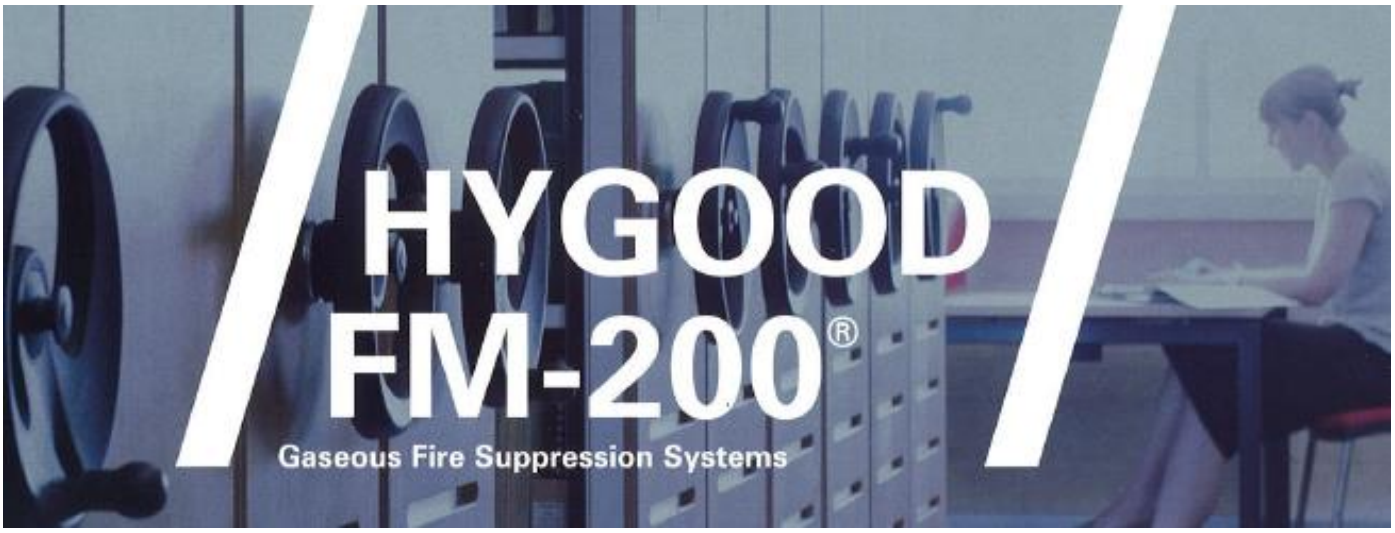


PROPOSED CLEAN AGENT (FM200) FIRE SUPPRESSION SYSTEM CATALOUGE

HYGOOD FM-200®

System Components

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.

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, and the 343 litre container in accordance with DOT 4BW450.

Material:	**Carbon Steel**
4BW500Hydraulic test pressure:	**69.0 bar (1000 psi)**
Working Pressure:	**34.5 bar (500 psi)**
4BW450Hydraulic test pressure:	**62.1 bar (900 psi)**
Working Pressure:	**31.0 bar (450 psi)**
Paint Specification:	**Red epoxy polyester or red polyester powder coated**

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)

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 separately), 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. 302.207.009

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 x 62mm
Weight:	2.96 kg / 6.526 lbs

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 x 100mm
Weight:	9.18 kg / 20.238 lbs

80 mm (3”) Valve

Body Material:	Brass CZ 121
Outlet Anti-Recoil Cap 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” BSPP
Solenoid Adaptor Port:	None
Overall Size:	241mm x 129mm
Weight:	18.82 kg / 41.491 lbs

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

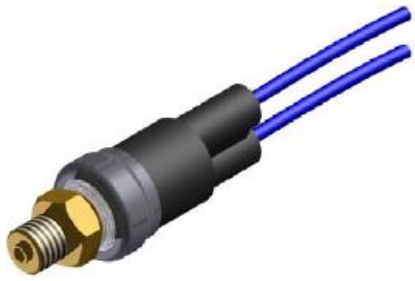
Body:	Brass CZ 121
Rating:	53.4 bar (774.5 psi) @ 50 °C
Thread:	M18 x 1.00
Hole Orientation:	90° to Body
Torque:	35 Nm (25.8 lbs.ft)
Overall Size:	20mm (L) x 18mm (Dia)
Weight:	0.028 kg / 0.062 lbs

80 mm (3") Valve

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

Low Pressure Switch

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 20 bar (290 psi) the switch operates to enable the condition to be signalled to a control unit.



Low Pressure Switch (Close On Fall)
(Part No. 305.209.005)

Low Pressure Switch (Open On Fall)
(Part No. 305.209.006)

Technical Information

Body:	Hermetically sealed Stainless Steel
Switch Type:	Normally Open at Atmospheric Pressure
Switch Point (Open on Fall):	Open on Fall at 20 bar (290 psi) Close on Rise at 24.1 bar (350 psi)
Switch Point (Close on Fall):	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:	Max 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)

Fixing Brackets

The bracket assembly consists of one back channel and two nuts and bolts with a bracket. To securely hold the container in position during the system discharge, Min. one bracket assemblies are required per container.

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:	Silver Paint
Mounting:	Unistrut Channel
Weight:	0.34 kg (0.75 lbs) (Part No. 311.205.020)4.5 litre Cylinder
	0.30 kg (0.66 lbs) (Part No. 311.205.013)8, 16, 32 litre Cylinder
	0.46 kg (1.01 lbs) (Part No. 311.205.014)52, 106, 147, 180 litre Cylinder
	0.71 kg (1.56 lbs) (Part No. 311.205.019)343 litre Cylinder

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
Actuation Pin:	Stainless Steel
Knob:	PVC (Colour: Red)
Safety Pin:	Stainless Steel 303
Piston Rod:	Brass CZ 121
Min. Actuation Force:	25.5 N (5.73 Ibf)
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.

Technical Information

Body:	Brass CZ 121
Actuation Pin:	Stainless Steel
Piston Rod:	Brass CZ 121
Pipe connection:	1/4" NPT Female
Min. Actuation Pressure:	4 bar (58 psi)
Min. Actuation Pressure:	75 bar (58 psi)
Piston Rod:	Brass CZ 121
Min. Actuation Force:	25.5 N (5.73 Ibf)
Overall Size:	48mm (L) x 41.5mm (Dia)
Weight:	0.228 kg (0.503lbs)

Figure 11 - Pneumatic Actuator (Part No. 304.209.004)

Electrical Actuator

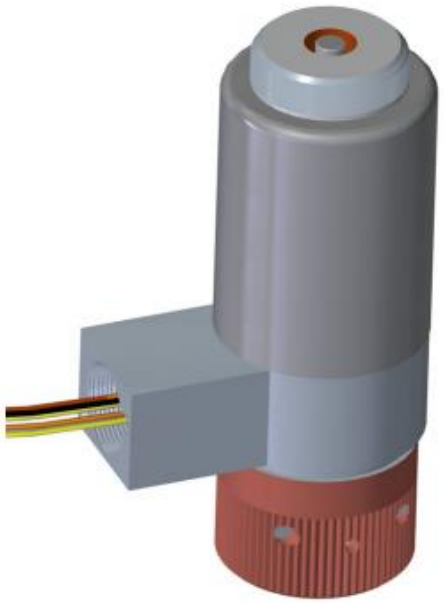
The electrical actuator electrically operates the system's master container. The electrical actuator is fitted with an internal placement switch to provide a fault indication at the panel if incorrectly fitted. A manual, manual-pneumatic, pneumatic, or CPM actuator fits on top of the electrical actuator.

The reset tool is attached to the actuator.

Note: If no additional actuator is fitted to the top of the electrical actuator, the protection cap must remain in place.

Location on system

The electrical actuator is installed to the top of the container valve.



Technical information

Body:	Mild steel and dull nickel
Body finish:	Electroless nickel plate
Actuation pin:	Stainless steel
Loose nut:	Brass CZ121 (CW614N)
Actuation type:	Latching
Reset requirement:	Manually with reset tool supplied
Connection:	1 in. BSPP
Nominal voltage:	24 VDC
Minimum firing voltage:	CE 20.5 VDC UL 864 65% of nominal voltage (15.6 VDC)
Minimum current:	0.32 A
Nominal current:	0.43 A
Maximum current:	0.54 A
Maximum monitoring current:	30 mA
Minimum duration of trigger signal:	1 s
Duty:	Continuous
Manual actuation force:	50 N (11.00 lbf)
Nominal pin travel:	4.57 mm (0.18 in.)
Electrical connection:	1/2 in. NPT Female conduit with inbuilt bridge rectifier
Back EMF protection:	Bridge rectifier
Working temperature range:	-20 °C to 50 °C (-4 °F to 122 °F) (CE) -18 °C to 54 °C (0 °F to 130 °F) (UL and FM)

Life span:	25 years
Testing:	100% check on start / finish position
Maximum humidity:	80% to 90% RH non-condensing
Ingress Protection class:	IP54
Approvals and listings:	UL, FM, and CE
Certification:	EN 12094-4
CE certification number:	0832-CPR-S0072 2831-CPR-S0072
Year of CE marking:	2019 (304205030) 2020 (304205040)
CE marking requirements:	Manufacturer's mark, part number, serial number, 24 VDC , 0.90 A, CE_{0832} or CE_{2831}
Method of marking:	Laser or engraved
Overall size:	132 mm (L) x 73 mm (W) (5.19 in. (L) x 2.87 in. (W))
Weight:	1 kg (2.2 lb)
Actuation force / PIN travel:	Minimum 66.4 N at 1 mm from unactivated Minimum 60.7 N at 2 mm from unactivated Minimum 55.0 N at 3 mm from unactivated Minimum 49.3 N at 4 mm from unactivated

DISCHARGE PRESSURE SWITCH

The discharge pressure switch activates from agent pressure during discharge and signals to a control panel that the system discharged. The discharge pressure switch latches on operation and contains a reset plunger.

The discharge pressure switch ordered under part number 437900 is supplied with a 3/8 in. NPT Male x 1/4 in. NPT Female adaptor. To connect to an actuation hose, use a 1/4 in. NPT x 1/4 in. BSPP Male adaptor (Part number 309.013.006).

Technical information

Switch case and cover:	C.R. steel (painted red)
Body:	C37700 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
Range:	1 bar to 3 bar
Reset method:	Manual through plunger
Minimum actuation pressure:	3.4 bar (50 psi)
Maximum operating pressure:	200 bar (2900 psi)
Electrical ratings:	10 A 250 VAC 15 A 125 VAC 3/4HP, 250 VAC 1-, 2-, or 3-phase
Switch configuration:	Three pole, double throw (3PDT)
Installation environment:	Indoor / non-corrosive
Working temperature range:	-20 °C to 50 °C (-4 °F to 122 °F) (LPCB) -18 °C to 65 °C (0 °F to 149 °F) (UL / FM)
Conformity:	EN 12094-10
Marking requirements:	Manufacturer's mark, part number, maximum working pressure, serial number
Method of marking:	Permanent, non-flammable
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)
Approvals and listings:	LPCB (Part number 305.209.009) UL / FM (Part number 437900)

Discharge Nozzle

FM-200® 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 or eight ports to allow for 180° or 360° horizontal discharge patterns. Ports are drilled in 0.1 mm (0.004 in) increments to the specified system design. Nozzles are supplied as standard in Brass NPT.

Figure 30 - 7 & 16 Port Nozzle Brass Configuration

Technical Information

Material:	Brass / Stainless Steel
Thread Type:	BSPP / NPT
Drill Incrementation:	0.1 mm
Nozzle Type:	8 Port 360° / 7 Port 180°
Max. Agent per Nozzle:	100 kg (220 lbs)
Orientation:	Pendant / Upright

Nozzle Weights

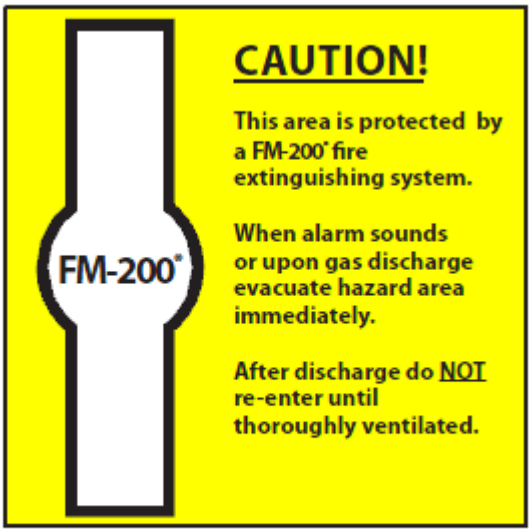
Nozzle Size	Brass
10 mm (3/8")	0.10 kg (0.22 lbs)
15 mm (1/2")	0.15 kg (0.33 lbs)
20 mm (3/4")	0.21kg (0.46 lbs)
25 mm (1")	0.27 kg (0.60 lbs)
32 mm (1¼")	0.41 kg (0.90 lbs)
40 mm (1½")	0.46 kg (1.01 lbs)
50 mm (2")	0.83kg (1.83 lbs)

Nozzle Overall Sizes

Nozzle Size	Length	Diameter
10 mm (3/8")	33.5 mm (1.32")	25 mm (0.98")
15 mm (1/2")	41 mm (1.61")	29 mm (1.14")
20 mm (3/4")	47 mm (1.85")	34.5 mm (1.36")
25 mm (1")	52 mm (2.05")	41.3 mm (1.63")
32 mm (1¼")	62 mm (2.44")	50 mm (1.97")
40 mm (1½")	68 mm (2.68")	60 mm (2.36")
50 mm (2")	89 mm (3.50")	76 mm (2.99")

Door Notice

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



For areas protected by concentrations less than NOAEL (Part No. 314.205.002).

Technical Information

Material:	2 mm (0.08") Craylon
Finish	Gloss, scratch resistant
Overall Size:	210mm (L) x 210mm (W)
Weight:	0.025 kg (0.055 lbs)