

REDEFINING

LINEAR PNEUMATIC FIRE DETECTION & SUPPRESSION

PRE-ENGINEERED AUTOMATIC DLP FK5-1-12 CLEAN AGENT
FIRE DETECTION & SUPPRESSION SYSTEM



PRE -ENGINEERED AUTOMATIC DIRECT LOW PRESSURE
FIRE SUPPRESSION SYSTEM UTILISING  FK-5-1-12 CLEAN AGENT

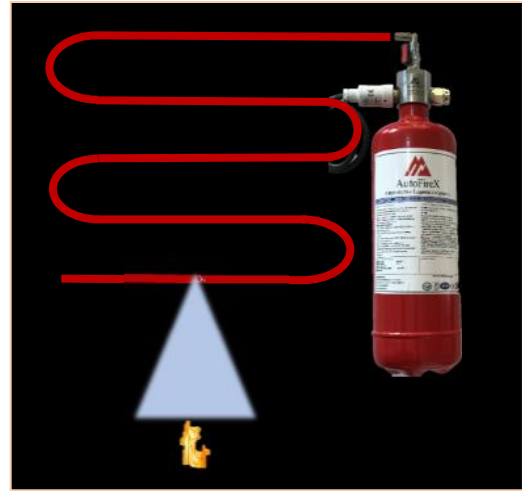
TECHNICAL DATA AND SPECIFICATION SHEET

AFX DLP FK-5-1-12 Clean Agent System TDS DOC-AFX-006 Rev Jan 2022

DIRECT LOW PRESSURE - DLP CLEAN AGENT FK5-1-12 SYSTEM UNIT
PRODUCT OVERVIEW & PRINCIPLE OF OPERATION

AutoFireX® DLP- Direct Low-Pressure Clean Agent Systems are primarily a Pre-Engineered Automatic Fire detection and suppression System utilising various Low-pressure agents like, Clean agents (HFC227ea, FK 5-1-12, FE36). These Units are designed, manufactured, and tested in ISO 9001:2015 certified facilities

The AutoFireX® Linear Pneumatic Fire Detection Tubing (FDT) is installed and connected to DLP Valve and routed throughout the protected hazard area/enclosure. Being heat sensitive, the primary function of Linear Pneumatic Fire Detection Tube (under pressure) is to detect heat/fire and activate the valve for discharge of the agent by rupturing at the hottest point along its installed length on flame impingement. On rupture a nozzle is formed at the burst point.



The clean agent under pressure, in the cylinder then flows out through the burst point, distributing the clean agent through the protected enclosure. Each DLP system consists of a High-Grade Stainless-Steel Direct valve assembly with 3 Ports and stainless-steel siphon tube, a removable pressure gauge integrated to a Schrader adaptor fitted to the valve body that indicates cylinder pressure, a quarter turn Next Gen isolation valve with a G 1/8" Dual Seal threaded slip on union is provided to connect the AutoFireX® Fire Detection Tubing. A PRD (Pressure Relief Device) tested to 44Bar can also be provided. The systems is supplied complete with UL Listed Cylinders and Brackets with appropriate agents, as required.

To assist in annunciation, an optional pressure switch can be installed at one of the ports on valve or at the end of the detection line using a End of Line Adaptor, also available with the system. The UL Listed pressure switch provides a potential free contact, that can be interfaced, with existing FACP (Fire Alarm Control Panel) to indicate system discharge, shutdown ventilation, shut-off electrical power, as may be required. Alternatively, it can also be connected to a Audio Visual (A/V) alarm unit for annunciation. Since the units are supplied as automatic units no simultaneous manual or electric actuators are provided.

GENERAL SPECIFICATION

PRODUCT CODE	SYSTEM INFORMATION		PERFORMANCE INFORMATION	
	AGENT QTY.	CYLINDER VOLUME	OPERATING PRESSURE(@21°C)	MAX VOLUME COVERAGE*
4000101	1 kg	1400 ml	15 Bar	1.0-1.10m ³
4000102	2 kg	2218 ml	15 Bar	2.0- 2.20m ³
4000104	4 kg	5000 ml	15 Bar	4.0-4.20m ³
4000106	6 kg	7250 ml	15 Bar	6.0-6.20m ³
4000106	9 kg	11000 ml	15 Bar	9.0-9.20m ³

*Figures based on ideal conditions in fully enclosed space. Actual figures may vary according to application.

Maximum volume coverage is determined by agent concentration discharged within the enclosure where the fire hazard is located. The discharge time for DLP system utilising various agents differ from agent to agent and capacity of the cylinder.

The AutoFireX® Direct Units can be used for local flooding application, but are not limited, to protect the following:

- Electrical and electronic cabinets.
- LV Telecommunication & Signalling Panels.
- Data Processing areas and cabinets.
- Computer/Data Storage Cabinets
- Process & Instrumentation Control Cabinets
- Laboratory fume /exhaust cabinets
- Pump enclosures
- UPS units
- Flammable Chemicals storage cabinets

- Generator Enclosures
- Engine Compartments
- Transformer Cabinets
- CNC & VMC Machining Control Panels

FIRE SUPPRESSION AGENT – AUTOFIREX® FK-5-1-12 CLEAN AGENT



AutoFireX® Automatic Linear Pneumatic DLP – Direct Low -Pressure fire suppression units are designed and supplied with UL Recognised Component Clean Agent FK5-1-12 (Fluro Ketone- generic name), Chemical formula -CF₃CF₂C(O) CF(CF₃)₂, which is more popularly recognised as Novec 1230 (Brand) manufactured by another reputed manufacturer. This Fluid has been evaluated and approved for use in unoccupied areas as a Total Flooding agent in NFPA 2001. This agent is a colourless, low odour fluid under room temperature condition. It is tested for being nontoxic under storage condition, electrically nonconductive, leaves no residue, environmentally friendly- Zero Ozone depleting potential & GWP of 1, and is an extremely effective fire suppression agent.

USAGE

Clean Agent FK5-1-12 Fire Protection Fluid is stored and transported as liquid under normal temperature and is discharged as gaseous fire suppression agent that is effective for use on:

- Class A – Surface type fires
- Class B – Flammable liquid fires
- Class C – Electrical fires

TYPICAL OPERATING AND ENVIRONMENTAL LIMITATIONS

DESCRIPTION	TYPICAL VALUES
SYSTEM OPERATING TEMPRATURE	-20°C to +60°C
SYSTEM STORGE TEMPRATURE	-5°C to +54°C
SYSTEM OPERATING PRESSURE	15 Bar
OPERATING HUMIDITY LEVEL	40-60 Rh

DESIGN & ENGINEERING CONSIDERATIONS

AutoFireX® DLP systems are based on Pre-Engineered design concept that minimizes the amount of engineering involved in system design. The DIOM – Design Installation, Operating & Maintenance Manual clearly specifies the limitations and capabilities of the system. All such systems including the AutoFireX® FDT detection/discharge tubing when installed within the limitations stated in the manual, no hydraulic calculations are required to determine pressure drop, agent flow, or discharge time.

ASSEMBLY DIMENSIONS:

PRODUCT CODE/CAP	TOTAL HEIGHT "A"(mm)	DIAMETER "B"(mm)
4000101/1 KG	326mm	90mm
4000102/2 KG	358mm	110mm
4000105/5 KG	360mm	150mm
4000106/9 KG	622mm	180mm



AutoFireX® DLP SYSTEM WITH UL LISTED ALUMINIUM SEAMLESS CYLINDER COMPONENTS & PART LIST:



S. No.	Part Number	Description
1	100155	SS DLP Valve
2	200119	UL listed Monitoring Pressure Switch
3	100100-103	UL Listed Cylinder/Container Aluminium Seamless (ALU)
4	100114-118	Cylinder Bracket
5	100159	Neck O Ring
6	100157	SS Siphon/ Dip Tube
7	100127	Pressure Gauge
8	200123	O ring for Pressure Gauge
9	100166	Port Plug
10	100173	O ring for Pressure Switch
11	200101	Dual Seal Threaded Slip on (tube) G 1/8"
12	100178	Next Gen Isolation Ball Valve
13	100174	SS Safety Lock
14	100152	Anti-Tamper Seal
15	200121	End of Line Adaptor with Pressure Gauge

AutoFireX® DLP VALVE Part No.100155

Technical Data Sheet

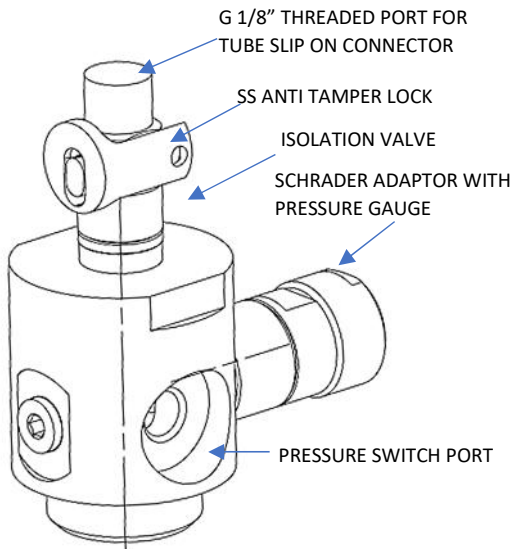
The unique AutoFireX® Direct Low Pressure Automatic Valve has been designed for DLP Fire suppression systems to accomplish discharge of agent on activation by Heat/Fire Detection (by utilising AutoFireX Linear Pneumatic Heat detection Tube). Also by using optional devices like Pressure switch, functions like annunciation via A/V Fire alarm units, or power shut off or ventilation shut off can be easily achieved. The system activation and health can also be monitored via interface of the pressure switch connected to the valve to BMS/SCADA through requisite relay units.

KEY FEATURES

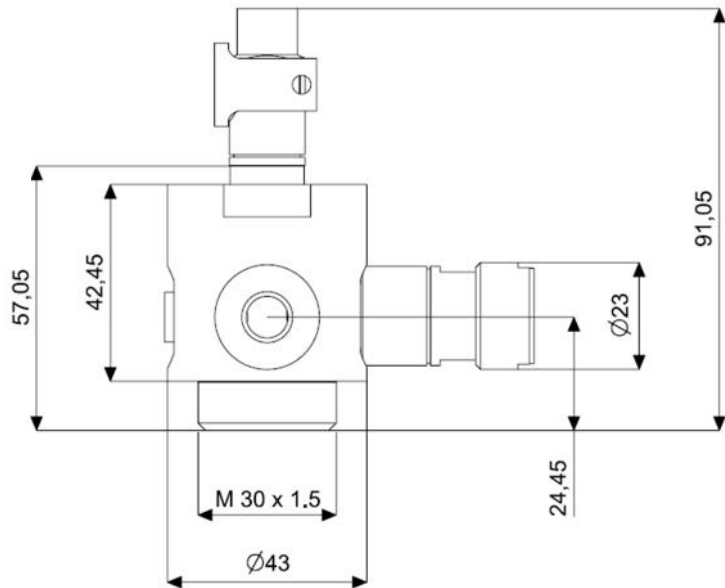
- Made from High-Grade Stainless-Steel SS 304
- Tested to Burst Pressure up to 140 Bar
- 2 x 1/8" BSP Ports/Outlets available.
- Removable Pressure gauge Schrader Adaptor mounted.
- Pressure switch/Solenoid Valve port.
- Next Generation Isolation ball valve.
- Integrated Schrader Valve for safety bleed off
- Optional PRD (pressure relief device) tested to 44 Bar
- SS Anti-Tamper Lock and seal for isolation Valve.



Description	Material Specification
Part Number	100155
Material Valve Body	Standard: Stainless Steel SS304, CE
Thread Size (screw-in connection)	Standard M 30 x 1.5
No. of Ports/Outlet	3 Ports Port 1 – For Schrader Adaptor with Removable Pressure Gauge Port 2 – For Optional Pressure Switch/Solenoid Valve Port 3 – For Optional PRD
Schrader Adaptor/Pressure Gauge Port Thread size	M 10 x 1 (As per EN3)
Pressure Gauge (Removable)	AutoFireX® Generic Pressure Gauge – M 10 x1; 12.5mm Brass Nickle coated with Pressure & temperature Grading 0-18Bar/ -30°C to +60°C) made to DIN ISO 1302; DIN 6784
Isolation Ball Valve	Chrome Nickel-plated Brass Body with PTFE Seats, NBR Seal O-RING, 7 PA66 Glass reinforced Handle, Acetylic resin Plate, Steel Screw, Chrome Nickel-plated Brass Ball Operating Temperature: -20°C - +80°C Operating Pressure: - -0.99Bar to 20 Bar
Top Tube Connection	G 1/8" suitable for Threaded Dual Seal Slip on Union fitting
Operating Temp.	-20°C to +80°C
Operating Pressure	For typical DLP systems up to 20 Bar
Burst Pressure	<140 Bar



TYPICAL DLP VALVE ASSEMBLY



TYPICAL SECTION DIAGRAM DLP VALVE ASSEMBLY

Typical Applications for systems utilising DLP Valve

- ✓ Electrical and electronic cabinets.
- ✓ LV Telecommunication & Signalling Panels.
- ✓ Data Processing areas and cabinets.
- ✓ Server/Data Storage Cabinets
- ✓ Process & Instrumentation Control Cabinets
- ✓ Laboratory fume /exhaust cabinets
- ✓ Pump enclosures
- ✓ UPS – Power Invertor units
- ✓ Flammable Chemicals storage cabinets
- ✓ Generator Enclosures
- ✓ Engine Compartments
- ✓ CNC & VMC Machining Control Panels

Compatible Extinguishing Agents: AutoFireX[®] DLP Valves are designed to be used with mostly Low-Pressure agents such as:

- ✓ Low Pressure Clean Agent (FK-5-1-12, HFC227ea, FE36, etc.)
- ✓ Dry Chemical Powder
- ✓ Wet Chemicals
- ✓ Foam
- ✓ Water

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MONITORING PRESSURE SWITCH Part No.200119

UL listed Type 6 Pressure Switches are suitable for alarm or safety cut out applications on air, water, oil and other low viscosity fluids that are compatible with EPDM rubber and brass.

-) Very Small and compact
-) Factory set and field adjustable
-) Spring diaphragm operated
-) Rated 3 amp at 250V /24VDC 50Hz
-) Burst Pressure 45 bar UL Listed



STANDARD MATERIALS & PRESSURES

-) ACTIVATION POINT: 100 ± 8 PSIG (6.9 BAR) OPEN INCREASING.
-) DEACTIVATION POINT: 73 ± 8 PSIG (5.0 BAR) CLOSE DECREASING.
-) MAX OPERATING PRESSURE: 200 PSIG (15 BAR).
-) CONNECTOR: NONE.
-) FITTING: BRASS M10x1.0-6g WITH DEFLATOR.
-) ELECTRICAL RATING: 3A 250 VAC/24 VDC.
-) BODY MATERIAL: PLASTIC.
-) CONDUCTORS: 18 AWG.
-) WIRE JACKET/INSULATOR MATERIAL: PVC

TEMPERATURE

Type 6 pressure switches are suitable for use in ambient temperature of -10 to +80°C. The Process fluid must not solidify within these limits

Connection	Brass
Body	Delrin
Seal	EPDM Rubber
Diaphragm	Beryllium Copper

ELECTRICAL DATA

Switching is effected by means of a micro-switch rated at 5 Amp 250V 50Hz. The use on dc circuits or with micro-processor controls should be discussed with Technical team before installation Type 12 pressure switches are supplied with 0.5 metre of 4 core cable connected as follows;

Common	Brown
Normally (Open)	Black
Normally (Closed)	Grey
Earth	Green / Yellow

CORROSIVE APPLICATIONS

The connection can either be stainless steel or UPVC. The diaphragm can be protected from corrosion by fitting a thin disc or PTFE (switches fitted with protection disc should not be subject to vacuum).

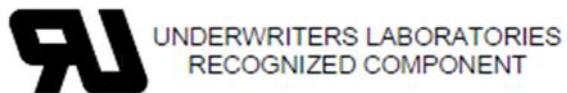
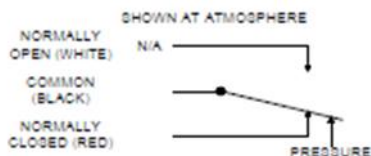
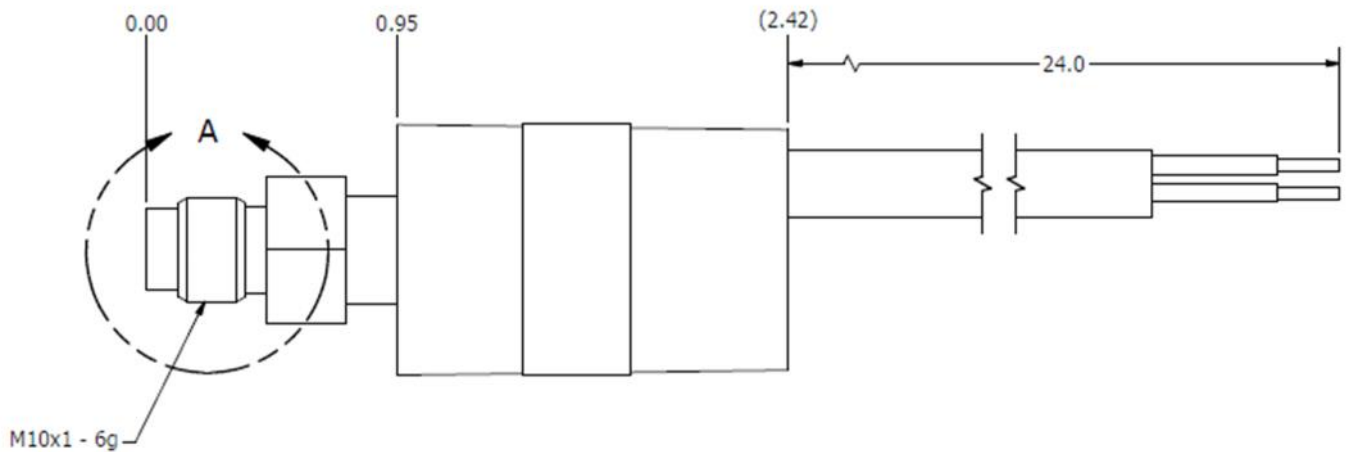
Seals can PTFE, Viton or Nitrile rubber.

MAXIMUM PRESSURE

To ensure long service and life select the pressure range as follows:

-) Dynamic pressure applications $P_{max} = 75\%$ of Range
-) Static pressure applications $P_{max} = 100\%$ of Range
-) Maximum Pressure that can be applied is 125% of pressure range

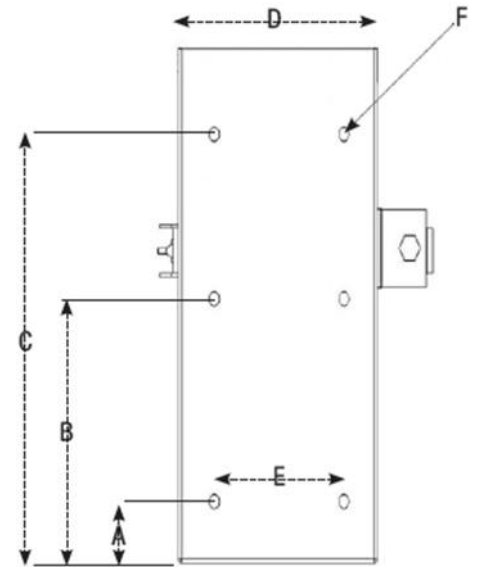
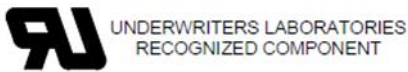
TECHNICAL DRAWING & DIMENSIONS:



The extinguishing agent is stored in Aluminium Seamless cylinders pressurized with dry nitrogen. Table 3.1 summarizes the dimensions of each model. Each cylinder is equipped with a straight vertical mounted siphon tube.

Product Code	Capacity Kg	Outside Diameter- A		Height- B		Volume	
		Inch.	Cm.	In.	Cm.	In ³	Cm ³
100100	1 kg	3.46	8.8	11.53	29.3	0.087	1.440
100101	2 kg	4.33	11	12.50	31.75	0.134	2.200
100103	4 kg	6.00	15.24	14.00	35.56	0.281	4.620
100105	6 kg	6.00	15.24	19.30	49.022	0.434	7.120

Table 3.1: Cylinder Assemblies



3.2 BRACKET DIMENSIONS AND BOLT PATTERN

The AutoFireX® Brackets are supplied along with the system as well as spares and are different for different size and capacity of the cylinder. The brackets are designed to be used for static installations as well as mobile installations. These are user friendly and easy to handle and come with an adjustable standard cylinder clamp.

Product Code	Capacity Kg	A cm	B cm	C cm	D cm	E cm	F cm
100114	1 kg	11.3	-	25.9	75	-	0.9
100115	2 kg	8.3	-	22.7	75	-	0.9
100116	4 kg	6.5	17.6	28.7	84	44	0.7
100117	6 kg	6.5	17.6	28.7	84	44	0.7

Key Features

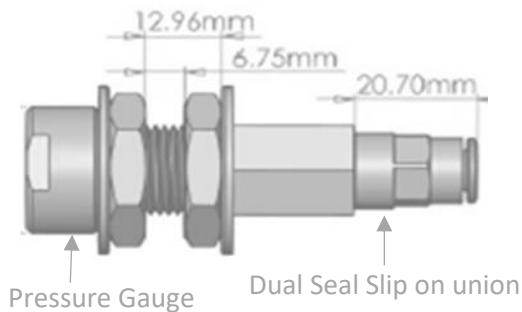
- ✓ High Grade Mild Steel
- ✓ Powder Coated
- ✓ Anti-Corrosion Treated
- ✓ Anti-Vibration Rubber Pads
- ✓ Adjustable Cylinder Clamps Included

END OF LINE ADAPTOR Part No. 200121

AutoFireX® End of Line (EOL) adaptor is primarily an end of line termination cum monitoring component which is attached to the detection line (Pneumatic Fire detection tube) and it comes complete with a pressure gauge which allows the system pressure to be monitored visually /status reporting and also recharge/ pressurise of the tube and commissioning, and system pressure checks as well. The EOL has an integrated internal Schrader valve that allow for the safe removal of pressure gauge and attaching charging adaptors even in charged condition. It comes with a dual seal quick connect slip on union to effortlessly connect the detection tube.

Key Features

- Made from High Grade Brass- Nickle Chrome plated.
- AutoFireX® Pressure gauge (removable) as standard
- Tested to 20 Bar.
- Integrated Schrader Valve Core
- Adaptable outlet Port for connecting adaptor for recharge/ commissioning and system monitoring.



TYPICAL DIMENSIONS FOR EOL

Description	AFX-EOL
Part Number	200121
Material	Brass- Nickle Chrome coated
Thread Size	G 1/8"
Operating Pressure	0-20 Bar
Operating Temperature	-50°C to +150°C
Tube connection	6mm
Length	71 mm
Hex Flat	SW12

INSTALLATION COMPATIBILITY:

AutoFireX® EOL are designed to be compatible with the following systems and devices:

SYSTEMS:

- DLP Systems with Low-Pressure Fire suppression agents (FK-5-1-12, HFC227ea, FE36, Dry Powders, Foams)
- ILP Systems with all Low-Pressure Fire suppression agents (FK5-1-12, HFC227ea, FE36, Dry Powders, Foam, wet chemicals, water)
- Heat/Fire Detection tube – 6mm dia.

AutoFireX® FIRE DETECTION TUBE Part No 7000100 & 7000200



AutoFireX® Fire Detection Tube is a Linear Pneumatic Heat Detection tube specifically manufactured and designed for the use in fire suppression systems that responds to combination of heat and radiant energy that generally accompanies a fire. The pressurised Fire Detection tube when exposed to fire/radiating heat from fire, is designed to rupture due to flame impingement, at specific temperatures at any point throughout its length, thereby releasing the pressure and initiate the release of the suppressant from connected valve and operate any other pressure operated signalling device interfaced with the system. The AutoFireX® Detection Tube is used as a nonelectrical detection device.

Key Features

- ✓ Special Formulated material designed to function in Harsh and reactive environments.
- ✓ Formulation designed to prevent surface damage when exposed to or installed on Galvanised metal/equipment's.
- ✓ Special Formulation prevents gradual permeation of pressurising agent over period of time, adding to its 100% reliability.
- ✓ Non-Destructive Tested to withstand pressure max up to 140 Bar.
- ✓ UV Protected (Blue)
- ✓ Low moisture and water absorption ratios.
- ✓ Chemically resistive to most common chemicals
- ✓ Compatible with all Inert, Low pressure and High-Pressure Agents
- ✓ Utilised and installed as combination linear heat detector and unit activation device to cause actuation of Fire Suppression Systems.

Typical Material Specification

Composition:	Special Formulated, inert, nonconductive blend of Modified Polymer Material	
Dimensions:	Red: 4mm x 6mm (ID x OD)	Blue: 4mm x 6mm (ID x OD)
Part Number	7000100	7000200
Rating:	132°C @15 Bar	164°C @15 Bar
Detection temperature:	Approx. (120°C to 132°C) *	Approx. (145°C to 162°C) *
Standard Requirements:	BS ISO: 7628: 2010, CE, UL	ISO7628: 2010(E), CE

*NOTE: Detection time and temperature will be affected by factors such as internal pressure, flame intensity and rate of rise temperature changes

Physical Properties 6 x 8mm Red FDT	
Density	1.025Kg/m ³
Moisture absorption 23°C - 50%RH	0.70%
Water absorption, immersion at 23°C	1.50%
Thermal Properties	
Thermal Decomposition	175°C
Heat Deflection Temperature	45°C
Electrical Properties	
Dielectric Strength (DIN53481)	Dry 35kV/mm
Volume resistivity	10 ¹¹ Ohm-m
Surface resistivity	10 ¹² Ohm

Physical Properties 6 x 8mm Blue FDT	
Density	1.095Kg/m ³
Moisture absorption 23°C - 50%RH	1.10%
Water absorption, immersion at 23°C	2.50%
Thermal Properties	
Thermal Decomposition	215°C
Heat Deflection Temperature	50°C
Electrical Properties	
Dielectric Strength (DIN53481)	Dry 40kV/mm
Volume resistivity	10 ¹³ Ohm-m
Surface resistivity	10 ¹² Ohm

APPROVALS & LISTINGS:



Quality Management System: ISO 9001:2015 Certified



UL Recognised Component

UL Recognised Component Marked Under UL 521 Certification of Heat-Automatic Fire Detectors Component (Tubing)

DUAL SEAL FIRE DETECTION TUBE FITTINGS



AutoFireX® Fire Detection Tube utilises specifically designed Dual Seal Tube fittings and connectors having NBR-O rings for secure sealing and quick connection to the tube. The Series 200100 fittings can withstand a maximum pressure of 60 bar and temperature from -20°C to 80°C. However, the tube used might affect or limit the operating pressure considerably.

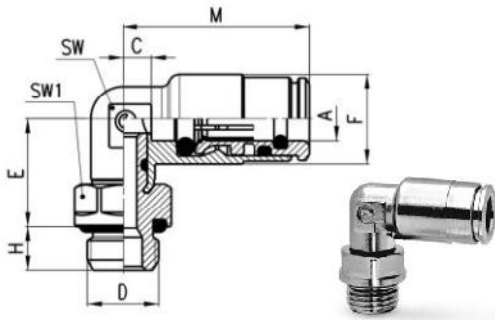
Description	Slip on Union Threaded	Slip on Elbow Threaded	Slip on Tee Threaded	Slip on Tee (Tube only)	Slip on Elbow (tube only)	Slip on inline (tube only)
Part Number	2000101	200102	200103	200104	200105	200106
Material	High grade Brass Nickle plated	High grade Brass Nickle plated	High grade Brass Nickle plated	High grade Brass Nickle plated	High grade Brass Nickle plated	High grade Brass Nickle plated
Thread Size/ ID/OD	1/8" BSP 6mm/4mm	1/8" BSP 6mm/4mm	1/8" BSP 6mm/4mm	6mm/4mm	6mm/4mm	6mm/4mm
Operating Pressure	15-25 Bar	15-25 Bar	15-25 Bar	15-25 Bar	15-25 Bar	15-25 Bar
Max Pressure	60 Bar	60 Bar	60 Bar	60 Bar	60 Bar	60 Bar
Operating Temp.	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C	-20°C to +80°C

BSP Male Connector- AFX-200101

DIMENSIONS										
Product Code	A	D	C	F	G	H	L	SW	SW1	Weight(g)
AFX-200101 6-1/8	6	G/8	5	11.7	13.5	6	27	12	4	15



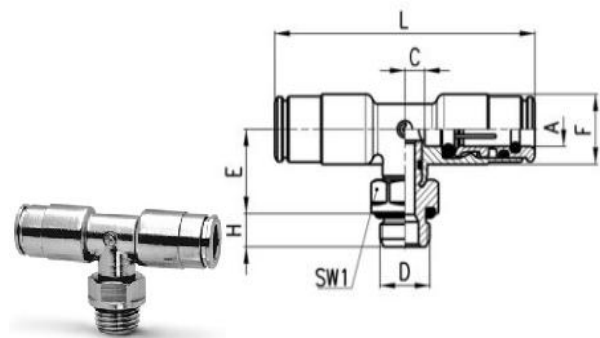
BSP SWIVEL MALE ELBOW – AFX-200102



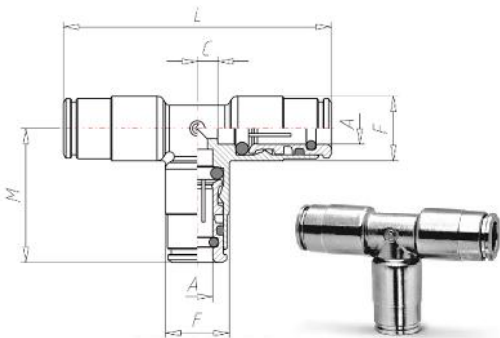
DIMENSIONS										
Product Code	A	D	C	F	G	H	L	SW	SW1	Weight(g)
AFX-200102 6-1/8	6	G/8	4	15	12.5	6	26	10	12	23

BSP SWIVEL MALE TEE – AFX-200103

DIMENSIONS										
Product Code	A	D	C	F	G	H	L	SW	SW1	Weight(g)
AFX-200103 6-1/8	6	G/8	4	15	12.5	6	26	10	12	23



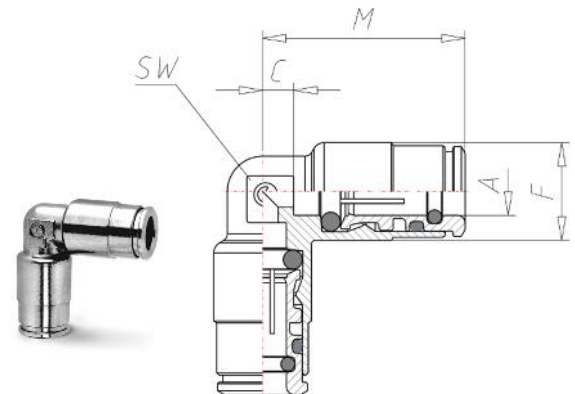
DUAL SEAL SLIP ON TEE CONNECTOR (TUBE) – AFX-200104



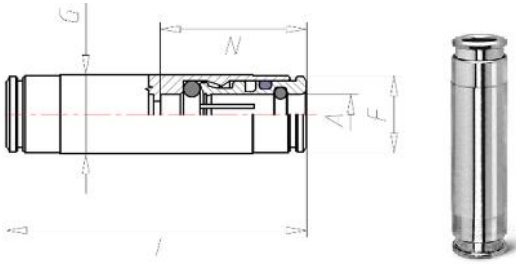
DIMENSIONS										
Product Code	A	D	C	F	G	M	L	SW	SW1	Weight(g)
AFX-200104 6-1/8	6	G/8	4	12.5	12.5	26	52	-	-	23

DUAL SEAL SLIP ON ELBOW (TUBE) – AFX-200105

DIMENSIONS										
Product Code	A	D	C	F	G	H	L	SW	SW1	Weight(g)
AFX-200105 6-1/8	6	-	4	12.5	-	6	26	10	-	23



DUAL SEAL SLIP ON LINE CONNECTOR (TUBE) – AFX-200106



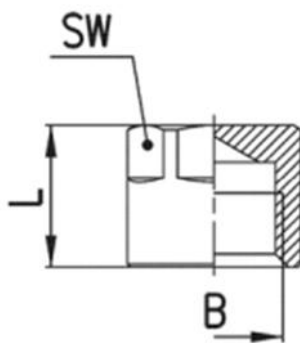
DIMENSIONS										
Product Code	A	D	C	F	G	H	L	N	SW1	Weight(g)
AFX-200106 6-1/8	6	-	4	11.7	12	6	45		10	23

END PLUG -EP Female Adaptor-blanking nut-1/8 BSP thread
Technical Data Sheet

AutoFireX® End Plug (EP) is primarily an end of line termination/ blanking nut female adaptor- component which is attached to a G 1/8” Threaded Slip-on Dual seal push in Union as a termination end connection to a detection line (Pneumatic Fire detection tube). It’s made of Brass- Nickle chrome coated and tested to withstand up to 20 Bar Pressure.

Key Features

- Made from High Grade Brass- Nickle Chrome plated.
- Tested to 20 Bar.
- Threaded end for connecting to G 1/8” Dual Seal Slip on Union for FDT termination.



Description	AFX-EP
Part Number	200135
Material	Brass- Nickle Chrome coated
Thread Size	G 1/8”
Operating Pressure	0-20 Bar
Operating Temperature	-50°C to +150°C
Tube connection	6mm
Hex Flat	SW12

DIMENSIONS				
Product Code	B	L (mm)	SW (mm)	Weight (g)
AFX-200135 6-1/8	G1/8	11	12	6

TYPICAL DIMENSIONS FOR EP