# Technology Guide

## Intrinsically Safe Fire Detection

The purpose of specifying I.S Fire Detection equipment within hazardous areas is to prevent the occurence of a fire or an explosion from the operation of that equipment. To be able to achieve this intrinis safety, all products that are installed within a hazardous area should be designed such that they cannot store sufficient energy to create a spark or reach a surface temperature, even when faulty, to ignite the hazardous material being stored or processed.

Within the UK this requirement is tested by an independent thrid party, for example, EECS. This requirement also applies to any cabling entering into the hazardous area, regardless if its for a zone of detectors or a sounder circuit. This is why a Zener barrier or Galvanic isolator must be used in conjunction with I.S Products to limit the energy entering the hazardous area.

### SLR-E-IS

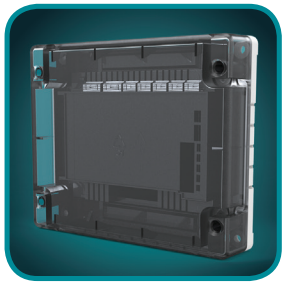
**A Conventional I.S. Photoelectric Smoke Detector** designed for use in hazardous areas. Incorporates a remote indicator output and a removable chamber for easy maintenance.

- Removable, High Performance chamber
- Twin fire LEDs allow 360° viewing
- Supported by a range of barriers
- Remote indicator output
- ATEX certification to: *II 1G EEx ia IIC T5 ( Tamb=55°C)*
- Suitable for installation in areas at Category 1 (inc all lower categories)
- Approved by LPCB, GL and IECEx

### DCD-1E-IS

**A Conventional I.S. Rate of Rise Heat Detector** designed for use in hazardous areas. Incorporates a remote indicator output and a 60°C fixed temperature element.

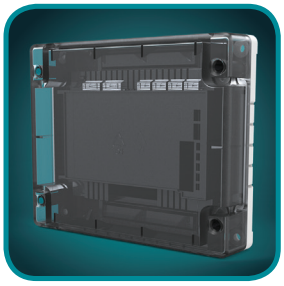
- Twin fire LEDs allow 360° viewing
- Electronics free mounting base
- Remote indicator output
- ATEX certification to: *II 1G EEx ia IIC T5 (Tamb=55°C)*
- Suitable for installation in areas at Category 1 (inc all lower categories)
- Approved by LPCB, GL and IECEx



### CHQ-DZM(SCI)-IS

**A Dual Zone Module** which is fully compatible with Hochiki's ESP analogue addressable protocol and I.S. equipment. The module will allow connection of up to 40 Hochiki I.S. conventional detectors (20 per zone) through a Galvanic isolator or Zener barrier, which are then fully monitored for open and short circuit. Also available as a DIN Rail mountable version. Both models feature an integral short-circuit isolator.

- Single loop address
- Supports two independent zones of Hochiki I.S. Conventional Detectors
- Both zones fully monitored for short/open-circuit
- Requires an auxiliary 24 Vdc supply
- DIN rail version available
- Both models feature an integral short-circuit isolator
- Both models approved by LPCB
- Installed in safe area



### CHQ-ISM

**This Sounder Control Module** interfaces between the Hochiki Analogue system via a CHQ-DSC or conventional sounder O/P's and the intrinsically safe sounder/beacon units via an intrinsically safe barrier.

The module provides line monitoring for open or short circuits on the wiring connected to both the safe and hazardous areas.

- Provides dual sounder circuits
- Provides fault-monitored input
- Interfaces between loop and I.S. sounders/beacons
- Requires I.S. barrier
- Allows 1 I.S. Sounder or Beacon to be connected.
- Fully monitored for short-circuits
- Requires 24 vdc external power supply
- Also available as a DIN module
- Installed in safe area

## Hazardous Areas

What constitutes a hazardous area can be difficult to determine for the Fire Installation company; close evaluation and consultation on the site must take place to identify potential hazards.

Many industrial processes produce hazardous environments such as Chemical Plants, Paint factories and other processes that involve chemical mixing.

A hazardous area is defined by the ATEX Directive (from July 1st 2003) as being in one of three categories:

## Category Classification for Gas (ATEX)

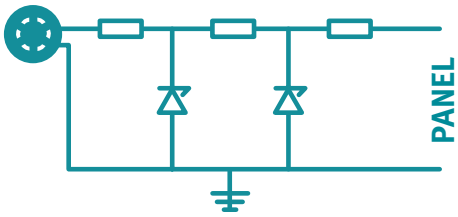
**Category 1** ▸ Where flammable atmospheres are present continuously or more than 1000 hours annually.

**Category 2** ▸ Where flammable atmospheres are present intermittently or more than 10 but less than 1000 hours annually.

**Category 3** ▸ Where flammable atmospheres are present abnormally - less than 10 hours annually.

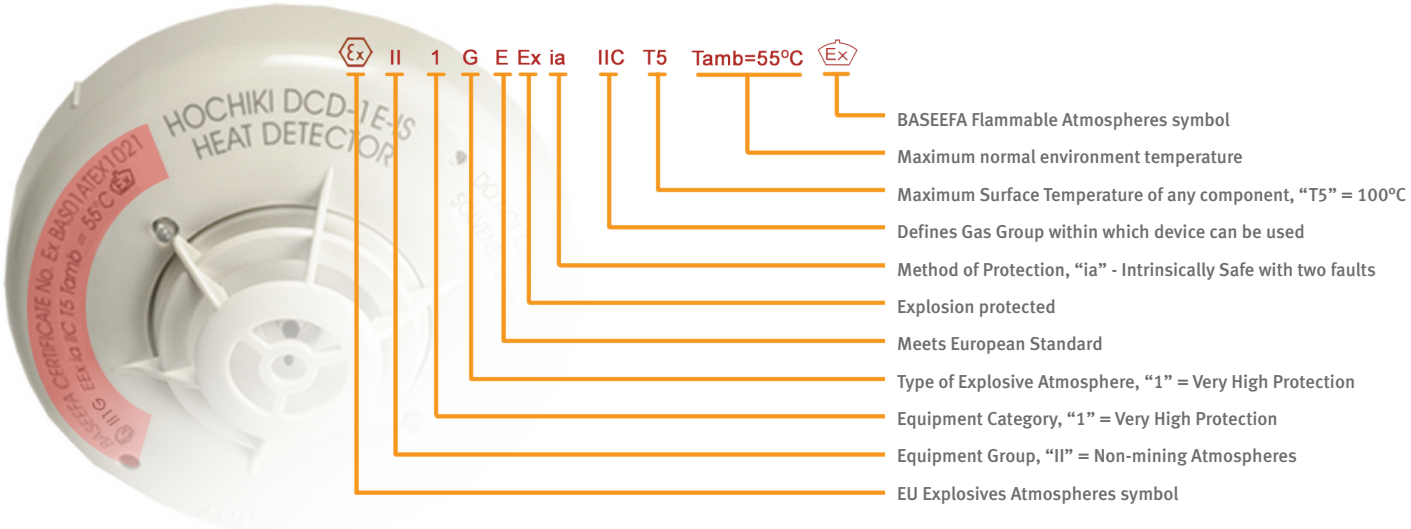

## MTL7787+ Zener Barrier

The Zener Barrier is a relatively simple device, the technique employed to reduce the amount of energy entering the hazardous area is the limiting of the voltage and current using resistors and zener diodes. Zener Barriers require earthing in accordance with standards (typically <1 ohm to main building earth point).





**Zener Barrier**
(must be earthed)
**or**
**Galvanic Isolator**



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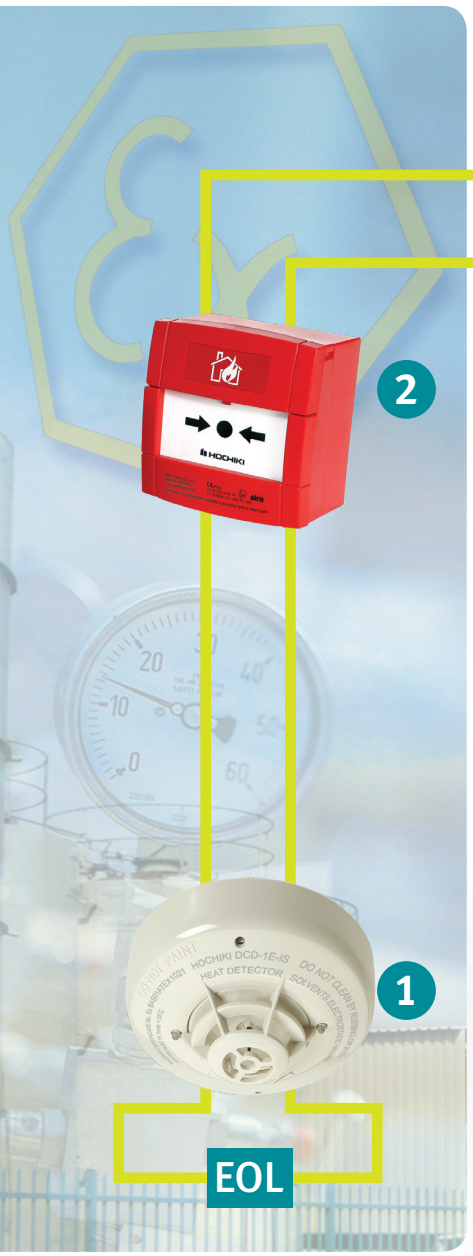
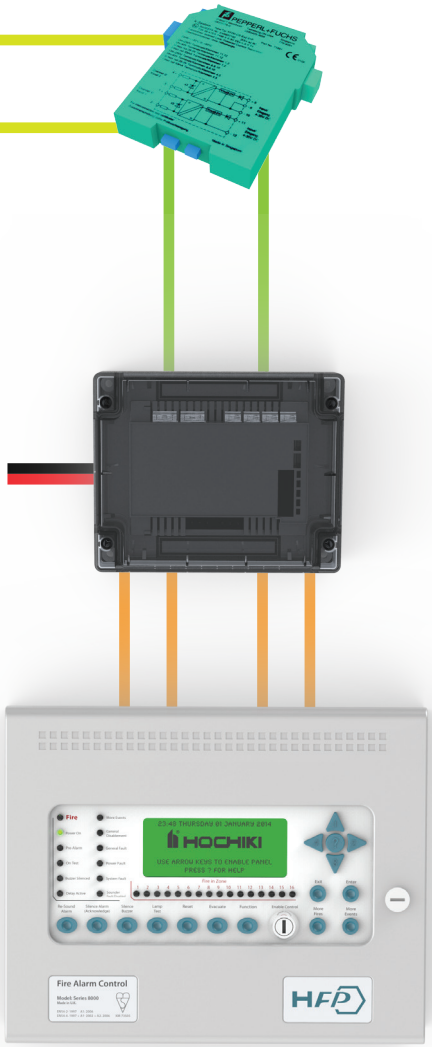
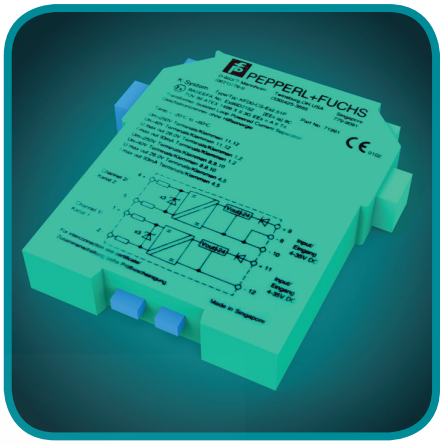
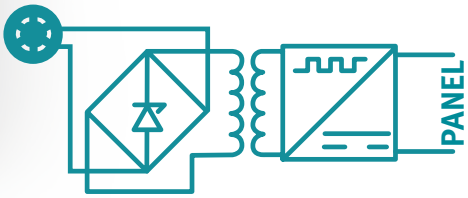


## Current Driver/Repeater

This isolated barrier is used for intrinsic safety applications. It transfers DC signals from fire alarms, smoke alarms, and temperature sensors in hazardous areas. It can also be used to control I/P converters, power solenoids, LEDs, and audible alarms.




Hochiki's Intrinsically Safe detectors have been certified by BASEEFA under the new ATEX directive which will become mandatory as of the 1st July 2003.
This directive changes the classification for the risk areas into categories and also changes the bias to prevent explosive atmospheres (EN 11127-1). The certification marking of Hochiki's DCD-1E-IS Heat Detector and SLR-E-IS Photoelectric Smoke Detector is shown left with an explanaation of each part.

**1** Up to 20 Intrinsically Safe Detectors (SLR-E-IS or DCD-1E-IS)

**2** Unlimited number of Intrinsically Safe Manual Call Points (CCP-E-IS) (Always first on the Zone)

**EOL** To ensure that the surface temperature of the resistor remains below that of the flash-point of the hazardous material present it is certified that the overal surface area must be greater than 230mm²

| Hazardous Area Zone Circuit | Safe Area Zone Circuit | Loop Cables | Auxiliary Power (24Vd.c) |
|---|---|---|---|

## Approvals

It is a clear requirement that all equipment installed within a hazardous area must be certified by a third party, this is to ensure that it will not cause any sparks or surface heat capable of causing the hazardous material to ignite. It is recommended that all equipment installed should be approved to EN54 parts 5 and 7, for heat and smoke performance respectively.

Within the UK the main independant approval bodies for testing to the European Standards (EN54) are the Loss Provention Certification Board (LPCB) and the Brittish Standards Institute (BSI).

## Installation

Apart from selecting and installing good quality third party approved equipment such as Hochiki's conventional I.S range of detectors, a number of safety precautions need to be considered. This is expecially important in Category 1, where no tools can be used that create a single spark. In Categories 2 and 3 tools can be used that create a single spark, as they typically do not have sufficient energy to ignite the Gas within the area. In any of the Categories tools such as electric drillsm which produce a continous steam of sparks, should not be used and even multi-meters should be rated for I.S. use with appropriate certification.

A consideration which is often forgotten is "Static Electricity" as this can produce high voltage discharges in the 20,000V range. So every precaution should be taken to prevent static build-up such as the use of anti-static "wrist straps" or "ankle straps" that can provide a safe connection to the earth potential.

### KFD0-CS-Ex2.51P

**A Current Driver/Repeater** This isolated barrier is used for intrinsic safety applications. It transfers DC signals from fire alarms, smoke alarms, and temperature sensors in hazardous areas. It can also be used to control I/P converters, power solenoids, LEDs, and audible alarms.

- 2-channel isolated barrier
- 24 V DC supply (loop powered)
- Current I/O 0 mA ... 40 mA
- I/P or transmitter power supply
- Accuracy 1%
- Reverse polarity protection
- Up to SIL2 acc. to IEC 61508

### MTL7787+

**A Zener-Diode Barrier** which is intrinsically safe and zone-powered, for use in conventional fire detection systems for protection within hazardous areas. Certified 'ia' for all zones and 'IIC' for all explosive atmospheres.

- Simple installation onto standard DIN 'top-hat' railing
- Removable colour-coded terminals for easy connection
- Can accommodate conductors up to 2.5 $mm^2$
- Supports one zone of I.S. products

### MTL7728+

**A Zener-Diode Barrier** which is intrinsically safe and zone-powered, for use in conventional fire detection systems for protection within hazardous areas. Certified 'ia' for all zones and 'IIC' for all explosive atmospheres. Can be used with the IFD-E(IS) Flame Detector.

- Simple installation onto standard DIN 'top-hat' railing
- Simplified installation and maintenance using plug-in connectors
- Input circuit protected against reverse polarity
- Supports 2 zones of I.S. Detectors

### CCP-E-IS

**A Conventional Manual Call Point** designed for use in hazardous areas and based upon the industry standard KAC world series housing.

- Supports either a 'Frangible Glass' element or a 'Non Frangible Plastic' element
- Terminals can accommodate up to a 2.5$mm^2$ solid conductor
- Approved to EN54 Part 12
- Rugged design
- ATEX Classification to: *II 1G EEx ia IIC T4*
- Installed in safe area

### YBN-R/4(IS)

**A Conventional Detector Mounting Base** associated with the CDX Range of Intrinsically Safe Detectors and is fully compatible with the majority of existing conventional fire alarm control panels.

- Low Profile, only 8mm
- Rugged design
- Dedicated cable screen terminal
- Accepts from 1 to 2.5$mm^2$ cables
- Quick connection via square cable clamps
- Electronics free
- Installed in safe area

HOCHIKI EUROPE (UK) LIMITED
Grosvenor Road, Gillingham Business Park,
Gillingham, Kent, England ME8 0SA
Telephone: +44 (0)1634 260133
Facsimile: +44 (0)1634 260132
e-mail (Non UK): export@hochikieurope.com
www.hochikieurope.com

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