
DOCUMENT CONTROL NUMBER /

**SYSTEM 800 - INTRINSICALLY SAFE MX ADDRESSABLE
FIRE DETECTION SYSTEM
PRODUCT APPLICATION AND DESIGN INFORMATION**

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1. INTRODUCTION

This manual details the information required to enable the MX Addressable Fire Detection System designed by Thorn Security Limited to be made Intrinsically Safe for the protection of risks in Hazardous Areas.

Electrical equipment supplied for use in Hazardous Areas must comply with rigid requirements to ensure that its introduction into the area does not increase the existing risk. Thorn Security Limited have designed Intrinsically Safe (I.S.) System 800 and equipment for use in Hazardous Areas which can be connected to MX Addressable Fire Detection Systems installed in Safe Areas.

The control equipment of the Fire Detection System must be connected by Isolating Interfaces to System 800 only.

An Isolated Sounder System is available for use with System 800.

Note: In the I.S. manuals for Systems 800, the words 'Isolating Interface' and 'Galvanic Isolator' are equivalent and interchangeable.

System 800 also requires an EXI800 Interface Module which is connected between the control equipment and the Safety Barrier.

2. APPLICATION

2.1 GENERAL

The System Designer must be familiar with BS5345, BS EN 60079-14: 1997, EN50 and BASEEFA certification and have successfully completed an appropriate recognised course in Intrinsic Safety.

Design of the system requires that the designer has all the information concerning the installation correctly documented.

The nature of the Hazard must be defined by the customer and a survey carried out to determine the proximity of the safe area to establish cable runs. The probability of a flammable mixture being present is defined by a Zone Number. Flammable gases are classified in Groups and their minimum spontaneous ignition temperature is categorized by Class. Thorn Security equipment marked EEx ia IIC T5 would be suitable for use in worst case conditions, eg, Zone 0 (ia), Hydrogen (IIC), T5 (100 deg C).

The Fire Alarm Equipment and Safety Barriers should be placed as near as possible to the containment wall of the Hazardous Area. This minimises the cable lengths between the barrier and the Hazardous Area and thus the capacity to store energy.

In order that an Installation will comply with the BASEEFA certification designated for each system, it is essential that the certified devices are connected with cables of the specified limits. These limits have been certified for specific classifications of hazard in order that energy storage is limited.

Safety Barriers are incorporated into the circuit feeding the Hazardous Area to limit the voltage excursion and the current. The limit of voltage and current will prevent a fault within the I.S. circuit exceeding the ignition conditions. **THE FITTING OF SAFETY BARRIERS, ISOLATING INTERFACES OR SOUNDER DRIVERS DOES NOT IN THEMSELVES MAKE A CIRCUIT TO WHICH THEY ARE CONNECTED INTRINSICALLY SAFE.**

2.2 HAZARDOUS AREA

A Hazardous Area is defined as one where in the presence of a flammable mixture, ignition may cause an explosion. There is a risk of an explosion when substances (whether liquid, gas, vapour, dust, powder, or solid) are mixed with air to form a flammable atmosphere.

To prevent the possibility of ignition in flammable atmospheres, special precautions for the construction and use of electrical apparatus is required. One method of construction and use is defined as INTRINSICALLY SAFE.

2.3 INTRINSIC SAFETY

To preclude the risk of an explosion, equipment in the Hazardous Area must not be capable of causing ignition under normal operating, or specific fault condition. Limiting the energy which can be stored in, and released by, electronic circuitry and cables in the Hazardous Area is achieved by using Intrinsically Safe equipment and by placing restrictions on the cable parameters.

To complete the explosion protection concept of a circuit, a Safety Barrier must be connected between the Hazardous Area equipment and the source of power in the Safe Area. The electrical power which may be supplied or drawn from a Safe Area (ie, an area with no definable hazard) is limited by using Isolating I.S. Interface Units.

Connection of the Hazardous Area equipment to the Safety Barrier must comply with the limitations listed in the System Certification. These limits have been certified for specific classifications of hazard in order that energy storage in the cables is limited. If the Electrical Energy in a circuit is less than the value required to ignite a potentially explosive mixture then the circuit is said to be INTRINSICALLY SAFE.

2.4 GALVANIC ISOLATORS

Galvanic isolators protect the integrity of an Intrinsically Safe circuit under 'Fault' conditions.

Galvanic isolators operate in a fully floating electrically isolated condition, no High Integrity I.S. earth is required.

3. CERTIFICATION

The design and construction of the equipment that may be installed in a Hazardous Area is controlled by a scheme of inspection and certification. The inspection and certification is carried out by the British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA). This certification is recognised worldwide except for North America where CSA, FM and UL are the Certifying Authorities.

Thorn Security are licensed to reproduce the marks on equipment that comply with the Certification listed in its Licence Number.

3.1 LABELLING OF I.S. APPARATUS IN ACCORDANCE WITH BS EN 60079-14

Certified I.S. apparatus must incorporate a label which shows sufficient information on its operational criteria and certification conditions. The information must be legible.

4. SYSTEM DESIGN PARAMETERS

WARNING:

THERE IS A POSSIBILITY THAT A HAZARD ALREADY EXISTS BEFORE THE DESIGN OF AN I.S. SYSTEM BEGINS OR WILL EXIST DURING THE DESIGN STAGE. ALL APPROPRIATE SAFETY PRECAUTIONS MUST THEREFORE BE ADHERED TO WHEN SURVEYING THE AREA CONCERNED.

Design of an Intrinsically Safe circuit must comply with the requirements of both the limits of circuit parameters of that part fitted in the Hazardous Area and of that in the Non-Hazardous Area. Both of these when added together must not exceed the circuit drive parameters of the Controller.

It is important to note that if the circuit drive parameters of the Controller are exceeded then the reliability of the system will be impaired.

If the circuit parameters of the Hazardous Area apparatus is exceeded, then certification of the system becomes VOID. It will be seen, therefore, that it is important to ensure that the apparatus used fully complies with the Certified Drawings of the Intrinsically Safe Wiring Configurations.

The number of devices connected to the barrier and located in the Hazardous Area must always be limited to not more than the listed maximum. When a mixture of devices is connected to any one zone, the numbers must be reduced in proportion to the ratio of the load presented to the barrier.

When a System includes the use of a S271i+, it must be remembered that the load they present to the circuit is three times that of a detector. A mixture of large and small load devices connected to a zone will require a calculation for the number of allowed detectors (refer to Publication 17A-02-ISLOOP, MX Digital I.S. Loop - Loading Calculation).

The Summary of Requirements for System 800, Fig. 6, show the basic concept of connection to the Hazardous Area.

The design of an I.S. system should always take into account ease of access for installation, commissioning and servicing. Plans and records (system documentation) of each installation should be generated in accordance with BS EN 60079-14 and kept up-to-date and in a safe but accessible place.

It is important that I.S. systems designed, installed, commissioned, and serviced by Thorn Security fully conform with all conditions specified in BS EN 60079-14.

The cable for sounder circuits is a maximum of 45 ohms.

5. SYSTEM DESCRIPTION

5.1 GENERAL

An isolated Sounder System is available for use with System 800.

5.1.1 DETECTION CIRCUIT

A detection circuit comprises detectors and callpoints connected to one or more Galvanic Isolating barrier. Each Safety Barrier provides a suitable interface between one detection zone of the Fire Control Equipment situated in a Safe Area and an Intrinsically Safe circuit containing detection devices situated in a defined Hazardous Area. The detection systems must meet all the requirements of BS EN 60079-14 except when overridden by any special requirements within the Hazardous Area.

5.1.2 SOUNDERS

Where it is necessary to site one or more sounders in a Hazardous Area, they must be certified Intrinsically Safe and connected, via a separate Isolating Sounder Driver, to the Fire Control Equipment.

5.1.3 SAFETY BARRIER

The Safety Barrier is mounted on a purpose built earthed busbar which is then normally housed in a wall-mounted enclosure situated in the safe area. To cater for variations in the number of barriers, combinations of barriers and associated interfaces necessary for differing installations, small, medium and large housings are available.

For System 800, the Pepperl + Fuchs KFD0-CS-Ex1.54 Galvanic Isolator Safety Barrier has been specified, as illustrated in Fig 1.



Fig. 1 Pepperl + Fuchs KFD0-CS-Ex1.54 Galvanic Isolator

For System 800 Sounder Systems, the MTL5021 Isolating Sounder Driver has been specified, as illustrated in Fig. 2.



Fig. 2 MTL5021 Isolating Sounder Driver (not MTL5021, but shown for type)

Note: Where there is need to site the safety barrier in a Hazardous Area because of cable length limitations, the barrier must be housed in either an 'N' type (Zone 2 only) or Flameproof (Zone 1 or 2) enclosure which are certified for this purpose. In no circumstances must these enclosures be used in a Zone 0 environment and special cable shall be provided which is 'N' or flameproof.

5.1.4 EXI800 INTERFACE MODULE

The EXI800 Interface Module, when combined with a galvanic isolator, provides a path for the MX Addressable Fire Detection Control Panel to transparently communicate to slave devices connected to the Intrinsically Safe detection circuit.

The EXI800 is normally mounted on a busbar and housed with the Galvanic Isolator in a wall-mounted enclosure, situated in the safe area. Refer to Publication 17A-02-EXI, EXI800 Interface Module - Product Application and Design Information.

Note: The EXI800 housing is the same as that used for the KFD0-CS-Ex1.54 Galvanic Isolator.



Fig. 3 EXI800 Interface Module

5.2 SYSTEM 800

The system diagram (pages 10 and 11) is with BASEEFA awaiting approval, however, this diagram may be used for guidance in design of an Intrinsically Safe system.

This system provides an Intrinsically Safe fire detection circuit to category 'ia' for gas group IIC in Zone 0, Zone 1 and Zone 2. The equipment which can be installed is as follows:

Note: This Section specifies maximum equipment loads for systems with a single I.S. spur on the addressable loop. For systems with more than one I.S. spur per loop, please also refer to document 17A-02-ISLOOP

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5.2.1 EQUIPMENT INSTALLED IN SAFE AREA

Equipment which can be installed in the Safe Area is detailed in Table 1:

Apparatus	Approval	No. Permitted	Temp. Class
Pepperl+Fuchs KFD0 - CS Ex I.54 Galvanic Isolator	Ex-95 C2064	One	IIC
and compatible control equipment, or associated equipment connected to the above Galvanic Isolator provided that it is not supplied from, or contains under normal or abnormal conditions, a source of potential with respect to earth in excess of 250V rms. or 250V dc.			

Table. 1 SYSTEM 800 - Equipment which can be Installed in the Safe Area

5.2.2 EQUIPMENT PERMITTED IN HAZARDOUS AREAS

Equipment permitted in the Hazardous Area is detailed in Table. 2.

Description	Approval	No. Permitted	Temp. Class
801PHEx Optical + Heat	BAS01ATEX1394X	Maximum combined number of 30	T5
801CHEx Carbon Monoxide + Heat			
801HEx Heat			
IF800Ex Interface Module	BAS01ATEX1394X	Maximum of 30	T5
S271i+ Advanced Flame Detector	Ex94C2080/13	Maximum of 10	T5
Manual Callpoint	Simple Apparatus	1 per IF800Ex	T5
CP840Ex BreakGlass Callpoint	BAS01ATEX1394X	Maximum of 30	T5
Any Simple Apparatus	Simple Apparatus	Any Number per IF800Ex	T4

Table. 2 SYSTEM 800 - Equipment Permitted in Hazardous Area

5.3 SOUNDERS

The sounders used for System 800 are; IS 28 ‘Banshees,’ which can generate upwards of 95dB each at one metre. Short-circuit line monitoring IS NOT possible beyond the barrier when using an MTL5021 Isolating Sounder Driver.

A maximum of four sounders may be connected in parallel.

Note: A reduction of sound output to approximately 90dB from each can be expected when four sounders are in circuit.

5.3.1 ISOLATED SOUNDER SYSTEM BASEEFA CERTIFICATE Ex872028

This system provides an Intrinsically Safe fire alarm sounder circuit to category ‘ia’ for Gas Groups IIC in Zone 0, Zone 1 or Zone 2. End-Of-Line monitoring is available only up to the Isolating I.S. Interface. The apparatus which can be installed is as follows:

5.3.1.1 EQUIPMENT INSTALLED IN SAFE AREA

The apparatus which can be installed in the Safe Area is detailed in Table 3.

Apparatus	Approval	No. Permitted	Temp. Class
MTL5021 Alarm Driver	Ex95D2426	ONE	-
and compatible control equipment, or associated equipment connected to the above safety barrier provided that it is not supplied from, or contains under normal or abnormal conditions, a source of potential with respect to earth in excess of 250V r.m.s. or 250V d.c.			

Table. 3 Isolated Sounder System - Equipment to be Installed in the Safe Area

5.3.1.2 EQUIPMENT PERMITTED IN HAZARDOUS AREA

The equipment permitted in the Hazardous Area is detailed in Table 4.

Apparatus	Approval	No. Permitted	Temp. Class
I.S. 28 BANSHEE	Ex86B2344	FOUR	T6

Table. 4 Isolated Sounder System - Equipment to be Installed in the Hazardous Area

5.4 POWER SUPPLIES

The d.c. power source used must be specific to the fire detection system to prevent electrical interference and must be earth free. Any earthing requirement must only be carried out at the safety barrier.

Any of the Thorn Security Limited range of 24V Power Supplies is suitable for use with an I.S. system. Where it is necessary to specify a Power Supply not of the Company’s range, ensure that it will not supply a source of potential with respect to earth, under normal or abnormal conditions, in excess of 250V r.m.s or 250V d.c.

6. CABLES SPECIFICATION

6.1 CABLES BETWEEN I.S. INTERFACE AND DEVICES WITHIN THE HAZARDOUS AREA

The cable connected into the hazardous area from the safety barrier must comply with the requirements of BS EN 60079-14: 'Specific requirements' and the regulations applicable to the type of installation as specified in this section.

The interconnecting cable must be either a PVC insulated twin or multi-core cable or a twin conductor mineral insulated copper clad (MICC) cable. The use of unscreened twin or multi-core cable is permitted for both I.S. Detection and I.S. Sounder circuits. However, it is recommended that screened cables are used where significant levels of electrical interference are expected to be present.

The screen of a twin or multi-core cable should be continuously covered with insulating material and isolated from earth.

Only I.S. circuits going to Zone 1 or Zone 2 risk areas should be run in the same multi-core cable and each I.S. circuit should occupy adjacent cores. **CIRCUITS GOING TO 'ZONE 0' RISK AREAS MUST BE RUN IN DEDICATED CABLES.**

The copper sheath of MICC cable must be securely earthed in the Hazardous Area at one point only.

Note: Because of the difficulty of insulating the outer copper sheath of MICC cable from the safety barrier housing metalwork and in running long lengths of cable in the same area without leakage to local structural earths, the I.S. Interface should always be situated as near as possible to the Hazardous Area.

Screwed steel conduit and steel wire armours must be treated in the same manner as the copper sheath of MICC cable. When selecting the type of cable to be used, consideration should be given to the effect of the environment upon the insulation whether from temperature, oil, chemicals, electrolytic, or other forms of contamination, and from mechanical damage (BS5839: Pt. 1 refers).

Limitations in capacitance (C), inductance (L), and inductance/resistance ratio (L/R) must be taken into account when determining cable lengths. Some Intrinsically Safe apparatus have a specified equivalent capacitance (Co). The value of that capacitance must be subtracted from the total allowable cable capacitance when calculating the maximum cable length permitted.

The hazardous area circuit must not exceed the following limitations of capacitance (C), inductance (L), or inductance/resistance ratio (L/R):

WARNING:
WHEN CALCULATING CABLE CAPACITANCE CONSIDERATION MUST BE GIVEN TO THE CAPACITANCE CORE-TO-CORE AND IF APPLICABLE, CORE-TO-SCREEN AND/OR ARMOUR.

IF A SCREENED OR ARMoured CABLE IS USED, THE VALUE OF CAPACITANCE CALCULATED IS THE TOTAL OF THE CORE-TO-CORE CAPACITANCE PLUS THE CORE-TO-SCREEN CAPACITANCE.

IN ADDITION, WHERE MULTI-CORE CABLES ARE USED, THE TOTAL CAPACITANCE WILL BE WHEN ALL THE CONDUCTORS (LESS ONE) ARE CONSIDERED TO BE SHORTED AT THE END REMOTE FROM THE BARRIER.

6.1.1 SYSTEM 800 CIRCUIT PARAMETERS

Single circuit barrier (28V/300 ohm):

Group	C(μF)	L(mH)
IIC	0.12	4.2
IIB	0.38	12.6
IIA	1.03	33.6

Models CP840Ex and IF800 Ex only:

Terminal TB2, Pins 1 to 4 (LED Drive and Contact Monitor)

Group	C(μF)	L(mH) OR L(μH)/Rohm	
IIC	0.083	15.8	65
IIB	0.65	59	241
IIA	2.15	126	479

Terminal SK1 Pins 1 to 4 (Programming Port)

Group	C(μF)	L(mH) OR L(μH)/Rohm	
IIC	0.083	79	159
IIB	0.65	297	500
IIA	2.15	598	500

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6.1.2 SYSTEM 800 CABLE PARAMETERS

The cable parameters as tabulated on the System 800 certificates give the system design limitations for ensuring that the installed systems meet the I.S. safety requirements, as stated in the BASEEFA certificate.

These figures do **not** give the limitations which have to be applied to the configuration of a system to ensure that it works satisfactorily with a MX addressable controller. To determine system limitations, refer to Publication 17A-02-ISLOOP.

6.1.3 SOUNDER CIRCUIT CABLE PARAMETERS

MTL5021 Isolating Sounder Driver:

Group	C(μF)	L(mH)	L/R(μH/ohm)
IIC	0.13	0.42	55

6.2 CABLES BETWEEN THE CONTROL EQUIPMENT AND THE BARRIER HOUSINGS

The cables used shall comply with the detection circuit cable requirements of 05A-02-I1 the earthing cable meeting the requirements of IEE Regulations.

6.2.1 CABLE SCREENS

When used, the Intrinsically Safe Detection Loop circuit cable screens must be joined within each device on the loop to form a continuous cable screen and that screen is isolated from earth.

6.3 RECOMMENDED CABLES

- a) PVC insulated and protected screened and unscreened twin 16/0.20mm types 16.2.2C and 16.2.2A to DEF Standard 61-12, Pt. 5. These cables are suitable for operating temperatures between -55°C and +85°C.

	Screened	Unscreened
Max Resistance	40.1 ohm/km	40.1 ohm/km
Max Capacitance	0.375 μF/km	0.141 μF/km
Inductance	0.65 mH/km	0.65 mH/km
L/R ratio	9.3 μH/ohm	9.3 μH/ohm

- b) Elastomeric instrument screened twin 0.5mm² or 0.75mm² cables type HCBH (DL) with EPR insulation and CSP sheathed, these cables are suitable for operating temperatures between -30°C and +90°C and for oil-resistant application.

	0.5mm ²	0.75mm ²
Max Resistance	40.7 ohm/km	25.9 ohm/km
Max Capacitance	0.188 μF/km	0.225 μF/km
Inductance	0.41 mH/km	0.39 mH/km
L/R ratio	12 μH/ohm	16.5 μH/ohm

- c) Twin Mineral Insulated Copper Cables (MICC) type 2L1 and 2L1.5 (light duty 1mm² and 1.5mm²) or 2H1 and 2H1.5 (heavy duty 1mm² and 1.5mm²). MICC cables should comply with BS6207: Pt. 1.

Light Duty	2L1	2L1.5
Max Resistance	17.2 ohm/km	11.5 ohm/km
Max Capacitance	0.575 μF/km	0.638 μF/km
Inductance	0.66 mH/km	0.63 mH/km
L/R ratio	21 μH/ohm	30 μH/ohm
Heavy Duty	2H1	2H1.5
Max Resistance	17.2 ohm/km	11.5 ohm/km
Max Capacitance	0.363 μF/km	0.413 μF/km
Inductance	0.83 mH/km	0.42 mH/km
L/R ratio	27 μH/ohm	37 μH/ohm

- d) 2-core insulated, PVC inner sheathed steel wire armoured and PVC oversheathed 600V/1000V cables to BS6346.

	1.5mm ²	2.5mm ²
Max Resistance	12.1 ohm/km	7.28 ohm/km
Max Capacitance	0.56 μF/km	0.6 μF/km
Inductance	0.33 mH/km	0.32 mH/km
L/R ratio	28 μH/ohm	45 μH/ohm

7. EQUIPMENT COMPATIBILITY

7.1 CONTROL EQUIPMENT

Any of the Control Equipment listed in Table 5 may be used with an I.S. System to protect a Hazardous Area, provided that they be used with a Certified I.S. Barrier or Interface as detailed in Fig. 4 and an EXI800 Interface Module.

7.2 SYSTEM 800 MX ADDRESSABLE DETECTORS AND DEVICES

Any combination of the detectors specified for System 800 (Table 2) may be used with any of the MX range of Control Units with up to a maximum of thirty addressable points per barrier. The number of detectors of any particular type can be ascertained by reference to Fig.4.

LEDs of addressable devices will blink when polled. The Control Equipment will limit to one, the number of continuously illuminated LEDs on the Intrinsically Safe loop at any time.

7.2.1 IF800Ex MX ADDRESSABLE INTERFACE MODULE

Refer to Publication 17A-02-IFEX, IF800EX Intrinsically Safe Contact Input Monitor - Product Application and Design Information.

The IF800Ex Interface Module is designed to monitor and signal the condition of a Manual Break Glass callpoint or equipment described as simple apparatus.

7.2.1.1 MONITORING CIRCUIT CABLE PARAMETERS

The parameters of the cables connected between the IF800Ex (Terminal TB2, Pins 1 to 4) and Manual Callpoint/Simple Apparatus must not exceed the values specified below.

GROUP	C(μF)	L(mH) OR Lμ(H)/Rohm	
IIC	0.083	15.8	65
IIB	0.65	59	241
IIA	2.15	126	479

7.2.2 CP840Ex INTRINSICALLY SAFE MX ADDRESSABLE WEATHERPROOF BREAKGLASS CALLPOINT

Refer to Publication 17A-02-CPEX, CP840Ex Intrinsically Safe Weatherproof Break Glass Callpoint - Product Application & Design Information.

The CP840Ex Intrinsically Safe MX Addressable Waterproof Break Glass Callpoint is designed to monitor and signal the condition of the switch contact in the callpoint.

7.3 SYSTEM 800 CONTROL EQUIPMENT

Control Unit	Safety Barrier	
	Detector Circuit	Sounder Circuit
MX 1000	Pepperl+Fuchs KFD0-CS-Ex1.54 Galvanic Isolator	MTL5021 Isolating Sounder Driver
MX4000		
MX4000M		
T2000		

Table. 5 MX Addressable Control Equipment

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NOTE:
SIMPLE APPARATUS WHICH
COMPLIES WITH B.S.5345 PART 4
1977 CLAUSE 6.3.3
MAY BE INSTALLED IN THE
HAZARDOUS AREA

DESCRIPTION	APPROVAL	No. PERMITTED	TEMP. CLASS
801PHEX OPTICAL + HEAT	BAS01ATEX1394X	MAXIMUM COMBINED NO. OF 30	T5
801CHEX CARBON MONOXIDE + HEAT	BAS01ATEX1394X		T5
801HEX HEAT	BAS01ATEX1394X		T5
CP840EX ADDRESSABLE CALLPOINT	BAS01ATEX1394X		T5
IF800EX CONTACT INPUT INTERFACE	BAS01ATEX1394X		T5
S271+ FLAME	Ex94C2080/13	10	T5
ANY SIMPLE APPARATUS	SIMPLE APPARATUS	1 PER IF800EX	
MUBEX BASE	BAS01ATEX1394X	ANY NUMBER	

PERMISSIBLE INTERCONNECTION CABLES

THE PARAMETERS OF THE CABLES CONNECTED TO THE OUTPUT (HAZARDOUS AREA)
TERMINALS OF THE SAFETY ISOLATOR MUST NOT EXCEED THE VALUES SPECIFIED
BELOW:

GROUP	C(μF)	L(mH)
IIC	0.12	4.2
IIB	0.38	12.6
IIA	1.03	33.6

MODELS CP840EX AND IF800EX ONLY

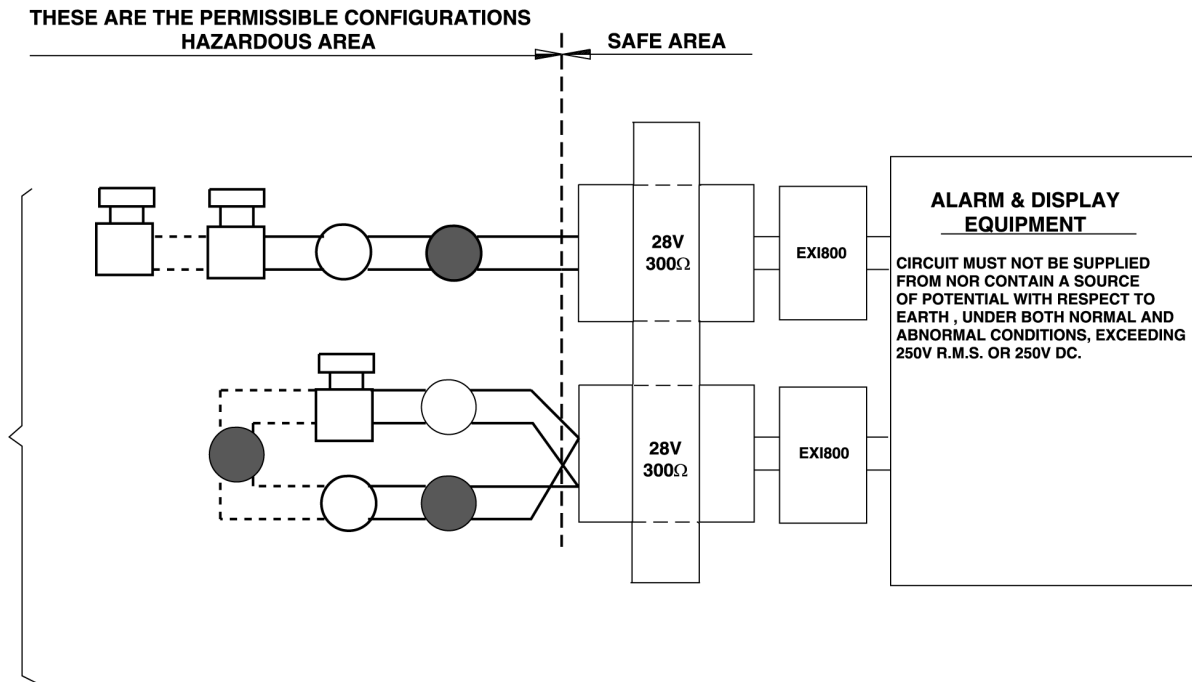
TERMINAL TB2, PINS 1 TO 4 (LED DRIVE & CONTACT MONITOR)

GROUP	C(μF)	L(mH) OR L(μH)/Rohm	
IIC	0.083	15.8	65
IIB	0.65	59	241
IIA	2.15	126	479

TERMINAL SK1, PINS 1 TO 4 (PROGRAMMING PORT)

GROUP	C(μF)	L(mH) OR L(μH)/Rohm	
IIC	0.083	79	159
IIB	0.65	297	500
IIA	2.15	598	500

Fig. 4a) SYSTEM 800 - Installation Diagram for Intrinsic Safety (CAT(ia))



SAFETY BARRIER

PEPPERL+FUCHS KFD0-CS-Ex1.54 Umax=28V, Imax=93mA, Ceq=5.6nf CERTIFIED BY BASEEFA TO [EEx ia] IIC ON CERTIFICATE No. Ex95C2064

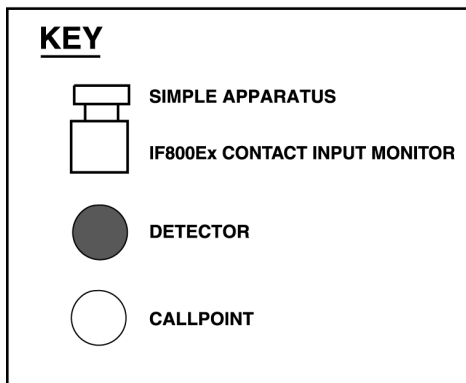


Fig. 4b) SYSTEM 800 - Installation Diagram for Intrinsic Safety (CAT(ia))

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7.3.1 SYSTEM 800 PERMISSIBLE CONFIGURATIONS

The system may be wired in any of the configurations shown in Fig. 5 The I.S. circuit zone should be considered as a 'SPUR' to the main addressable circuit protected.

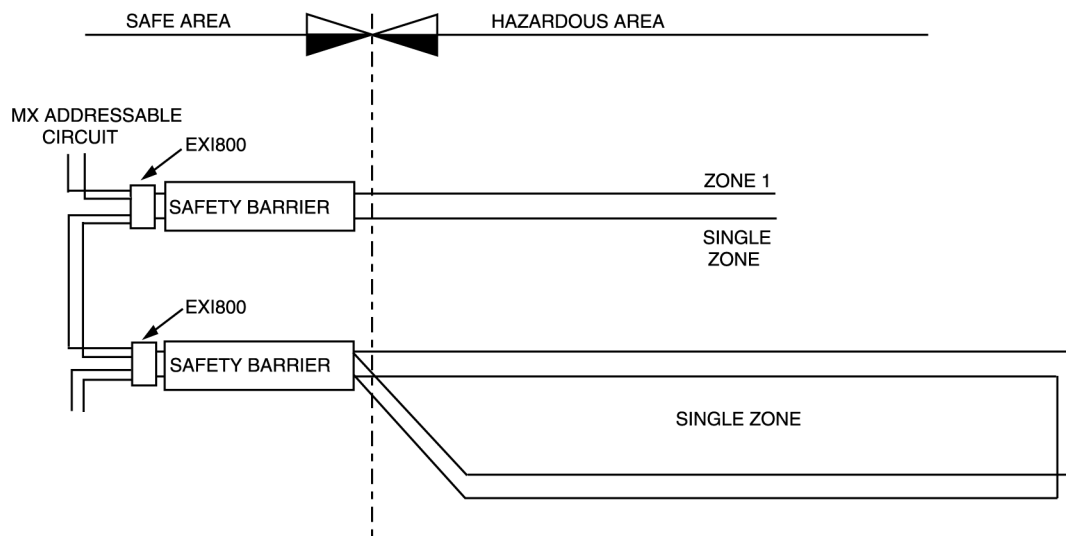


Fig. 5 Permissible Zoning

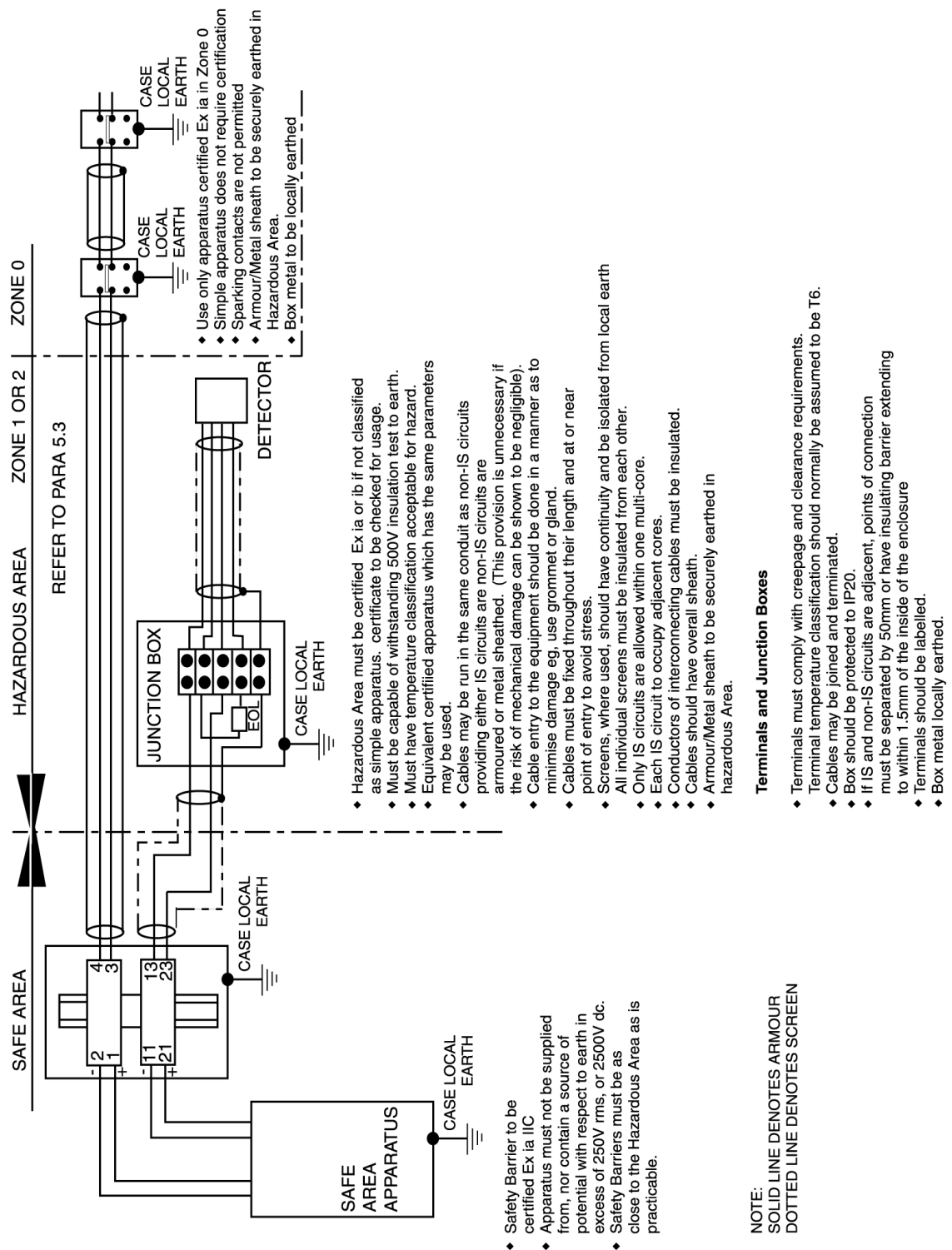


Fig. 6 Summary of Requirements for System 800

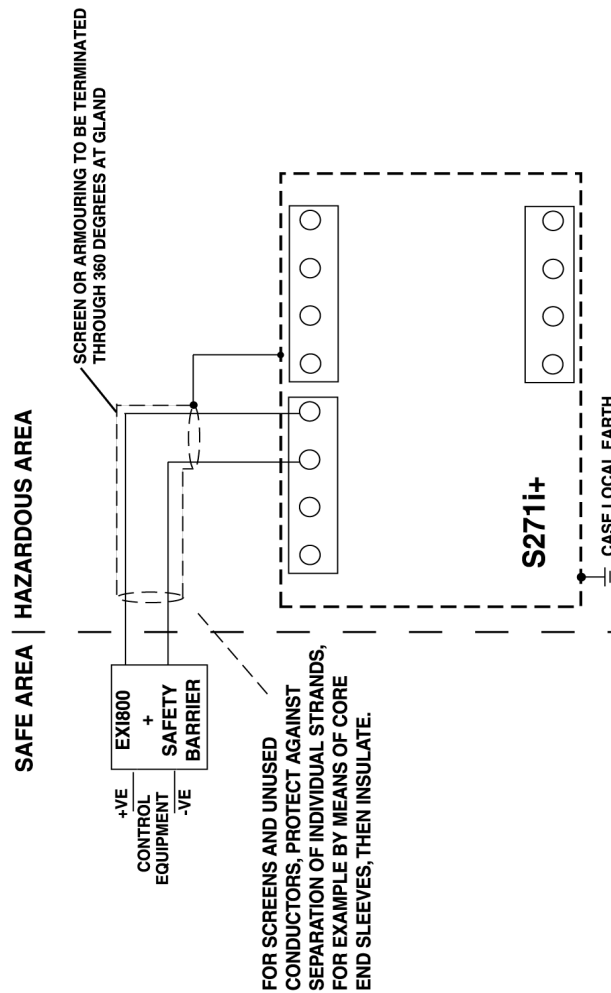
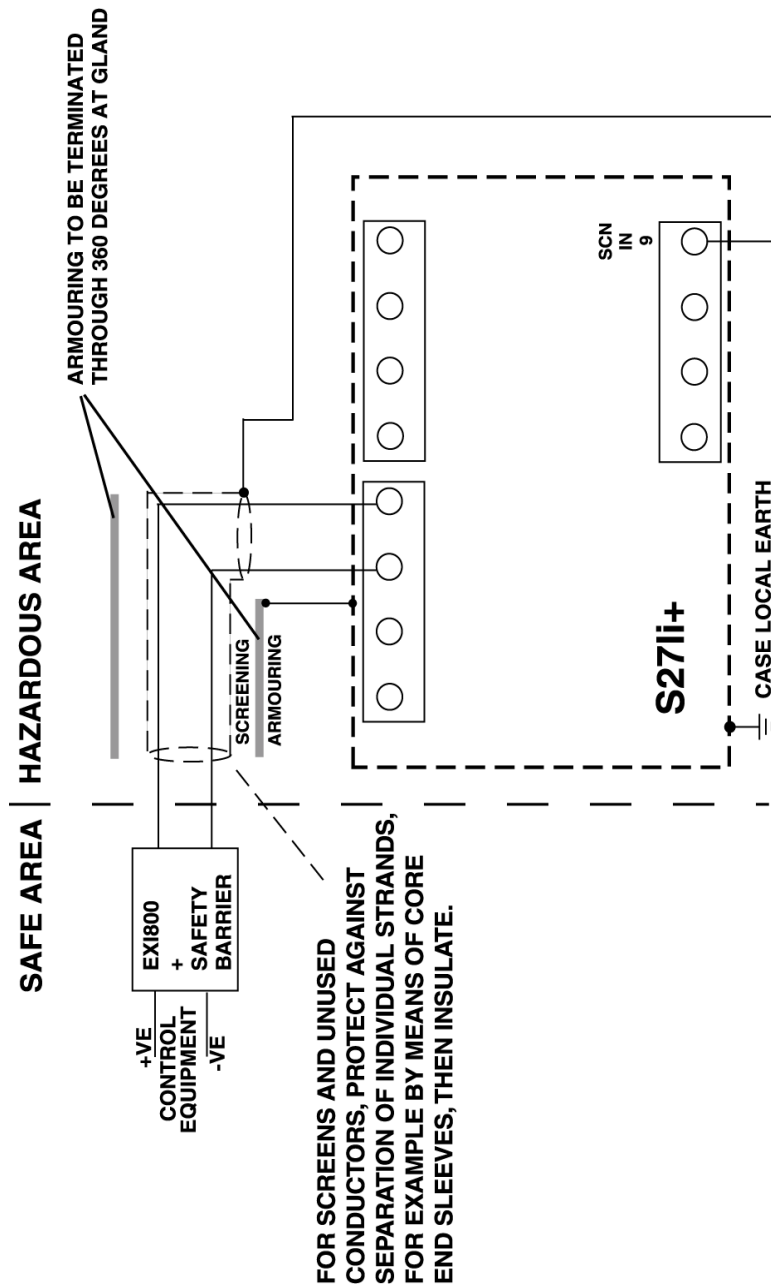


Fig. 7 EMC Directive - Earthing Arrangements for Screened Cable or Armoured Cable

Note: EMC DIRECTIVE - To meet the requirements of BS EN50082-1, it is necessary to follow a particular cable arrangement. The important criteria is to terminate the armouring /screening of the cable through 360° to the detector housing gland. In addition, to meet the requirements of BS EN50082-2 and BS EN50130-4, it is necessary to pass the conductors through a nominal 26mm diameter OD, 12.7mm, ID, 28.5mm long ferrite bead.



THIS ARRANGEMENT IS ALSO APPLICABLE TO THE SUBSEQUENT WIRING DIAGRAMS FOR HAZARDOUS AREAS:

- a) IF A CABLE WHICH IS BOTH ARMoured AND SCREENED IS EMPLOYED.
- b) IF A SCREENED CABLE IS RUN IN METAL CONDUIT.

Fig. 8 EMC Directive - Earthing Arrangements for an Armoured Screened Cable

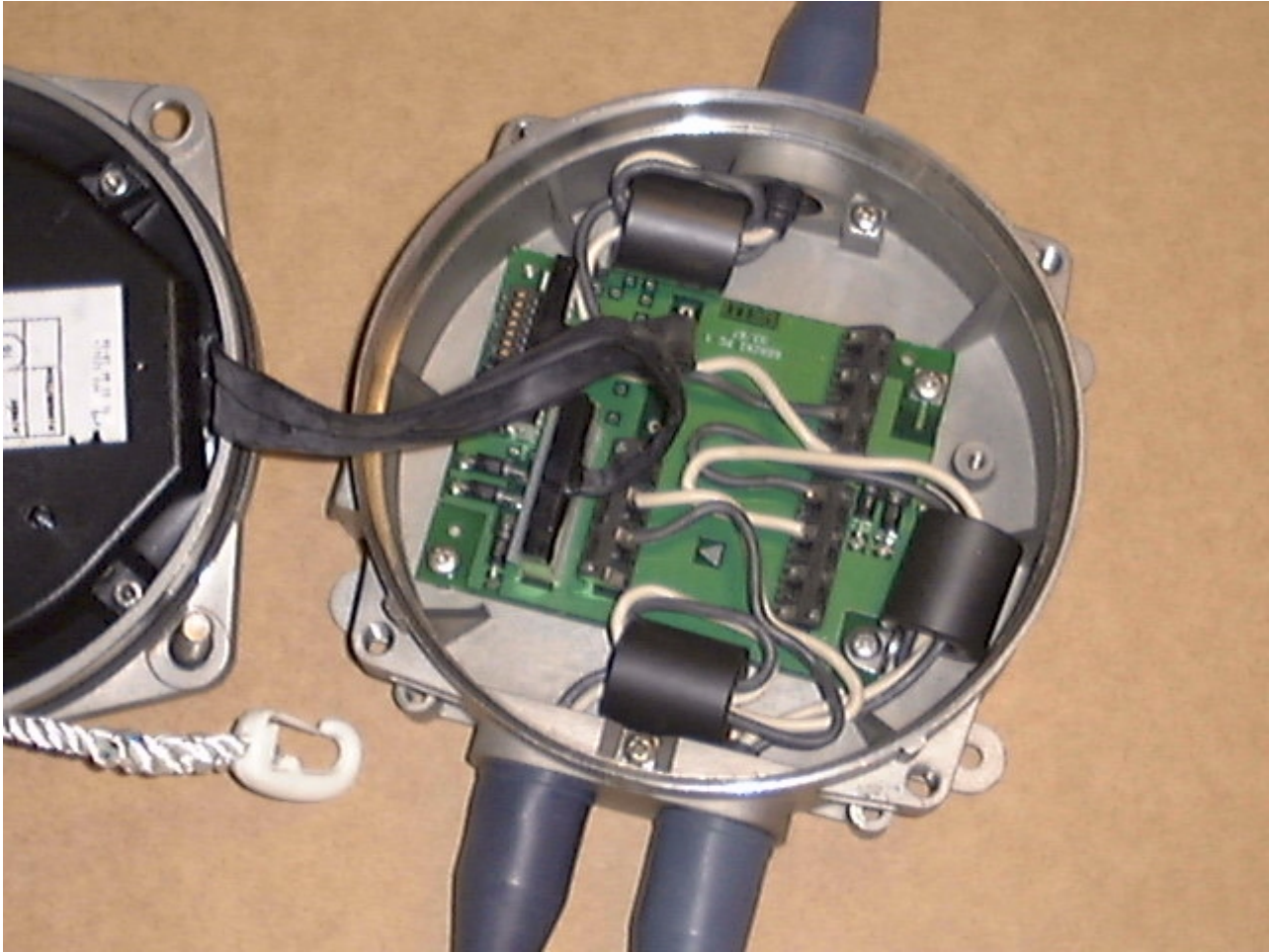


Fig. 9 Ferrite Bead Placement

Note:

- 1) *EMC DIRECTIVE* - To meet the requirements of BS EN50082-1, it is necessary to follow a particular cable arrangement. The important criteria is to terminate the armouring /screening of the cable through 360° to the detector housing gland. In addition, to meet the requirements of BS EN50082-2 and BS EN50130-4, it is necessary to pass the conductors through a nominal 26mm diameter OD, 12.7mm, ID, 28.5mm long ferrite bead.
- 2) *APPROVAL* - The S27li+ detector is LPCB approved to prEN54: Part 10, but not when used with the 'REMOTE RANGE' and/or 'REMOTE SELF TEST' functions connected.

For Earthing arrangements of Armouring and Screening, see Figs. 7 and 8. For Ferrite Bead placement, see Fig. 9 above.

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- NOTES: 1. ALL SCREEN JUNCTIONS TO BE INSULATED FROM LOCAL EARTH.
2. THIS SUPPLY MAY BE PROVIDED FROM THE CONTROLLER OR FROM AN EXTERNAL SOURCE ISOLATED FROM THE MX PSU.

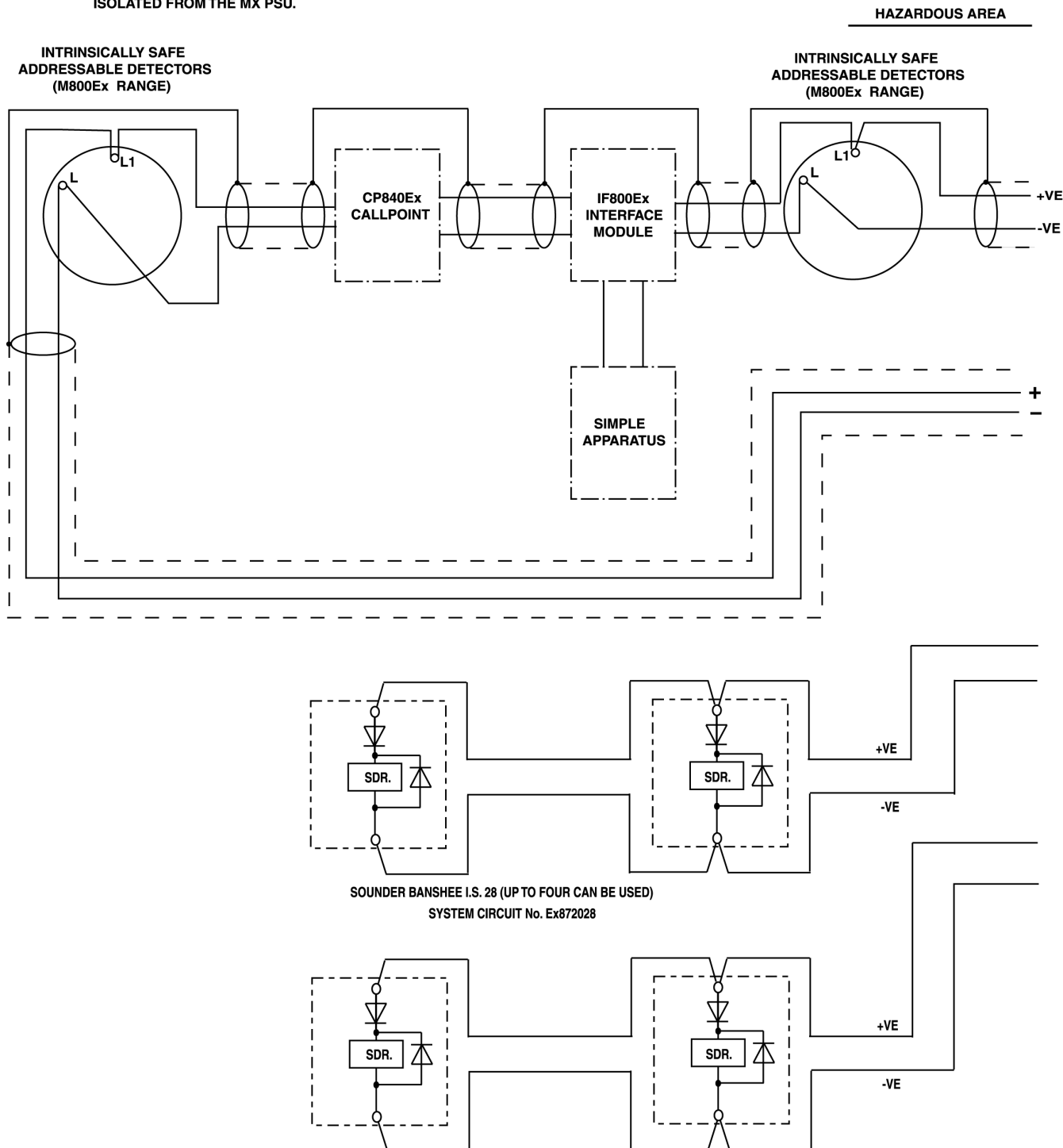


Fig. 10a) I.S. Interconnecting Diagram to MX Addressable Systems

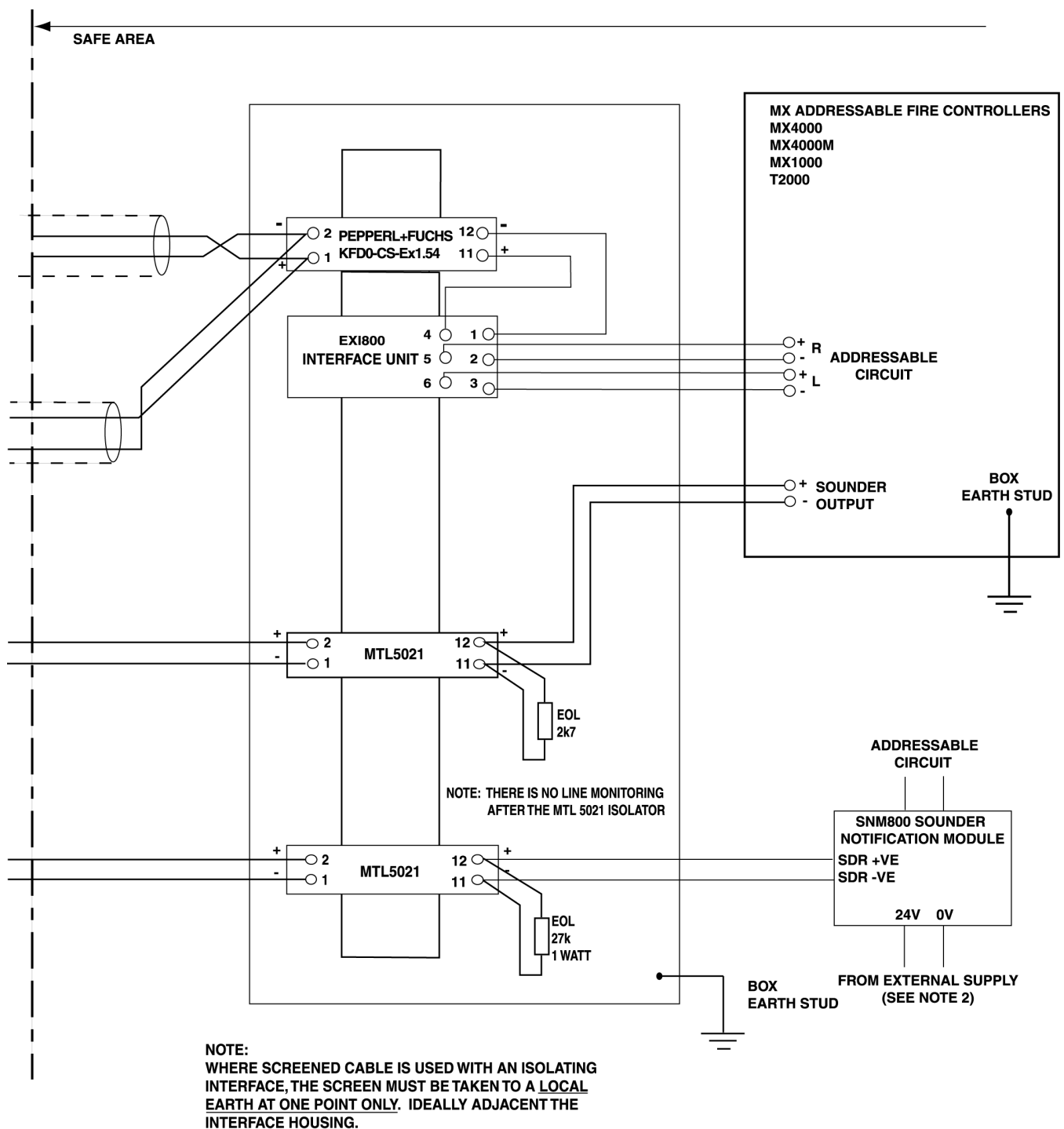
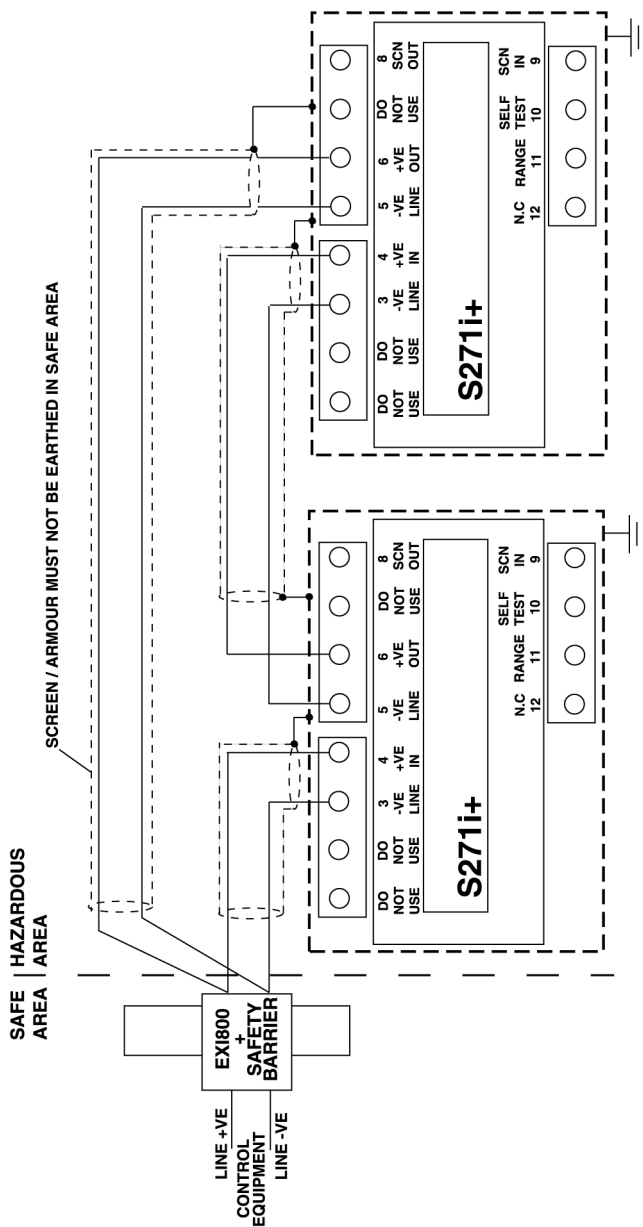


Fig. 10b) I.S. Interconnecting Diagram to MX Addressable Systems



NOTE:
 1. SEE FIG. 7 IF AN ARMoured OR SCREENED CABLE IS USED.
 2. SEE FIG. 8 IF ARMoured SCREENED CABLE IS USED.

Fig. 11 S271i+ Wiring for Hazardous Areas

8. TECHNICAL SPECIFICATION

a) 4-Way Housing used with EXI800 MX Loop Interface Module/Galvanic Isolator Type PEPPERL+FUCHS KFD0-CS-Ex1.54/Isolating Sounder Driver

Overall Dimensions: See Fig. 12

- Fixings: Corner screws or plastic lugs screwed to base.
- Weight: 0.36kg
- Material: Polycarbonate: glass-filled base, transparent lid.
- Finish: Dark grey base
- Protection Category: IEC529: IP65

Gland Fixing: 2 x 20mm holes pre-drilled through bottom side.

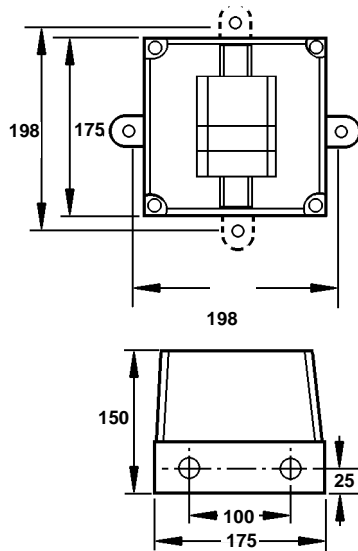


Fig. 12 Four Way Housing used with EXI800 MX Loop Interface Module/Galvanic Isolator Type PEPPERL+FUCHS KFD0-CS-Ex1.54/Isolating Sounder Driver - Overall Dimensions

b) 8-Way Housing used with EXI800 MX Loop Interface Module/Galvanic Isolator Type PEPPERL+FUCHS KFD0-CS-Ex1.54/Isolating Sounder Driver

Overall Dimensions: See Fig. 13

- Fixings: Plastic lugs screwed to base, plugged Knockout holes or rear fixing screws.
- Weight: 2.2kg
- Material: Polycarbonate: glass filled base, transparent lid.
- Finish: Light grey base
- Protection: IEC529: IP65
- Gland Fixing: Top and bottom gland plates detachable for drilling.

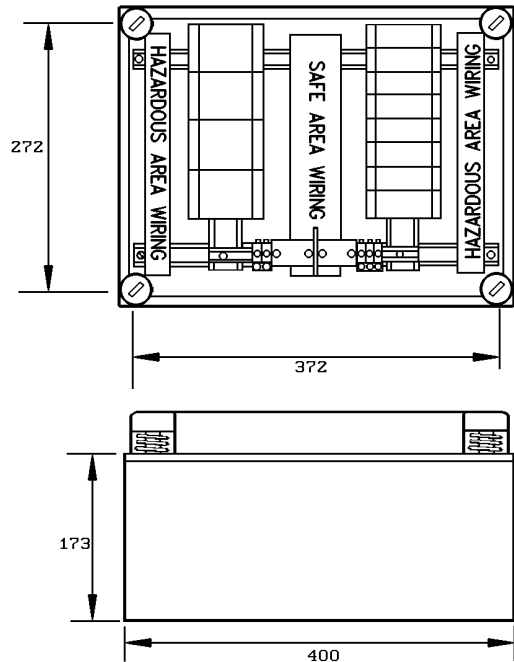


Fig. 13 Eight Way Housing used with EXI800 Interface Module/ Galvanic Isolator Type PEPPERL+FUCHS KFD0-CS-Ex1.54/Isolating Sounder Driver - Overall Dimensions

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c) Galvanic Isolator Type PEPPERL+FUCHS KFD0-CS-Ex1.54

Overall Dimensions: See Fig. 14

Weight: 100g approx.

Environmental:

Operating Temperature: -20°C to +60°C

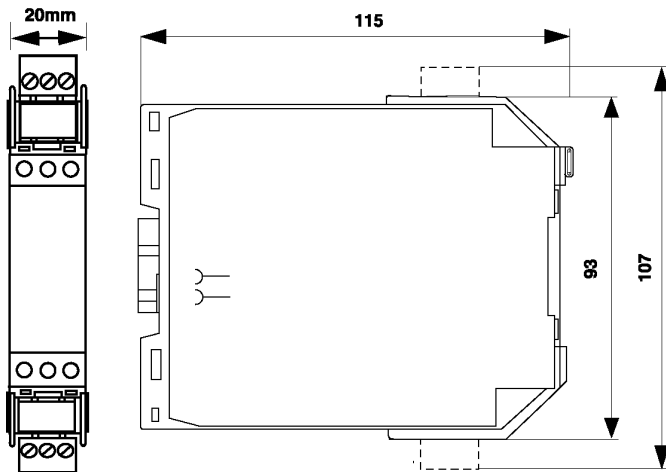
Storage Temperature: -40°C to +90°C

Humidity: 95% RH max

Electrical:

Input Voltage: 4V to 26V

Maximum output Voltage: 28V from 300 ohm



**Fig. 14 Galvanic Isolator Type
PEPPERL+FUCHS KFD0-CS-Ex1.54**

d) EXI800 MX IS Loop Interface Module

Overall Dimensions: See Fig. 15

Environmental

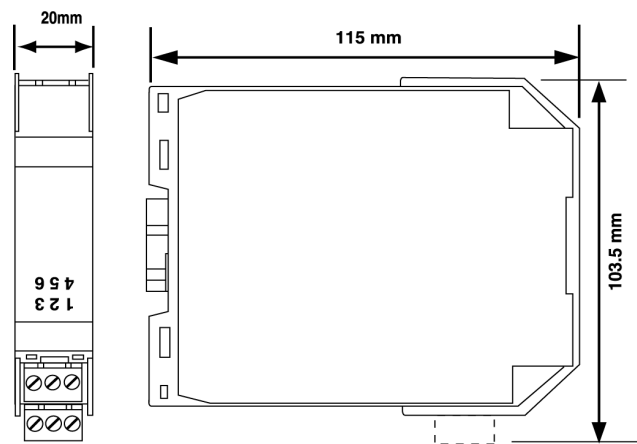
Operating Temperature:- -25°C to +70°C

Storage Temperature: -40°C to +70°C

Relative Humidity: up to 95% RH
(non-condensing)

Weight: 88g approx.

IP Rating: 20



**Fig. 15 EXI800 IS Loop Interface Module -
Overall Dimensions**

e) DX070 Housing

Overall Dimensions: See Fig. 16

- Fixings:** Wall fixing lugs provided. Captive fixing screws for lid fixing.
 Knockout holes are provided in two different sizes (15.5mm and 21mm) on the side faces of the base.
- Weight:** 0.8kg
- Material:** Glass reinforced polycarbonate base
 Transparent polycarbonate lid.
- Protection:** IEC529: IP65
- Gland Fixing:** Side gland plate detachable for drilling

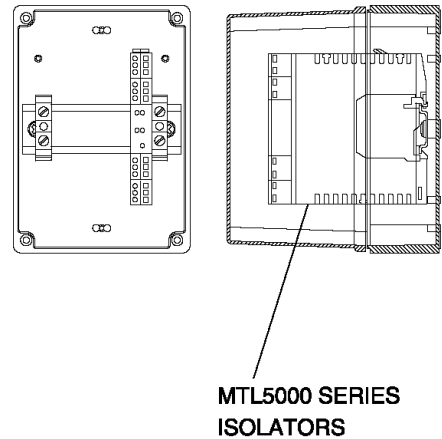


Fig. 17 DX070 showing mounted MTL5000 Series Modules

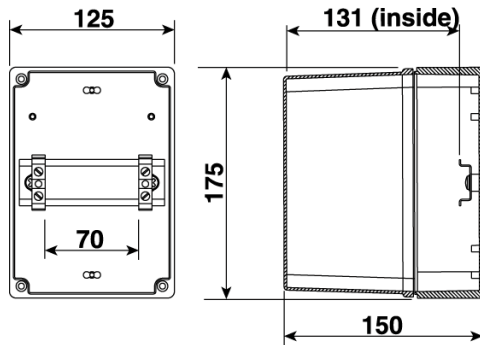


Fig. 16 DX070 - Overall Dimensions

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f) DX170 Housing

Overall Dimensions: See Fig. 18

Fixings: Wall fixing lugs provided. Captive fixing screws for lid fixing.

Knockout holes are provided in two different sizes (15.5mm and 21mm) on the side faces of the base.

Weight: 2.6kg

Material: Glass reinforced polycarbonate base
Transparent polycarbonate lid.

Protection: IEC529: IP65

Gland Fixing: One gland plate on each side.

MTL5000 SERIES ISOLATORS

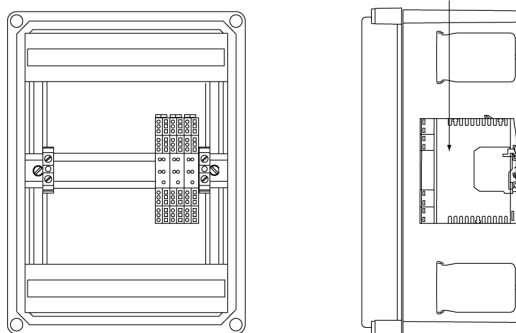


Fig. 19 DX170 Showing Mounted 5000 Series Modules

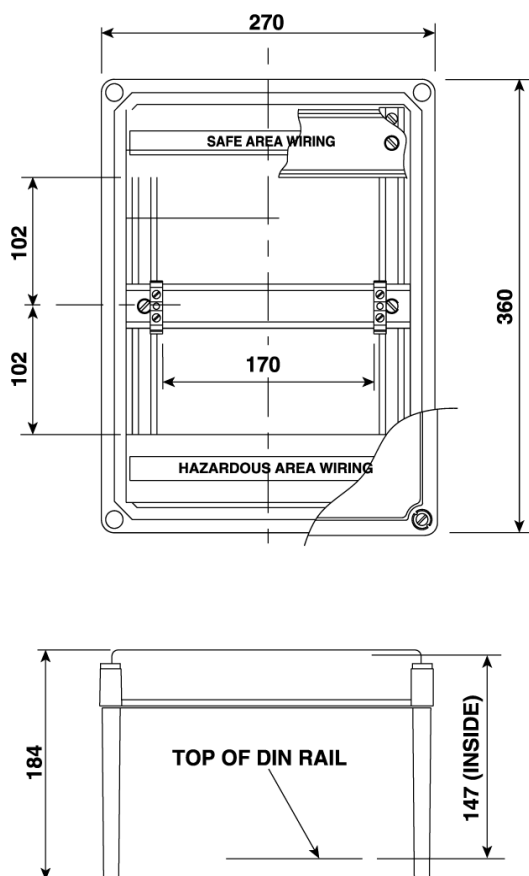


Fig. 18 DX170 - Overall Dimensions

8.1 DETECTORS

Reference should be made to the appropriate detector publication by Thorn Security for each type of detector used in the system.

9. ORDERING INFORMATION

801HEx Heat Detector:	516.800.532
801PHEx Optical Smoke + Heat Detector:	516.800.530
801CHEx Carbon Monoxide + Heat Detector:	516.800.531
S271i+ MX Digital Addressable Flame Detector:	516.041.004
MUBEx Base for use with Ex Detectors:	517.050.610
Sounder Banshee I.S. 28:	576.501.013
IF800Ex MX Digital Addressable Interface Module Assembly:	514.001.062
CP840Ex MX Digital Addressable BreakGlass Callpoint:	514.800.513
MTL Housings 4-Way Housing:	517.001.196
8-Way Housing:	517.001.197
MTL5021 Isolating Sounder Driver:	517.001.245
DX070 Enclosures:	517.001.248
DX170 Enclosure:	517.001.247
EXI800 Interface Module:	514.001.063
Pepperl+Fuchs KFD0-CS-Ex1.54 Galvanic Isolator:	517.001.259
Spare Service Tool Ex Dongle:	557.203.008

MK/jm/an

13th January 2003