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**DOCUMENT CONTROL NUMBER /**

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**SYSTEM 800 - INTRINSICALLY SAFE MX ADDRESSABLE  
FIRE DETECTION SYSTEM  
INSTALLATION INSTRUCTIONS**

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# SYSTEM 800 - INTRINSICALLY SAFE MX ADDRESSABLE FIRE DETECTION SYSTEM

## INSTALLATION INSTRUCTIONS

### 1. INTRODUCTION

This manual details the information required to install the Intrinsically Safe MX Addressable Fire Detection System designed by Thorn Security Limited.

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. manual for System 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. GENERAL

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#### WARNING:

**THE DESIGNED SYSTEM DOCUMENTATION MUST BE READ AND UNDERSTOOD BEFORE ANY WORK IS PERFORMED. THERE IS A POSSIBILITY THAT A HAZARD EXISTS OR WILL OCCUR DURING INSTALLATION. ALL APPROPRIATE SAFETY PRECAUTIONS MUST BE ADHERED TO AT ALL TIMES. ALL RISKS SHOULD BE DOCUMENTED.**

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The installation of I.S. systems must be carried out by suitably trained Thorn Security Limited engineers.

It is important that I.S. systems designed, installed, commissioned and serviced by Thorn Security Limited personnel fully conform with all conditions specified in BS EN 60079-14:1997 (CP for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres).

The complete fire detection system must meet all BS5839 Pt. 1 requirements except when overridden by any special requirements within the Hazardous Area.

The installation should be performed in such a way as to avoid external damage to the apparatus and insulation which would impair the integrity of the designed system.

Wiring should be installed, as far as is practicable, in positions that will prevent exposure to mechanical damage, the effects of heat and corrosive or solvent substances. Where such exposure cannot be avoided, protective measures must be taken.

All apparatus and connections should be clearly marked in order that their usage/relationship to other devices can be readily recognised.

All isolating I.S. interface units and isolating sounder drivers must be sited in a Safe Area (ie, an area with no definable hazard). Isolating I.S. interfaces and isolating sounder drivers if used exclusively in floating systems do not require a High Integrity earth but require a local earth for cable screens.

*Note: Where there is a need to site the safety barriers 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.*

### 3. CERTIFICATION REQUIREMENTS

The Intrinsically Safe systems used for the protection of low voltage fire detection systems produced by Thorn Security Limited have been certified category 'ia' by the British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA).

- System 800 can be used for a Gas Group IIC hazard in a Zone 0, Zone 1 or Zone 2 environment.
- Sounder System (BASEEFA Ex872028) can be used for a Gas Group IIC hazard in a Zone 0, Zone 1 or Zone 2 environment.

For information on Gas Groups and Zones refer to document, 26A-01-G1 - Use of Electrical Equipment in Fire Detection And Extinguishing Systems for Protection of Hazardous Areas.

#### 3.1 SYSTEM 800

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:

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*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.*

## 3.1.1 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 Ex1.54 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**

## 3.1.2 EQUIPMENT PERMITTED IN HAZARDOUS AREA

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**

## 3.2 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:

## 3.2.1 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 Equipment to be installed in the Safe Area**

### 3.2.2 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 Equipment to be installed in the Hazardous Area**

## 4. CHECKING THE EQUIPMENT

### WARNING:

**ALL INSTALLATION PRACTICES EMPLOYED MUST, IN ADDITION TO THE FOLLOWING INSTRUCTIONS MEET THE REQUIREMENTS SPECIFIED IN THE CURRENT EDITION OF BS EN 60079-14. ALL ELECTRICAL EQUIPMENT, INCLUDING MEASURING INSTRUMENTS, USED IN THE HAZARDOUS AREA MUST FIRST BE ACCEPTABLE TO THE CUSTOMER'S SAFETY OFFICER.**

- The system documentation should be read and understood before proceeding with any installation work.
- Ensure that the correct number and type of enclosures, isolating I.S. interface and sounder interface units have been supplied.
- Ensure that all devices for use in the hazardous area(s) are as specified and have been certified for the type of risk concerned.
- Ensure that the cable used between each isolating I.S. interface and the device(s) in the hazardous area meets the certification requirements for the type of risk concerned. The cable between each isolating I.S. interface and control equipment zone terminals must comply with the requirements laid down in Publication 17A-13-D.

## 5. MOUNTING THE EQUIPMENT

### 5.1 I.S. INTERFACE

- Remove the enclosure front cover.
- Remove the internal fixings.
- Choose a method of mounting suitable for the type of wall.
- Fix the mounting lugs (if specified).
- Knock out any conduit/cable gland holes and/or remove the gland plates and drill the required holes (the method of entry to the apparatus should be such as to minimize the risk of mechanical damage to cables: BS EN 60079-14).
- Using the internal fixing holes or fixing lugs as a template, fix the enclosure to the wall (see Figs. 1 to 2). Suitable clearance should be allowed for removing the front cover.
- Replace the internal fixings and front cover.

### 5.2 DETECTORS AND CALLPOINTS

Site the detector bases, addressable interface modules and callpoints in the positions shown on the Installation Diagram (refer to System Documentation).

### 5.3 SOUNDERS

Site the sounders in the positions shown in the Installation Diagram.

### 5.4 SYSTEM CONDUITS AND CABLES

Refer to 17A-13-D for cable parameters and to ascertain the cable requirements for a system. Install the cables as follows:

- Run the conduits/cables between the devices in the hazardous area and the I.S. Interface ensuring that they enter the enclosure via the holes designated 'I.S. Wiring only'.
- Run the conduits/cables between the control equipment and the I.S. Interface ensuring that they enter the housing via the holes designated 'Non-I.S. Wiring'. (The method of entry to apparatus should be such as to minimize the risk of mechanical damage to cables: BS EN 60079-14).
- Ensure physical separation of at least 50mm is maintained between the I.S. and Non-I.S. wiring throughout, including inside the I.S. Interface.

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- d) Bond the steel conduit or copper sheath of MICC cable to earth at one point only within the Hazardous Area. (Earthing via the I.S. Interface box earth point is acceptable if the box is situated close to the Hazardous Area).

- b) To check the continuity of the cable screen, short circuit the screen and one end of the circuit pair at one end of the loop.
- c) Locate and rectify any continuity faults by quartering the circuit.

## 6. INITIAL CONNECTIONS

- a) At all devices to be connected to the circuit, connect the LOOP IN and LOOP OUT wires via a connector block, observing the correct polarity.
- b) To ensure continuity of cable screening, and to prevent earth loops, the cable screen/copper sheath should be joined at device positions and insulated from earth.
- c) At the last device, short LOOP IN (+ve) to LOOP RETURN (-ve).
- d) The insulation of the conductors should be continued to a point as close as possible to the connection. No loose strands of wire are allowed.
- e) Do not connect any devices at this stage.

## 7. CONTINUITY AND INSULATION TESTS

If no Hazard exists or will not occur during installation, the following tests may be carried out using a 500V megger with the permission of the customer's safety officer.

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### WARNING:

**DO NOT USE A HIGH-VOLTAGE INSULATION TESTER EG, MEGGER FOR ANY OF THE FOLLOWING CHECKS. THESE TESTS MAY ONLY BE PERFORMED USING AN INTRINSICALLY SAFE INSULATION TESTER MEETING THE REQUIREMENTS OF BS EN 60079-14.**

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### 7.1 CONTINUITY TESTS

Carry out the tests using a certified intrinsically safe ohmmeter as follows in accordance with EN BS 60079-14: 1997 and record the results:

- a) To check the continuity, short-circuit the circuit pair at one end of a loop.

### 7.2 HIGH-VOLTAGE INSULATION TESTS

The following tests are carried out to ensure that no earths or short-circuits have occurred during connection:

- a) To test the high-voltage insulation between conductors and earth, connect the insulation tester between the circuit and earth. A resistance reading above 1M ohm is acceptable. Record the reading obtained.
- b) To test the high-voltage insulation between conductors, remove the short-circuit and connect the insulation tester between the circuit pair at the barrier end and measure the insulation resistance. A resistance reading above 1M ohm is acceptable. Record the reading obtained.
- c) To test the high-voltage insulation between cable screen and earth, connect the insulation tester between the screen and earth. A resistance reading above 1M ohm is acceptable. Record the reading obtained.

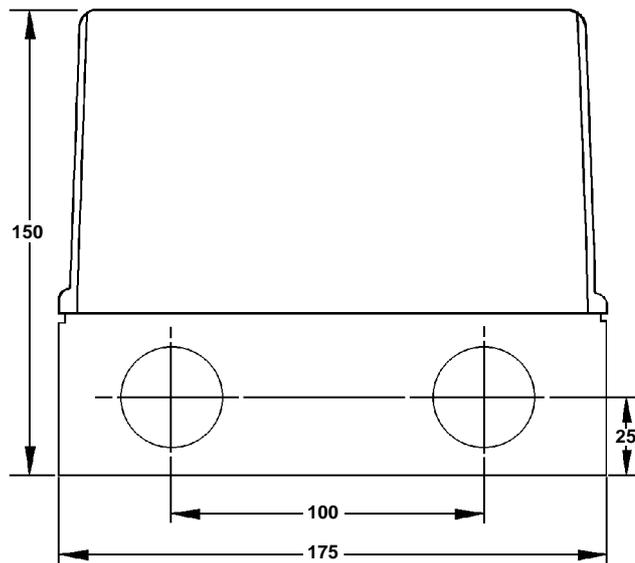
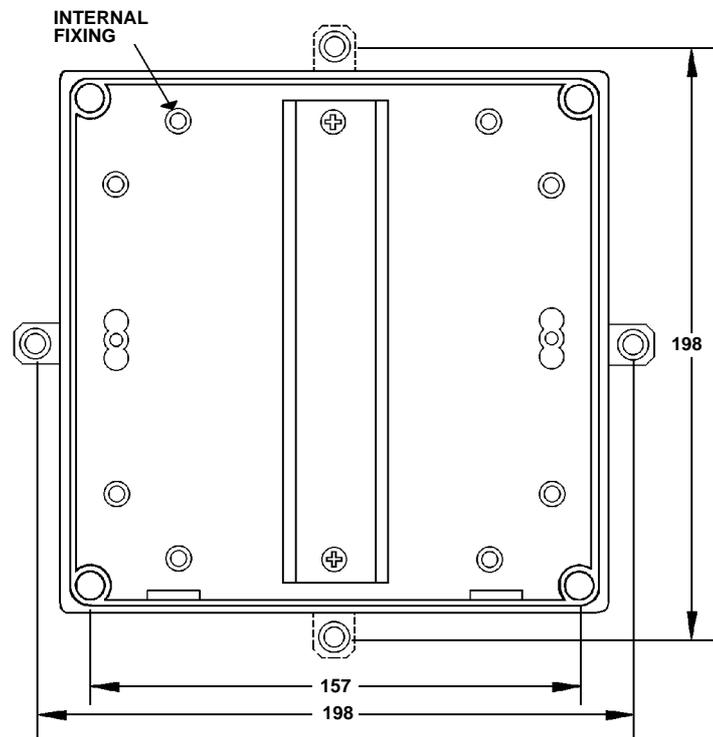
Locate and rectify any insulation faults using the quartering method.

## 8. FINISHING OFF

- a) At the barrier housing(s) and at all devices, ensure that all metal chippings, cable snippets, etc. are cleared away.
- b) Replace all device and barrier housing covers where applicable.
- c) Ensure that copies of the cable routing diagrams and copies of ALL circuit and insulation tests are left in the barrier housing.

MK/jm/an

13<sup>th</sup> January 2003

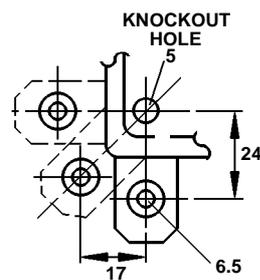
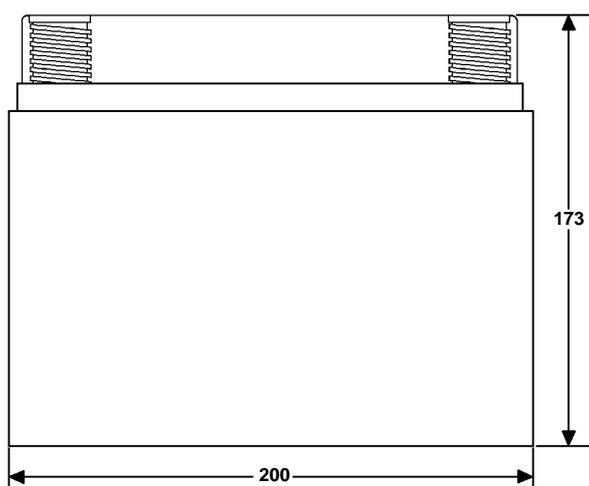
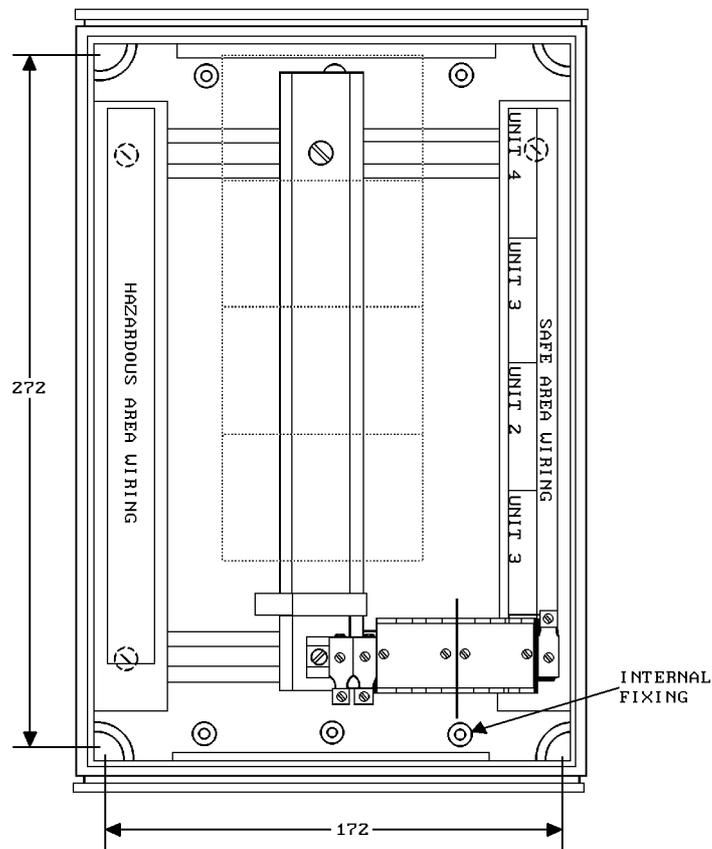


**Fig. 1 Overall and Fixing Dimensions for UC2 4-Way Housing - for I.S. Sounder Driver/EXI800 MX Loop Interface/Galvanic Isolator**

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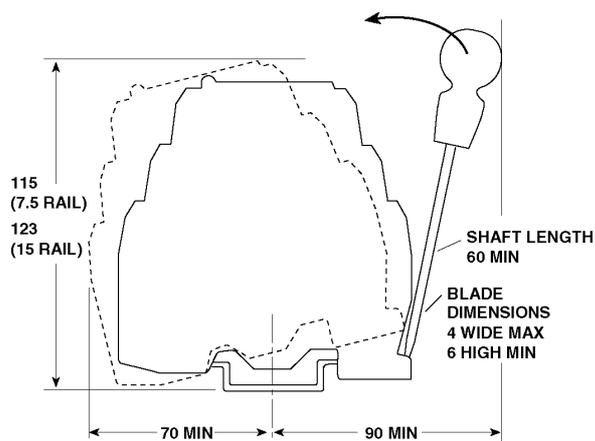
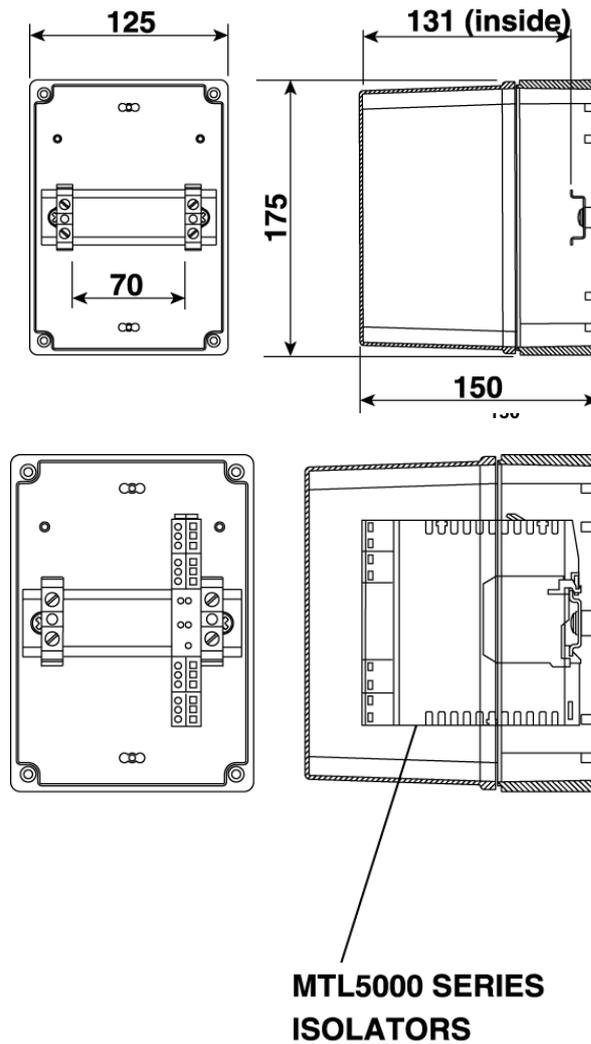
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**NOTE:**

- 1) SCREW ON FIXING LUGS MAY BE POSITIONED AS SHOWN
- 2) ADD 5mm TO DEPTH IF FIXING LUGS USED

**Fig. 2 Overall and Fixing Dimensions for UC4 8-Way Housing- for I.S.Sounder Driver/EXI800 MX Loop Interface/ Galvanic Isolator**



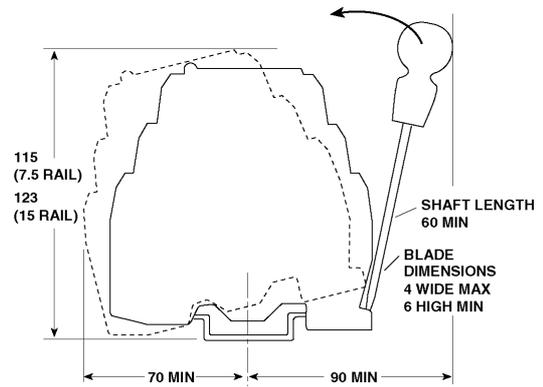
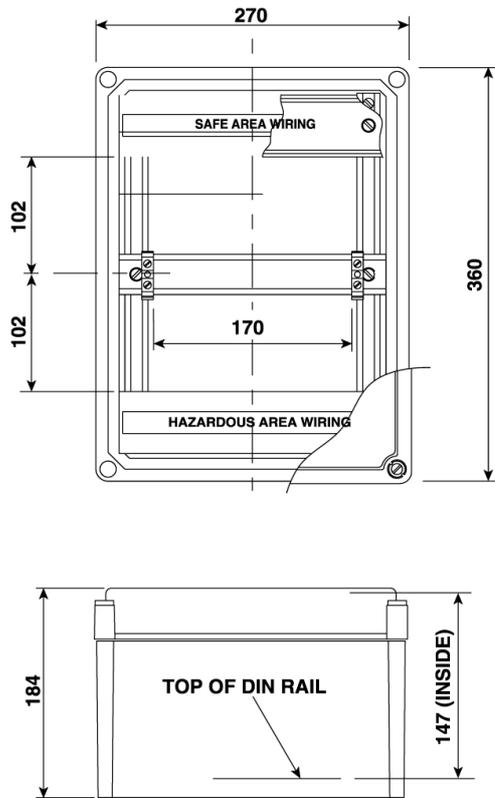
CLEARANCES (MM) FOR FITTING AND REMOVING BARRIERS

**Fig. 3 DX070 Overall Dimensions Showing Mounted MTL5000 modules**

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CLEARANCES (MM) FOR FITTING AND REMOVING BARRIERS

## MTL5000 SERIES ISOLATORS

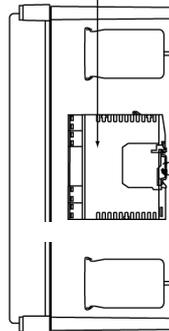
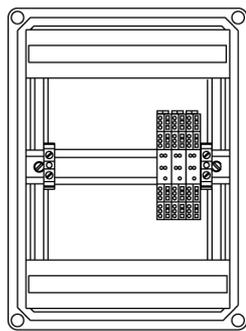


Fig. 4 DX170 Overall Dimensions Showing Mounted MTL5000 modules

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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.

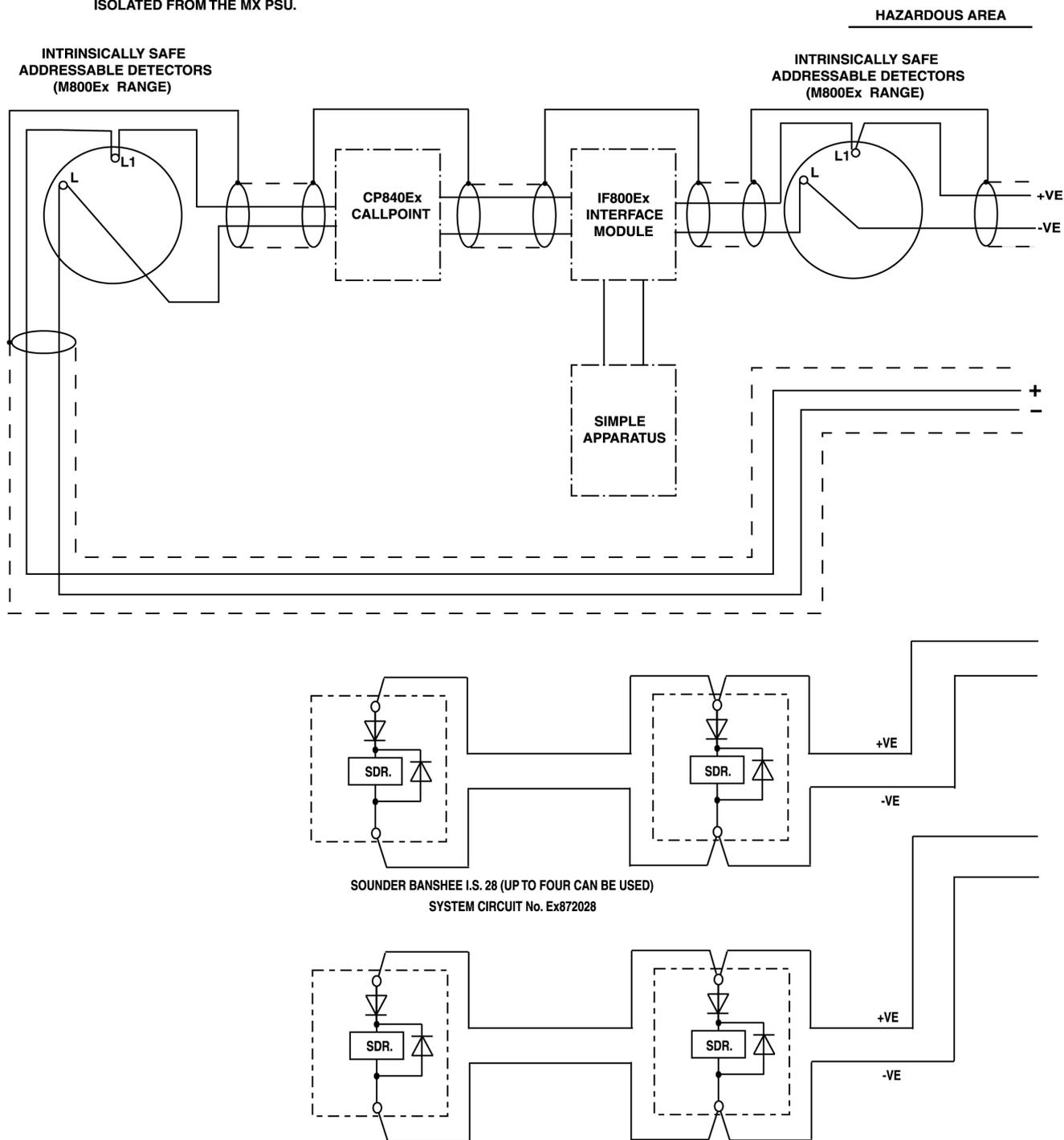


Fig. 5a) I.S. Interconnection Diagram to MX Addressable Fire Detection Systems

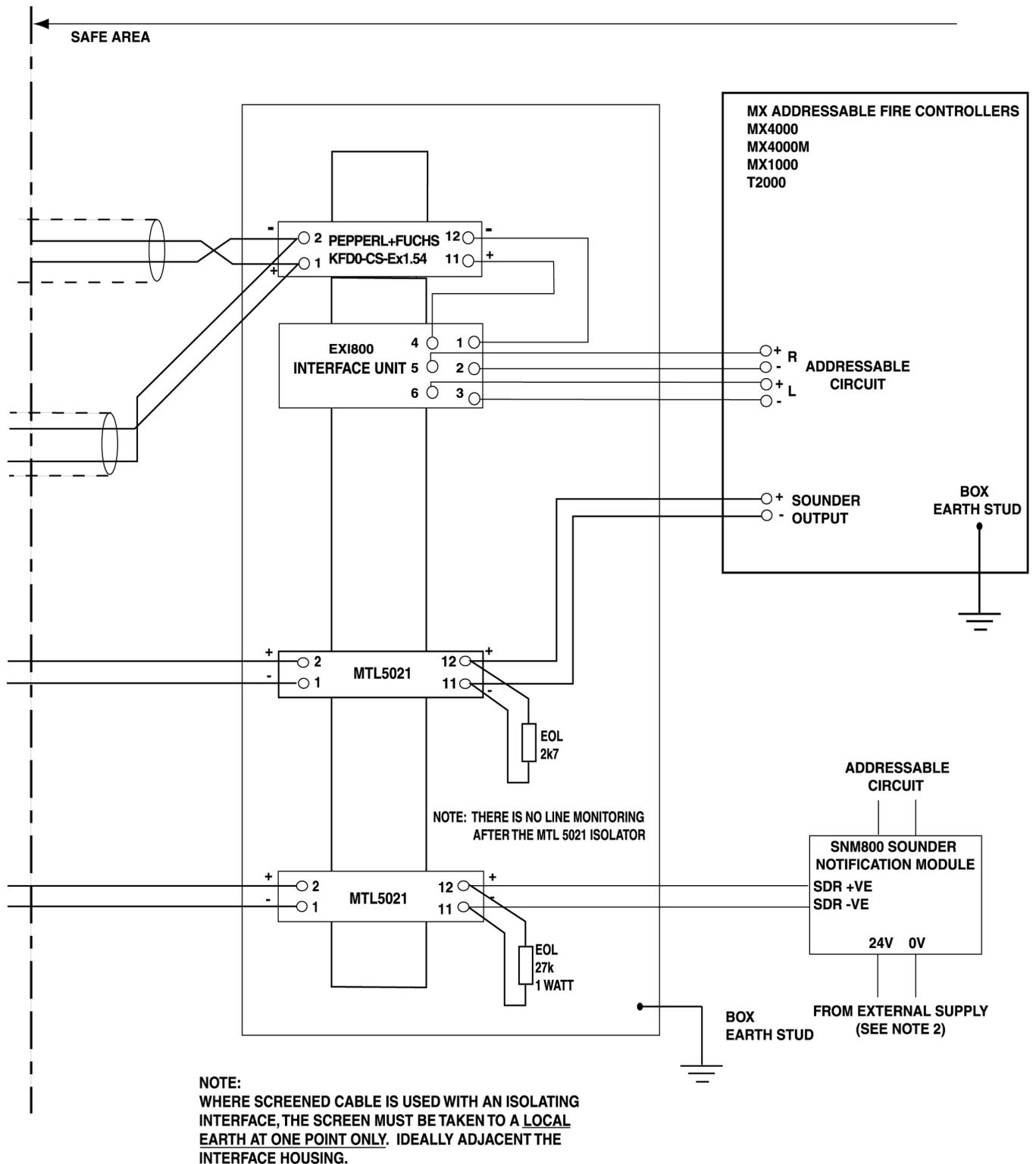
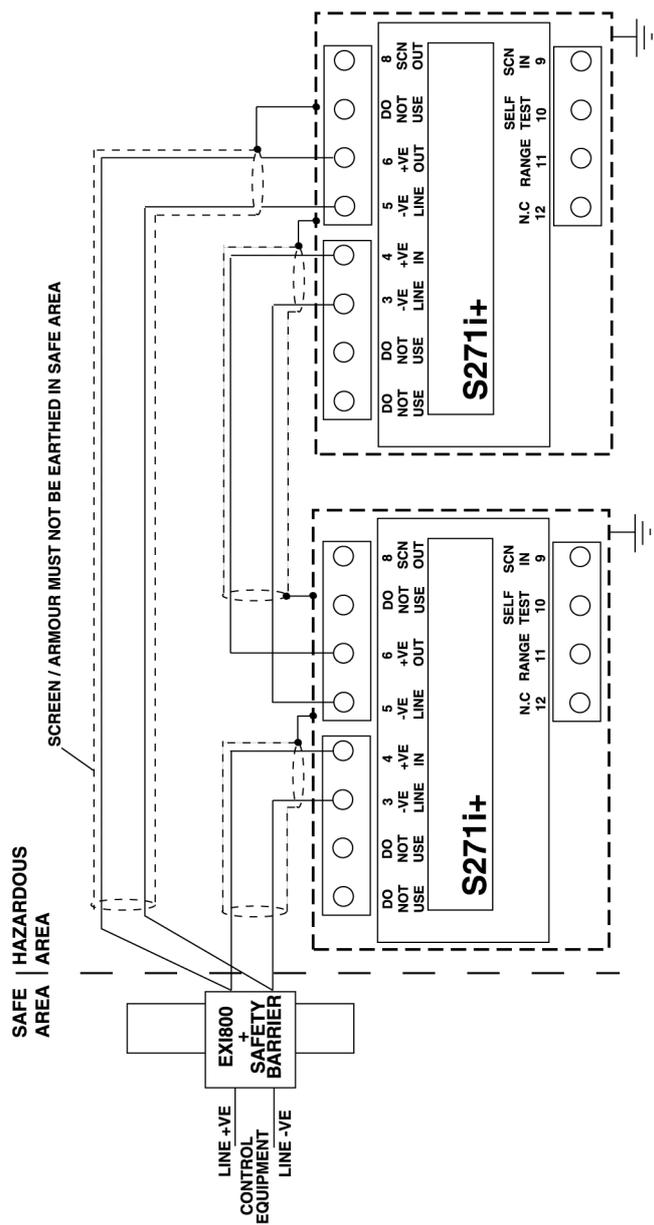


Fig. 5b) I.S. Interconnection Diagram to MX Addressable Fire Detection Systems



**Fig. 6 S271i+ Wiring Diagram for Hazardous Areas**