (Colour: Red)
Safety Pin:	Stainless Steel 303
Piston Rod:	Brass CZ 121
Min. Actuation Force:	25.5 N (5.73 lbf)
Overall Size:	52mm (L) x 41.5mm (Dia) (2.05" (L) x 1.63" (Dia))
Weight:	0.265 kg (0.584 lbs)

Pneumatic Actuator

The pneumatic actuator is used to pneumatically operate the system at the container position and is fitted to the top of the valve assembly or removable electrical actuator. Pressure from a 'master' container is used to actuate the valve, via small bore piping or a flexible hose.

Figure 11 - Pneumatic Actuator (Part No. 304.209.004)

Technical Information

Body:	Brass CZ121
Actuation Pin:	Stainless Steel
Piston Rod:	Brass CZ 121
Pipe connection:	1/4" NPT Female
Min. Actuation Pressure:	4 bar (58 psi)
Max. Working Pressure:	56 bar (812 psi)
Overall Size:	48mm (L) x 41.5mm (Dia) (1.89" (L) x 1.63" (Dia))
Weight:	0.228 kg (0.503 lbs)

Removable Electrical Actuator (Suppression Diode)

The removable electrical actuator locates to the top of the container valve. 24 v dc is required for solenoid operation. Provision is made for the connection of a manual actuator to the top of the actuator assembly. The suppression diode electrical actuator must be wired up correctly with the positive supply from the control panel connected to terminal 1, and the negative supply connected to terminal 2.The removable electrical actuator has a life span of 10 years from manufacture, which is indicated on the label.

Figure 12 - Electrical Actuator - Suppression Diode (Part No. 304.205.010)

Technical Information

Body:	Mild Steel & Dull Nickel
Swivel nut:	Brass CZ121
Actuation Pin:	Stainless Steel
Actuation Type:	Latching
Reset Requirement:	Manually via Reset Tool supplied
Connection:	1" BSPP Brass
Nominal Voltage:	24 v dc
Nominal Current:	0.25 A
Max. Monitoring Current:	25 mA
Manual Actuation Force:	50 N (11.24 lbf)
Nominal Pin Travel:	4.4 mm (0.17")
Electrical connection:	3-pin plug connector
Back EMF Protection:	Suppression Diode
Certification:	UL Recognised
Overall Size:	104mm (L) x 44mm (Dia) (4.09" (L) x 1.73" (Dia))
Weight:	0.95 kg (2.09 lbs)

Removable Electrical Actuator (Bridge Rectifier)

The removable electrical actuator locates to the top of the container valve. 24 v dc is required for solenoid operation. Provision is made for the connection of a manual actuator to the top of the actuator assembly. Due to the design of the bridge rectifier it will operate regardless of how it is wired up; the positive supply from control panel can be connected to either terminal 1 or 2 with the reverse for the negative supply. The removable electrical actuator has a life span of 10 years from manufacture, which is indicated on the label.

Figure 13 - Electrical Actuator - Bridge Rectifier (Part No. 304.209.001)

Technical Information

Body:	Mild Steel & Dull Nickel
Swivel nut:	Brass CZ121
Actuation Pin:	Stainless Steel
Actuation Type:	Latching
Reset Requirement:	Manually via Reset Tool supplied
Connection:	1" BSPP Brass
Nominal Voltage:	24 v dc
Nominal Current:	0.25 A
Max. Monitoring Current:	25 mA
Manual Actuation Force:	50 N (11.24 lbf)
Nominal Pin Travel:	4.4 mm (0.17")
Electrical connection:	3-pin plug connector
Back EMF Protection:	Bridge Rectifier
Certification:	UL Recognised
Overall Size:	104mm (L) x 44mm (Dia) (4.09" (L) x 1.73" (Dia))
Weight:	0.95 kg (2.09 lbs)