FD708EX
Exd Triple IR Flame Detector
Installation Guide

Introduction

This guide gives an overview of the installation of the FD708EX triple IR flame detector. It provides detail of the electrical installation and reference is made to the installation practices required for EXD. Information on the specifics of the Exd certification of the FD708EX and its rating are also detailed within the guide. However, the classification, design and execution of the installation for classification of the hazardous area to both local and international standards is outside the scope of this guide. As such it advised that a suitably qualified engineer familiar with codes of practice in and around hazardous areas provide the overall formal design for equipment layout and interconnection, including but not limited to the glands and cable containment (ref EN 60079-0 formally EN 50014).

A flame detector provides early detection of fires in the coverage area by identifying a flame based on its light characteristics. This is especially useful for fires that have relatively clean burning flames such as alcohol as conventional smoke detection techniques cannot identify fires of this type due to the lack of smoke. The FD708EX uses the infra-red (IR) light part of the spectrum to identify the flame, it uses three separate parts of the IR spectrum and advanced analysis to minimise false alarms and improve accurate detection of fire.

General Specification

The general parameters of the FD708EX can be found in table 1, the details pertinent to its Exd rating can be found later in the manual under section ATEX Markings.

Model	FD708EX
Mains Voltage	18 to 30Vdc
Operating current (Relay Out)	Monitor: ≦25mA – Alarm: ≦35mA
(Current Loop Out)	Monitor: ≦30mA – Alarm: ≦45mA
Maximum Detection Angle and Range	90° 40m
Relay Output	Fault, Fire Alarm
Current Loop Out	Fault: ≦2mA – Normal:5mA - Alarm:15mA
Spectral range	IR:3.8~5.0μM
Explosion proof certification	ExdⅡC T6 Gb/tD A21 IP66/IP67 T80℃
Protection class	IP66 IP67
Reset method	Power off reset, Communication protocol reset, Remote control reset
Indicator light	Three (Fire,Fault,Normal)
Environmental	Temperature range: -40 to 85°C Humidity: 0 to 96% RH, non-condensing can withstand 100% condensation humidity for a short time
Materials and colours	Cast aluminium, baking varnish on the surface (the coating with insulating layer), Red
Electrical Interface	M25*1.5
Size	120mm* 95mm* 85mm
Weight	700g

Table 1 – General Specification

Common Detection Criteria

The FD708EX has a maximum detection coverage of 40m at a 90 degrees. Depending on the type of flame source this coverage can differ. Please refer to details in table 2 for additional information.

Due to the algorithm within the FD708EX the response time to any suitable flame will not be instantaneous but will be within 10 seconds (N-Heptane). This delay is due to the false alarm management of the device to ensure that the flame characteristics observed do belong to a true flame.

Fire Source & Size	Max Detection Range (m)
N-Heptane 0.3x0.3m	40
Gasoline 0.3x0.3m	35
Diesel 0.3x0.3m	35
Alcohol 0.3x0.3m	30
Kerosene 0.3x0.3m	35
Methane 0.5x0.2m	30
Paper 0.3x0.3m	30

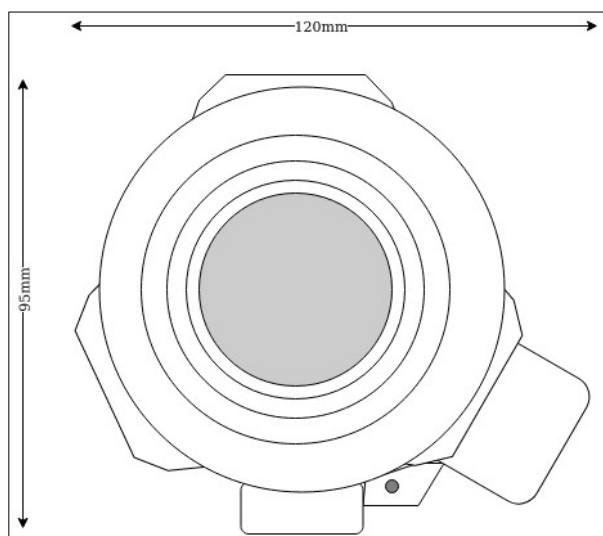*Table 2 – maximum coverage*

Physical Characteristics

Diagram 1 – Physical Layout

Installation

The device is supplied with mounting bracket and has a dedicated cable entry. No modifications should be made to the device housing in any way as this will compromise the Exd certification and mechanical performance of the device.

When shipped the device also has a nylon protector for the machine thread for the cable entry point. This is to prevent scratches to the machining of the thread. It is important that the thread not be damaged in anyway and care must be taken in the installation process to ensure this.

The bracket should be fitted in a location where the device can view the protected area with minimum obstruction and where it can provide suitable coverage as per table 2.

Cable Entry - before fitting a suitable grease should be applied to the thread and the rubber cable gland must be in place. The thread must then be tightened to ensure air tight fitting. The attached device to the threaded entry should be an approved flame-proof (Exd) fitting; table 3.

Once cables are terminated as per diagram 2, then the rear cover machine thread should be cleaned of all dust and debris and suitable grease applied before the cover is threaded in to place. The rubber gasket near the lip of the cover must be in place. The cover must be tightened by hand until the gasket sits firmly against the main body of the unit.

The small hex key locking screw can the be tightened into place so that the cover cannot be easily removed.

The glass cover should be wiped clean on the outside and inspected to ensure there are no scratches on the glass surface.

Explosion Protection Technique For The Equipment	Cable Gland Protection Technique		
	Ex d	Ex e	Ex nR
Ex d	X		
Ex e	X	X	
Ex nR	X	X	X
Ex i Group II	X	X	X
Ex p	X	X	X

Table 3 – Gland Selection
(Extract from Table 10 of EN 60079-14)

Connectivity

The FD708EX can be wired to a conventional zone or to an addressable fire panel input interface. In addition it requires its own dedicated power supply which can be taken from axillary output from the fire control panel or separate power supply.

The unit is reset by removing power the +24V and GND power supply cables. This is usually achieved automatically on most fire control equipment when the main system is reset. If this is not facilitated by you control equipment automatically then a suitable output unit or physical reset button must be installed and its usage documented on site.
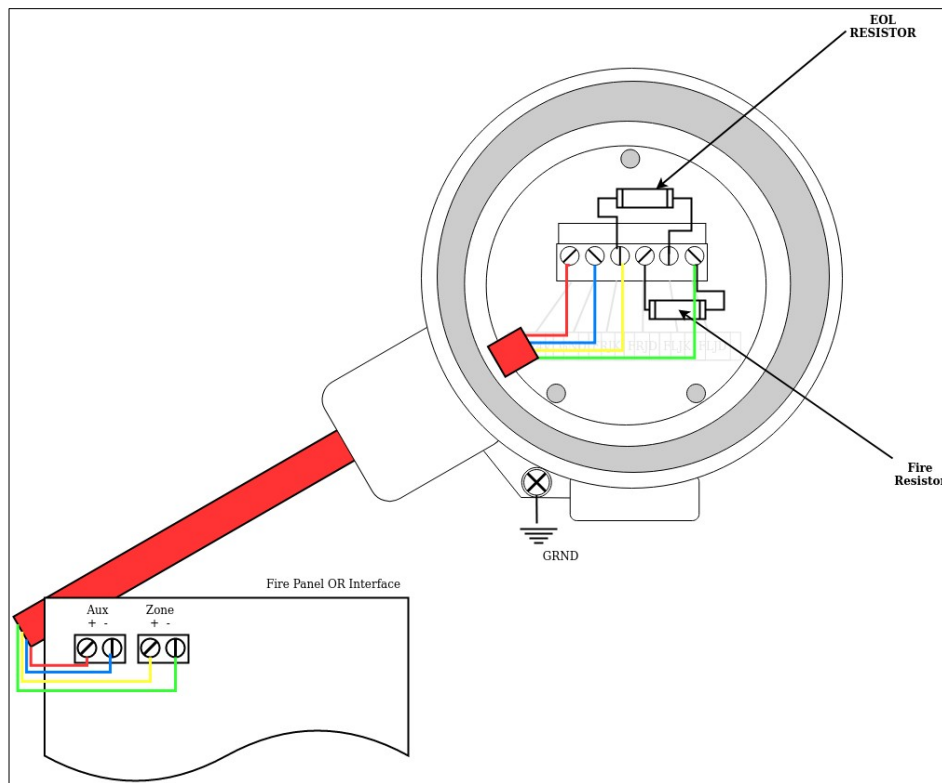

Diagram 2 – Wiring

EoL and Fire resistors – are dependent on the fire control equipment used

All power supplies, fire control equipment etc. that is not certified EX should be installed in the non hazardous (safe) area and then as the cabling passes into the hazardous area it should be contained in explosion proof containment as per EN 60079.

Diagnostic LED Indicators

There are three LED's fitted to the unit in the upper part of the viewing window. These LED's provide easy to see status of the unit without needing to visit the fire control equipment.

1) Red – this will illuminate continuously when the detector is in alarm condition. The LED remains illuminated (latched) even when the source of the alarm has been removed. The fire control equipment if performing correctly should also be indicating an alarm condition. In order to remove the FD708EX from alarm condition power must be recycled on the +24V and Gnd power supply cable.

2) Green – this will illuminate continuously when the device first powers up. Once the device has gone through its initial start-up this LED will start to flash indicating that the unit is performing in its normal operating condition.

3) Amber – this will illuminate continuously if there is an internal fault on the device. The device should be immediately inspected and replaced where necessary. In addition to this LED being illuminated the fire control equipment should be reporting a fault if the device has been installed correctly.

Maintenance

The device should be inspected and cleaned on a schedule determined on site based on the environment that the device has been fitted. In order to operate correctly the viewing window should be kept clear of a build up of dirt.

The testing of the device should be done in accordance with the site schedule and in-line with local installation fire detection codes of practice.

As part of this test procedure the device should be inspected for any damage to the housing or associated fittings to ensure they are still providing adequate Exd performance. Where any damage is found or suspected the damaged item should be replaced. The device should also be tested to ensure its performance with a flame in the field of view. This includes ensuring that the electrical signal is passed to the fire control equipment and that this performs as expected.

Should the wiring need to be maintained then it must be ensured that the devices cover plate is installed correctly and locked in place as per the installation instructions.

Classification of Hazardous Areas

As per EN 60079-0 electrical apparatus for potentially explosive atmospheres requires specially designed and certified equipment. The areas are divided into 3 classifications:

- Group I – Mining - Electrical equipment for mines susceptible to firedamp
- Group II – Surface - Electrical equipment for places with an explosive gas atmosphere
- Group III – Surface - Electrical equipment for places with an explosive dust atmosphere

The FD708EX is designed to be used as electrical apparatus in Group II

The explosion proof FD08EX is designed so that if any failure occurs within the device that the enclosure will absorb this explosion and will not deform or allow the explosion to interact with the surrounding atmosphere. In addition the heat generated by this internal explosion will not increase the external surface temperature of the device above a nominal value a set out in the Exd certification. It is important to note that flame proof Exd is the entire installation within the hazardous zone including cable containment and all interconnections.

FD708EX ATEX Markings

Ex II 2 G

Ex – EU marking for Explosive Atmosphere Symbol

II – Means that the device is certified for Group II

2 – Definition of ATEX Equipment in Group II and this indicates 'high level of protection'

G – This is for Gas within the zone

FD708EX IEC Markings

EX d IIC T6 Gb

Ex – Explosion protection symbol

d – Flameproof

IIC – For gases listed as IIC in EN60079-0

T6 – Maximum surface temperature of device 85°C

Gb – Equipment Protection Level Gas