

IS-mC1 IS-minialert

The IS-mC1 is a compact combined 100dB(A) alarm sounder and L.E.D. beacon - only one Zener barrier or galvanic isolator required to run both sounder & beacon or alternatively the unit can be operated as individual signals.

Approvals include ATEX, IECEx and GOST-R for Zone 0 applications and FM approval for Class I Division 1 and Class I Zone 0 applications.

COMSEC PROTECTION SYSTEMS LTD.
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Part codes:

IS-mC1-R/[x]

ATEX / IECEx / FM

II 1G Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +60°C)

IS Class I, Division 1, Groups A, B, C, D T4

IS Class I, Zone 0, AEx ia IIC T4 Ta = +60°C

GOST-R

OExialICT4 IP65 -40° to +60°C

[x]: Lens colour:

A: Amber B: Blue

G: Green R: Red

C: Clear (white LED)

Combined or Sounder only:

May be powered from any certified Zener barrier or galvanic isolator whose output parameters do not exceed :

Uo: 28vdc

Io: 93mA

Po: 660mW

Beacon only:

May be powered from any certified Zener barrier or galvanic isolator whose output parameters do not exceed :

Uo: 28vdc

Io: 660mA

Po: 1.2W

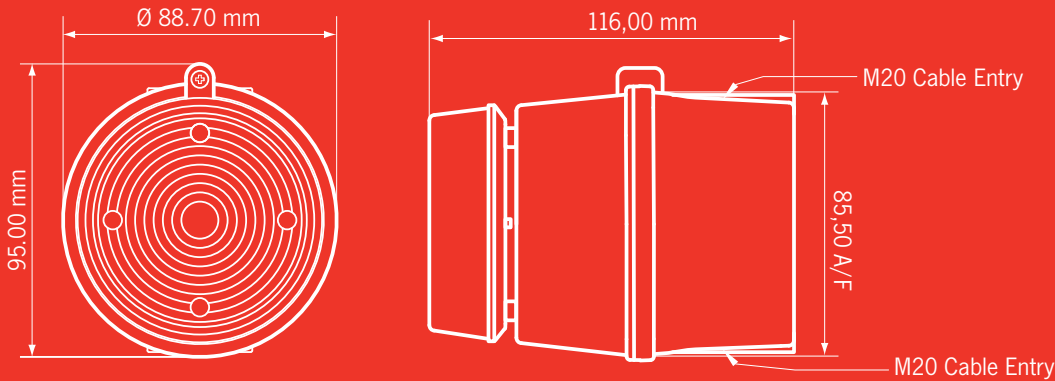
Features:

- Input overload and reverse current protection
- End of line resistor certified
- Auto synchronised sound output
- Prismatic lens optimises L.E.D effectiveness
- Available with custom tone configurations and frequencies

Approvals:

- ATEX certificate: SIRA05ATEX2084X,
EN 60079-0 : 2006, EN 60079-11 : 2007,
EN 60079-26 : 2007
- IECEx certificate: IECEx SIR 06.0045X,
IEC 60079-0 : 2004, IEC 60079-11 : 2006,
IEC 60079-26 : 2006
- FM approved:
Class 3600 1998, Class 3610 1999
Class 3810 2005
- GOST-R certificate: POCC GB.JB05.B02205



**Specification:****Alarm sounder:**

| | |
|------------------|--------------------------------------|
| Nominal output: | 100dB(A) @ 1m +/- 3dB - Tone 2* |
| No. of tones: | 49 (UKOOA/PFEER compliant) |
| No. of stages: | 3 |
| Volume control: | Max. 100dB(A); Min. 90dB(A) - Tone 2 |
| Effective range: | 40m @ 1KHz |

L.E.D. Beacon:

| | |
|-------------------------|-------------------------------------|
| Light source: | Array of 6 high intensity L.E.D.'s. |
| L.E.D. colours: | Red, Amber, Blue, Green & Clear |
| Flash modes: | Double flash at 2Hz and 1Hz |
| Effective intensity cd: | 23cd* |

General:

| | |
|---------------------|---|
| Voltage: | 16-28vdc via Zener barrier or galvanic isolator |
| Combined current: | approx: 30mA typical when powered from 24v supply via 28v 3000hm Zener barrier. |
| Ingress protection: | IP65 |
| Rating: | Continuous |
| Housing material: | UL94V0 & 5VA FR ABS & PC |
| Housing colour: | RAL3000 Red |
| Fixings: | Stainless Steel |
| Cable entries: | 2 x M20 clearance gland knockouts. Custom configurations also available. |
| Terminals: | 0.5 to 2.5mm ² |
| Operating temp: | -40° to +60°C |
| Storage temp: | -40° to +70°C |
| Relative humidity: | 90% at 20°C |

Stage 1 Frequency Description

| Stage 1 | Frequency Description | Stage 2 | Stage 3 |
|---------|--|---------|---------|
| Tone 1 | 340 Hz Continuous | Tone 2 | Tone 5 |
| Tone 2 | 800/1000Hz @ 0.25 sec Alternating - BS5839 Alarm tone | Tone 17 | Tone 5 |
| Tone 3 | 500/1200Hz @ 0.3Hz 0.5 sec Slow Whoop - NEN 2575:2000 | Tone 2 | Tone 5 |
| Tone 4 | 800/1000Hz @ 1Hz Sweeping | Tone 6 | Tone 5 |
| Tone 5 | 2400Hz Continuous | Tone 3 | Tone 20 |
| Tone 6 | 2400/2900Hz @ 7Hz Sweeping | Tone 7 | Tone 5 |
| Tone 7 | 2400/2900Hz @ 1Hz Sweeping | Tone 10 | Tone 5 |
| Tone 8 | 500/1200/500Hz @ 0.3Hz Sweeping | Tone 2 | Tone 5 |
| Tone 9 | 1200/500Hz @ 1Hz - DIN / PFEER P.T.A.P. | Tone 15 | Tone 2 |
| Tone 10 | 2400/2900Hz @ 2Hz Alternating | Tone 7 | Tone 5 |
| Tone 11 | 1000Hz @ 1Hz Intermittent | Tone 2 | Tone 5 |
| Tone 12 | 800/1000Hz @ 0.875Hz Alternating | Tone 4 | Tone 5 |
| Tone 13 | 2400Hz @ 1Hz Intermittent | Tone 15 | Tone 5 |
| Tone 14 | 800Hz 0.25sec on, 1 sec off Intermittent | Tone 4 | Tone 5 |
| Tone 15 | 800Hz Continuous | Tone 2 | Tone 5 |
| Tone 16 | 660Hz 150mS on, 150mS off Intermittent | Tone 18 | Tone 5 |
| Tone 17 | 544Hz (100mS)/440Hz (400mS) - AFNOR NF S 32-001 | Tone 2 | Tone 27 |
| Tone 18 | 660Hz 1.8sec on, 1.8sec off Intermittent | Tone 2 | Tone 5 |
| Tone 19 | 1.4KHz-1.6KHz 1s, 1.6KHz-1.4KHz 0.5s - AFNOR NFC48-265 | Tone 2 | Tone 5 |
| Tone 20 | 660Hz Continuous | Tone 2 | Tone 5 |
| Tone 21 | 554Hz/440Hz @ 1Hz Alternating | Tone 2 | Tone 5 |
| Tone 22 | 544Hz @ 0.875 sec. Intermittent | Tone 2 | Tone 5 |
| Tone 23 | 800Hz @ 2Hz Intermittent | Tone 6 | Tone 5 |
| Tone 24 | 800/1000Hz @ 50Hz Sweeping | Tone 29 | Tone 5 |
| Tone 25 | 2400/2900Hz @ 50Hz Sweeping | Tone 29 | Tone 5 |
| Tone 26 | Bell | Tone 2 | Tone 15 |
| Tone 27 | 554Hz Continuous | Tone 26 | Tone 5 |
| Tone 28 | 440Hz Continuous | Tone 2 | Tone 5 |
| Tone 29 | 800/1000Hz @ 7Hz Sweeping | Tone 7 | Tone 5 |
| Tone 30 | 300Hz Continuous | Tone 2 | Tone 5 |
| Tone 31 | 660/1200Hz @ 1Hz Sweeping | Tone 26 | Tone 5 |
| Tone 32 | Two tone chime. | Tone 26 | Tone 15 |
| Tone 33 | 745Hz @ 1Hz Intermittent | Tone 2 | Tone 5 |
| Tone 34 | 1000 & 2000Hz @ 0.5 sec Alternating - Singapore | Tone 38 | Tone 45 |
| Tone 35 | 420Hz @ 0.625 sec Australian Alert | Tone 36 | Tone 5 |
| Tone 36 | 500-1200Hz 3.75sec /0.25sec. Australian Evac. | Tone 35 | Tone 5 |
| Tone 37 | 1000Hz Continuous - PFEER Toxic Gas | Tone 9 | Tone 45 |
| Tone 38 | 2000Hz Continuous | Tone 34 | Tone 45 |
| Tone 39 | 800Hz 0.25sec on, 1 sec off Intermittent | Tone 23 | Tone 17 |
| Tone 40 | 544Hz (100mS)/440Hz (400mS) - NF S 32-001 | Tone 31 | Tone 17 |
| Tone 41 | Motor Siren - slow rise to 1200 Hz | Tone 2 | Tone 5 |
| Tone 42 | Motor Siren - slow rise to 800 Hz | Tone 2 | Tone 5 |
| Tone 43 | 1200 Hz Continuous | Tone 2 | Tone 5 |
| Tone 44 | Motor Siren - slow rise to 2400 Hz | Tone 2 | Tone 5 |
| Tone 45 | 1KHz 1s on, 1s off Intermittent - PFEER Gen. Alarm | Tone 38 | Tone 34 |
| Tone 46 | 1200/500Hz @ 1Hz - DIN / PFEER P.T.A.P. | Tone 47 | Tone 37 |
| Tone 47 | 1KHz 1s on, 1s off Intermittent - PFEER Gen. Alarm | Tone 46 | Tone 37 |
| Tone 48 | 420Hz @ 0.625 sec Australian Alert | Tone 49 | Tone 5 |
| Tone 49 | 500-1200Hz 3.75sec /0.25sec. Australian Evac. | Tone 26 | Tone 37 |

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The IS-mC1 combined unit is CE marked for compliance with the European Explosive Atmospheres Directive 94/9/EC and the European EMC Directive 89/336/EEC

1) Introduction

The IS-mC1 minialert is an ATEX and IECEx certified intrinsically safe combined sounder/beacon unit which produces both a loud audio warning and a visual warning and can be installed in a hazardous area. The sounder section has forty-nine first stage alarm sounds that can be selected by internal switches and each one can be externally changed to a second or third stage alarm sound. The beacon section can be set internally for a flash rate of either 1Hz or 2Hz. The combined unit sounder and beacon can be operated simultaneously from one barrier or from separate barriers if independent operation is required. The IS-mC1 Combined Unit can be used in all gas groups IIA IIB and IIC.

2) Description

Fig 1 shows a simplified block diagram of an IS-mC1 minialert sounder section. The device operates immediately power is applied to the sounder + and – terminals which are duplicated to allow a second sounder to be connected in parallel, or for an end of line monitoring resistor to be installed. The output tone is defined by the positions of the six internal switches and this tone can be changed to a second or third stage alarm tone by connecting terminals S2 or S3 to 0V. The tone generator is crystal controlled to ensure that when two sounders connected to the same power supply are started at the same time the output tones remain synchronised.

3) Supply Voltage

The IS-mC1 minialert unit has been designed to operate in a hazardous area from a 24V dc supply via 28V 93mA resistive ATEX and IECEx certified Zener Barriers or Galvanic Isolators. The unit may be tested or used in safe areas without a Zener Barrier or Galvanic Isolator, but at supply voltages above 16V the internal current limit will function and therefore it is recommended that they are not operated continuously with a direct supply greater than 16V.

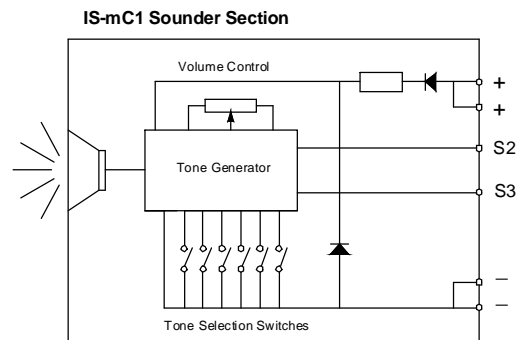



Fig 1 Simplified block diagram

4) Intrinsic Safety Certification

4.1 ATEX certificate

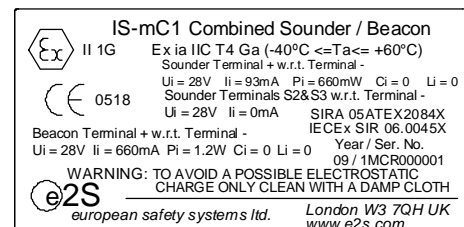
The IS-mC1 combined minialert unit complies with the following standards:-

- EN60079-0:2006
- EN60079-11:2007
- EN60079-26:2007
- IEC60079-0:2007 (used for guidance in respect of marking)

 II 1G Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +60°C)

The EC-Type Examination Certificate SIRA 05ATEX2084X has been issued by the Notified Body Sira. This confirms compliance with the European ATEX Directive 94/9/EC for Group II, Category 1G equipment. The sounder carries the Community Mark and subject to local codes of practice, may be installed in any of the EEA member countries. This instruction sheet describes installations which conform to EN60079:Part14:2008 Electrical Installation in Hazardous Areas. When designing systems for installation outside the UK, the local Code of Practice should be consulted.

- 1) The certification marking is as follows:



- 2) The equipment may be used in zones 0, 1 and 2 with flammable gases and vapours with apparatus groups IIA, IIB & IIC and with temperature classes T1, T2, T3 and T4.
- 3) The equipment is only certified for use in ambient temperatures in the range -40°C to +60°C and should not be used outside this range.
- 4) The certificate number has an 'X' suffix, which indicates that the certificate contains one of more

special conditions for safe use. Those installing or inspecting the equipment should refer to this section of the certificate.

- 5) The equipment has not been assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).
- 6) Installation of this equipment shall be carried out by suitably-trained personnel in accordance with the applicable code of practice.
- 7) Repair of this equipment shall only be carried out by the manufacturer or in accordance with the applicable code of practice.
- 8) The certification of this equipment relies on the following materials used in its construction:

Enclosure: ABS Plastic
Lens: Polycarbonate

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

“Aggressive substances” - e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

“Suitable precautions” - e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

SPECIAL CONDITIONS FOR SAFE USE (as stated in the EC Type Examination Certificate SIRA 05ATEX2084X)

Conditions for IS-mCI Combined Sounder / Beacon

The equipment has an ingress protection rating of IP65. However, if it has been supplied without cable entry devices, then the user shall ensure that the devices that are fitted will provide an ingress protection that is appropriate to the environment in which it is installed i.e. IP20 or better. If only one of the two cable entries are used, then the unused entry 'knockout' shall be left intact or fitted with a blanking device that ensures ingress protection appropriate to the environment in which it is installed i.e. IP20 or better.

The total capacitance connected to sounder terminals + wrt - (i.e. the capacitance of the cable plus any other capacitance) shall not exceed 83nF.

The enclosure is non-conducting and may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions that might cause a build-up of electrostatic charges on non-conducting surfaces, additionally, cleaning of the equipment should be done only with a damp cloth.

The equipment shall only be supplied via Sounder Terminals + w.r.t. Sounder Terminals - from a barrier having a maximum open circuit voltage U_0 that is $\leq 28V$ and a maximum short circuit current I_0 that is $\leq 93mA$, where I_0 is resistively limited. The barrier shall be ATEX certified by a notified body.

If not already fitted optional internal wiring connections between Sounder Terminals + / - and Beacon Terminals + / - may be fitted by the user. The wiring used for such connections shall have a minimum radial thickness of insulation of 0.5mm.

4.2 Zones, Gas Groups and Temperature Classification

The IS-mCI minialert unit has been certified Ex ia IIC T4 Ga. When connected to an approved system it may be installed in:

| | |
|--------|---|
| Zone 0 | explosive gas air mixture continuously present. |
| Zone 1 | explosive gas air mixture likely to occur in normal operation. |
| Zone 2 | explosive gas air mixture not likely to occur, and if it does, it will only exist for a short time. |

Be used with gases in groups:

| | |
|---------|----------|
| Group A | propane |
| Group B | ethylene |
| Group C | hydrogen |

Having a temperature classification of:

| | |
|----|-------|
| T1 | 450°C |
| T2 | 300°C |
| T3 | 200°C |
| T4 | 135°C |

4.3 Sounder + and - Terminals

Power is supplied to the sounder section via the sounder input terminals + and - on the sounder PCB (see Fig 2) and the terminals have the following input safety parameters:

| | | |
|-------|---|-------|
| U_i | = | 28V |
| I_i | = | 93mA |
| P_i | = | 660mW |

$$C_i = 0 \quad L_i = 0$$

The IS-mCI combined sounder section may be powered from an ATEX certified Zener barrier or galvanic isolator which have output parameters equal to or less than 28V, 93mA and 660mW, where I_0 is resistively limited. The cable parameters stated on the selected Zener barrier or galvanic isolator certificate must be observed.

4.4 Sounder S2 and S3 Terminals

When terminals S2 or S3 are connected to 0V (- terminal) the sounder output tone changes to the second or third stage alarm respectively. The input safety parameters for these terminals are:

| | | |
|-------|---|-----|
| U_i | = | 28V |
| I_i | = | 0mA |

Because the permitted input current is zero, these terminals may only be connected to a diode return barrier, an intrinsically safe relay or a galvanic isolator, all of which must have been certified by an EC Notified Body. Only diode return barriers with a voltage drop of less than 0.9V may be used. Alternatively, these terminals may be connected directly to a mechanically activated switch within the hazardous area.

4.5 Beacon + and - Terminals

Power is supplied to the beacon section via the beacon input terminals + and - on the beacon PCB (see Fig 2) and the terminals have the following input safety parameters:

$$\begin{aligned} U_i &= 28V \\ I_i &= 660mA \\ P_i &= 1.2W \\ C_i &= 0 \quad L_i = 0 \end{aligned}$$

The IS-mC1 combined beacon section may be powered from any 28V, 660mA 1.2W ATEX certified Zener barrier or galvanic isolator. The cable parameters stated on the selected Zener barrier or galvanic isolator certificate must be observed.

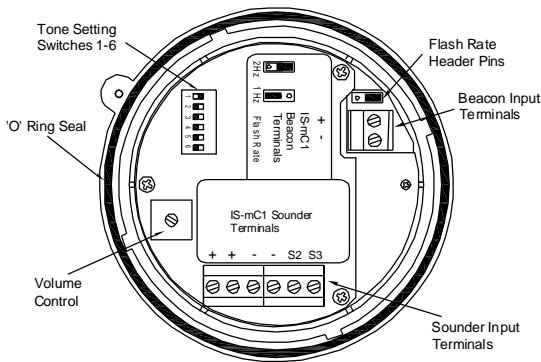


Fig 2 Location of field terminals and controls.

4.6 Other intrinsic safety certifications

Please contact European Safety Systems Ltd. for details of non-European intrinsic safety approvals.

5) Installation

The IS-mC1 minialert combined unit should only be installed by trained competent personnel.

5.1 Mounting

The IS-mC1 minialert combined unit may be secured to any flat surface by inserting two mounting screws through the back of the round base (see figure 3). The enclosure provides IP65 protection and is suitable for installation in exterior locations provided that the area around the two mounting screws through the back of the base moulding has been sealed and that suitable cable glands with the required IP rating have been used.

5.2 Installation procedure

- Unscrew the combined unit security screw and remove the sounder/beacon section from the base by turning it anti-clockwise. Ensure that the 'O' ring seal remains in place.
- Remove the required 20mm knockout section(s) depending on system wiring and mount the base to a flat surface by inserting two screws through the back of the base.
- Fit the required number of 20mm cable glands or conduit entries into the base and connect the field wiring to the appropriate sounder terminals as shown in section 6 and fig 2 of this manual. The power supply terminals + and - are duplicated so that sounders may

be connected in parallel, or an end of line monitoring resistor may be fitted.

- Select the required sounder output tone by positioning the six switches as shown in Table 1 and Fig 2.
- Apply power to the sounder and adjust the internal volume control to provide the required sound level.
- Check that the 'O' ring seal is correctly located on the sounder/beacon section (see Fig. 2) and insert the sounder/beacon section into the base. Push it fully home and turn it clockwise to align the mouldings before tightening the security screw.

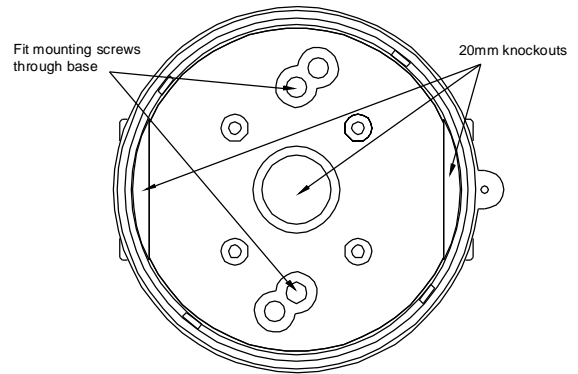


Fig 3 Mounting Combined Unit Base.

6) Electrical System Design For Installation In Hazardous Areas Using Zener Barriers

6.1 Sounder single stage alarm

If the control switch is in the positive supply, or the power supply is being turned on and off, only a single channel Zener barrier is required as shown in Fig 4. This circuit may also be used if the sounder is being controlled by a mechanically activated switch on the hazardous area side of the barrier.

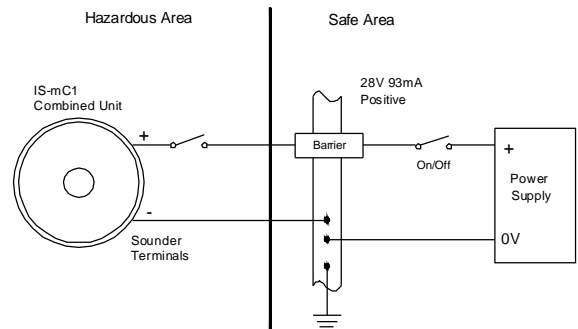


Fig 4 Sounder single stage alarm using single channel barrier.

If the control switch must be in the negative supply, the circuit shown in Fig 5 may be used. Any diode return barrier certified Ex ia by a EC Notified Body may be used, providing its voltage drop is less than 0.9V.

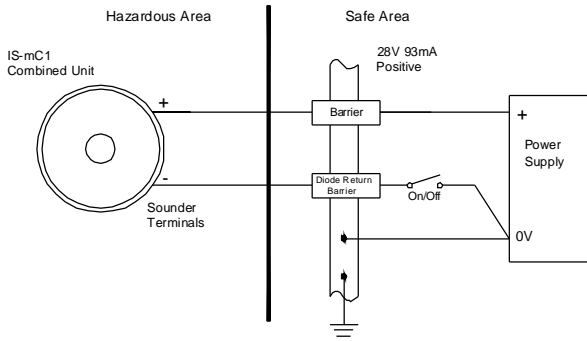


Fig 5 Sounder single stage alarm using two channel barrier.

6.2 Sounder multi-stage alarm

Connecting terminal S2 to 0V activates the second stage alarm, and similarly terminal S3 for the third stage alarm. Fig 6 shows how the diode return barriers may be used. If only two stages of alarm are required the third stage barrier should be omitted, the 28V 93mA barrier and the single diode return channel may then be contained in one package.

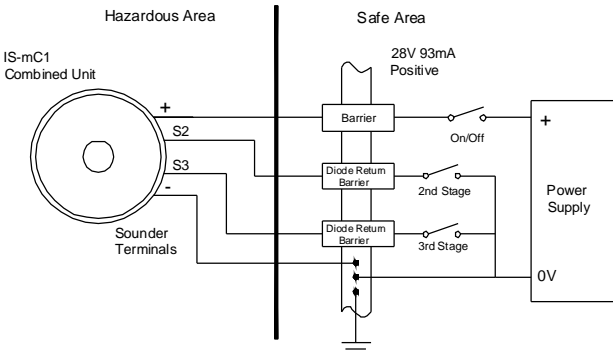


Fig 6 Sounder multi stage alarm using Zener barriers.

6.3 Beacon operation

The beacon can be operated from the same Zener barrier being used to power the sounder (see Fig 7) or from a separate barrier if the sounder and beacon need to operate independently (see Fig 8). A Diode return barrier can be used if the sounder second and third stage tones are required.

NOTE: If the beacon is operated from the same barrier as the sounder then the sounder and beacon boards must be connected together as shown in Fig 7 using connecting wires that have a minimum radial thickness of insulation of 0.5mm. Also the barrier used must meet the requirements for the sounder section (see section 4.3).

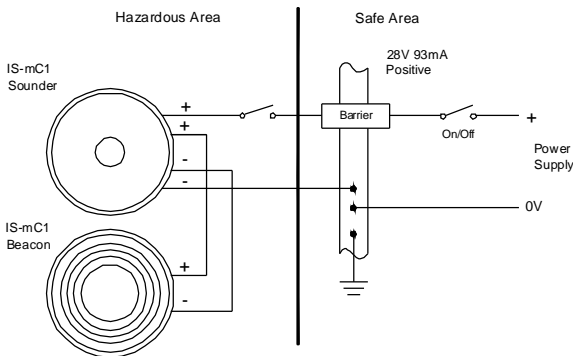


Fig 7 Combined Unit wired for simultaneous operation using one Zener barrier.

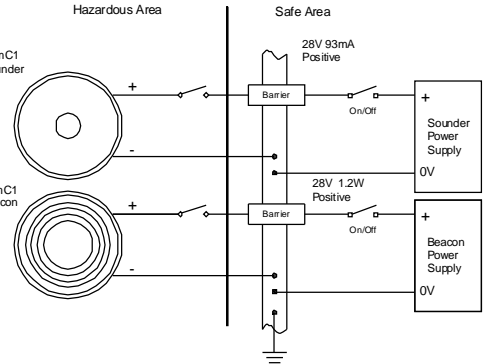


Fig 8 Combined Unit wired for independent operation using separate Zener barriers.

7) Electrical System Design For Installation In Hazardous Areas Using Galvanic Isolators

Galvanic isolators do not require a high integrity earth connection. For small systems where a high integrity earth is not already available, the use of galvanic isolators often reduces the overall installation cost and simplifies design.

7.1 Sounder single stage alarm

The IS-mC1 minialert combined unit may be powered by any galvanic isolator having output parameters within the limits specified in section 4.3, which has been certified Ex ia by an EC Notified Body. The combined unit may be controlled by turning the galvanic isolator on and off, or by a mechanically activated switch on the hazardous area side of the isolator.

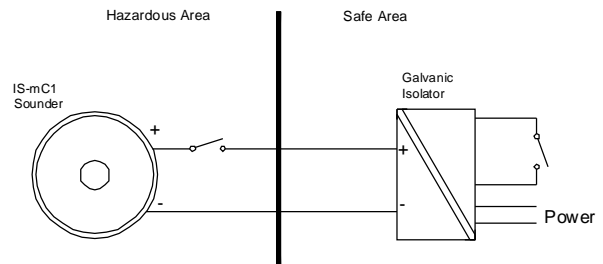


Fig 9 Sounder single stage alarm using galvanic isolator.

6.2 Beacon operation

The beacon can be operated from the same isolator being used to power the sounder (see Fig 10) or from a separate isolator if the sounder and beacon need to operate independently (see Fig 11).

NOTE: If the beacon is operated from the same isolator as the sounder then the sounder and beacon boards must be connected together as shown in Fig 11 using connecting wires that have a minimum radial thickness of insulation of 0.5mm. Also the isolator used must meet the requirements for the sounder section (see section 4.3).

Tone Selection – To select the required first stage tone set the tone switches 1 to 6 (see Fig 2) to the tone setting shown in the table below. The table also shows which 2nd and 3rd stage tones are available for use with the selected first stage tone if more than one tone output stage is required.

| Tone Number | Tone Description | Switch Settings | Second Stage Alarm | Third Stage alarm |
|-------------|--|-----------------|--------------------|-------------------|
| | | 1 2 3 4 5 6 | | |
| Tone 1 | Continuous 340Hz | 0 0 0 0 0 | Tone 2 | Tone 5 |
| Tone 2 | Alternating 800/1000Hz @ 0.25s intervals | 1 0 0 0 0 | Tone 17 | Tone 5 |
| Tone 3 | Slow whoop 500/1200Hz @ 0.3Hz with 0.5s gap repeated | 0 1 0 0 0 | Tone 2 | Tone 5 |
| Tone 4 | Sweeping 500/1000Hz @ 1Hz | 1 1 0 0 0 | Tone 6 | Tone 5 |
| Tone 5 | Continuous 2400Hz | 0 0 1 0 0 | Tone 3 | Tone 20 |
| Tone 6 | Sweeping 2400/2900Hz @ 7Hz | 1 0 1 0 0 | Tone 7 | Tone 5 |
| Tone 7 | Sweeping 2400/2900Hz @ 1Hz | 0 1 1 0 0 | Tone 10 | Tone 5 |
| Tone 8 | Siren 500/1200/500Hz @ 0.3Hz | 1 1 1 0 0 | Tone 2 | Tone 5 |
| Tone 9 | Sawtooth 1200/500Hz @ 1Hz - <i>D.I.N.</i> | 0 0 0 1 0 | Tone 15 | Tone 2 |
| Tone 10 | Alternating 2400/2900Hz @ 2Hz | 1 0 0 1 0 | Tone 7 | Tone 5 |
| Tone 11 | Intermittent 1000Hz @ 1Hz | 0 1 0 1 0 | Tone 2 | Tone 5 |
| Tone 12 | Alternating 800/1000Hz @ 0.875Hz | 1 1 0 1 0 | Tone 4 | Tone 5 |
| Tone 13 | Intermittent 2400Hz @ 1Hz | 0 0 1 1 0 | Tone 15 | Tone 5 |
| Tone 14 | Intermittent 800Hz 0.25s ON, 1s OFF | 1 0 1 1 0 | Tone 4 | Tone 5 |
| Tone 15 | Continuous 800Hz | 0 1 1 1 0 | Tone 2 | Tone 5 |
| Tone 16 | Intermittent 660Hz 150Ns ON, 150ms OFF | 1 1 1 1 0 | Tone 18 | Tone 5 |
| Tone 17 | Alternating 544Hz (100ms) / 440Hz (400ms) – <i>NFS 32-001</i> | 0 0 0 0 1 | Tone 2 | Tone 27 |
| Tone 18 | Intermittent 660Hz 1.8s ON, 1.8s OFF | 1 0 0 0 1 | Tone 2 | Tone 5 |
| Tone 19 | Sweep 1400Hz to 1600Hz up 1s 1600Hz to 1400Hz down 0.5s | 0 1 0 0 1 | Tone 2 | Tone 5 |
| Tone 20 | Continuous 660Hz | 1 1 0 0 1 | Tone 2 | Tone 5 |
| Tone 21 | Alternating 554/440Hz @ 1Hz | 0 0 1 0 1 | Tone 2 | Tone 5 |
| Tone 22 | Intermittent 544Hz @ 0.875Hz | 1 0 1 0 1 | Tone 2 | Tone 5 |
| Tone 23 | Intermittent 800Hz @ 2Hz | 0 1 1 0 1 | Tone 6 | Tone 5 |
| Tone 24 | Sweeping 800/1000Hz @ 50Hz | 1 1 1 0 1 | Tone 29 | Tone 5 |
| Tone 25 | Sweeping 2400/2900Hz @ 50Hz | 0 0 0 1 1 | Tone 29 | Tone 5 |
| Tone 26 | Simulated bell | 1 0 0 1 1 | Tone 2 | Tone 15 |
| Tone 27 | Continuous 554Hz | 0 1 0 1 1 | Tone 26 | Tone 5 |
| Tone 28 | Continuous 440Hz | 1 1 0 1 1 | Tone 2 | Tone 5 |
| Tone 29 | Sweeping 800/1000Hz @ 7Hz | 0 0 1 1 1 | Tone 7 | Tone 5 |
| Tone 30 | Continuous 300Hz | 1 0 1 1 1 | Tone 2 | Tone 5 |
| Tone 31 | Sweeping 660/1200 @ 1Hz | 0 1 1 1 1 | Tone 26 | Tone 5 |
| Tone 32 | Two Tone Chime | 1 1 1 1 1 | Tone 26 | Tone 15 |
| Tone 33 | Intermittent 745Hz | 0 0 0 0 1 | Tone 2 | Tone 5 |
| Tone 34 | Alternating 1000/2000Hz @ 0.5s – <i>Singapore</i> | 1 0 0 0 1 | Tone 38 | Tone 45 |
| Tone 35 | 420Hz @ 0.625s - <i>Australian Alert</i> | 0 1 0 0 1 | Tone 36 | Tone 5 |
| Tone 36 | 500-1200Hz 3.75s / 0.25s - <i>Australian Evacuate</i> | 1 1 0 0 1 | Tone 35 | Tone 5 |
| Tone 37 | Continuous 1000Hz | 0 0 1 0 1 | Tone 9 | Tone 45 |
| Tone 38 | Continuous 2000Hz | 1 0 1 0 1 | Tone 34 | Tone 45 |
| Tone 39 | Intermittent 800Hz 0.25s ON 1s OFF | 0 1 1 0 1 | Tone 23 | Tone 17 |
| Tone 40 | Alternating 544Hz (100ms) / 440Hz (400ms) – <i>NFS 32-001</i> | 1 1 1 0 1 | Tone 31 | Tone 27 |
| Tone 41 | Motor Siren – Slow rise to 1200Hz | 0 0 0 1 0 | Tone 2 | Tone 5 |
| Tone 42 | Motor Siren – Slow rise to 800Hz | 1 0 0 1 0 | Tone 2 | Tone 5 |
| Tone 43 | Continuous 1200Hz | 0 1 0 1 0 | Tone 2 | Tone 5 |
| Tone 44 | Motor Siren – Slow rise to 2400Hz | 1 1 0 1 0 | Tone 2 | Tone 5 |
| Tone 45 | Intermittent 1000Hz 1s ON, 1s OFF | 0 0 1 1 0 | Tone 38 | Tone 34 |
| Tone 46 | Sawtooth 1200/500Hz @ 1Hz - <i>D.I.N. (PFEER P.T.A.P)</i> | 1 0 1 1 0 | Tone 47 | Tone 37 |
| Tone 47 | Intermittent 1000Hz 1s ON, 1s OFF – <i>PFEER General Alarm</i> | 0 1 1 1 0 | Tone 46 | Tone 37 |
| Tone 48 | 420Hz @ 0.625s - <i>Australian Alert</i> | 1 1 1 1 0 | Tone 49 | Tone 5 |
| Tone 49 | 500-1200Hz 3.75s / 0.25s - <i>Australian Evacuate</i> | 0 0 0 1 1 | Tone 26 | Tone 37 |

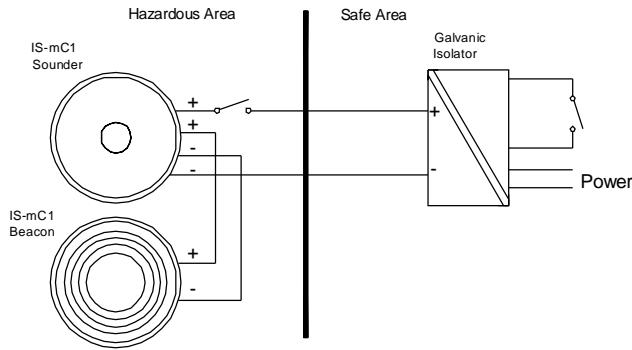


Fig 10 Combined Unit wired for simultaneous operation using one isolator.

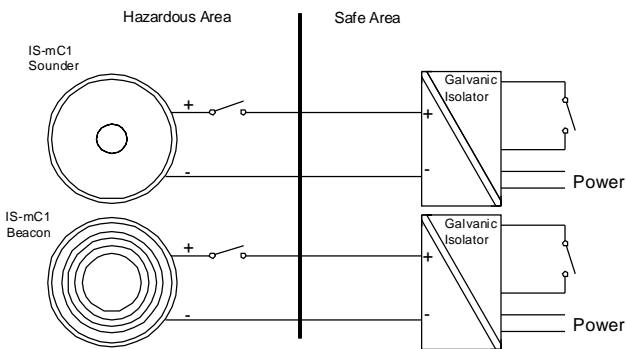


Fig 11 Combined Unit wired for independent operation using separate isolators

11) Guarantee

Sounders that fail within the guarantee period should be returned to European safety Systems Ltd. It is helpful if a brief description of the fault symptoms is provided.

12) Customer Comments

European Safety Systems Ltd. is always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.

8) Cable Parameters

The maximum permitted cable parameters are as specified on the certificate of the Zener barrier or galvanic isolator that has been selected for the installation. Normally the limits are not restrictive, but care should be taken not to exceed a capacitive limit of 83nF for installations when very long cables are used.

9) Volume Control

The output level of the IS-mC1 Combined Sounder / Beacon can be set by adjusting the volume control potentiometer (see Fig 2).

10) Maintenance

The sounder should be regularly inspected to ensure that it has not been damaged. Frequency of inspection depends upon environmental conditions, but initially we recommend that this should be done annually.

No attempt should be made to repair a faulty ISmA1 sounder. Suspect sounders must be returned to European Safety Systems Ltd. or to your local agent for repair.

IECEX Approval

The IS-mC1 Combined Sounder / Beacon has also been approved to the IECEx scheme.

The installation requirements for IS-mC1 combined sounder / beacon approved to the IECEx scheme are the same as the installation requirements for IS-mC1 combined sounder / beacon approved to the ATEX directive.

Certificate No. IECEx SIR 06.0045X

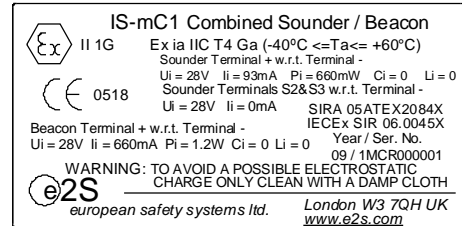
Marking: Ex ia IIC T4 Ga (Ta = -40°C to +60°C)

Standards: IEC 60079-0:2004 Edition 4
IEC 60079-11:2006 Edition 5
IEC 60079-26:2006 Edition 2

CONDITIONS OF CERTIFICATION (as stated on the IECEx Certificate of Conformity IECEx SIR 06.0045X)

- The equipment has an ingress protection rating of IP65. However, if it has been supplied without a cable entry device, then the user shall ensure that the devices that are fitted will provide an ingress protection that is appropriate to the environment in which it is installed i.e. IP20 or better. If only one of the two cable entries are used, then the unused entry 'knockout' shall be left intact or fitted with a blanking device that ensures ingress protection appropriate to the environment in which it is installed i.e. IP20 or better.
- The total capacitance connected to Sounder Terminals + w.r.t. Terminals - (i.e. the capacitance of the cable plus any other capacitance) shall not exceed 83nF.
- The enclosure is non-conducting and may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions that might cause a build-up of electrostatic charges on non-conducting surfaces, additionally, cleaning of the equipment should be done only with a damp cloth.
- The equipment shall only be supplied via Sounder Terminal + w.r.t. Sounder Terminal - from a barrier having a maximum open circuit voltage U_0 that is $\leq 28V$ and a maximum short circuit current I_0 that is $\leq 93mA$, where I_0 is resistively limited.
- If not already fitted optional internal wiring connections between Sounder Terminals + / - and Beacon Terminals + / - may be fitted by the user. The wiring used for such connections shall have a minimum radial thickness of insulation of 0.5mm.

The IS-mC1 combined sounder / beacon is marked with the certification requirements for the ATEX and IECEx and approvals.



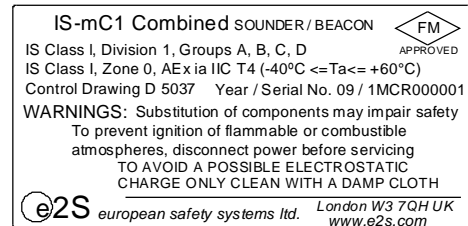
FM Approval

The IS-mC1 Combined Sounder / Beacon has also been FM Listed.

Marking: IS Class I, Zone 0, AEx ia IIC T4

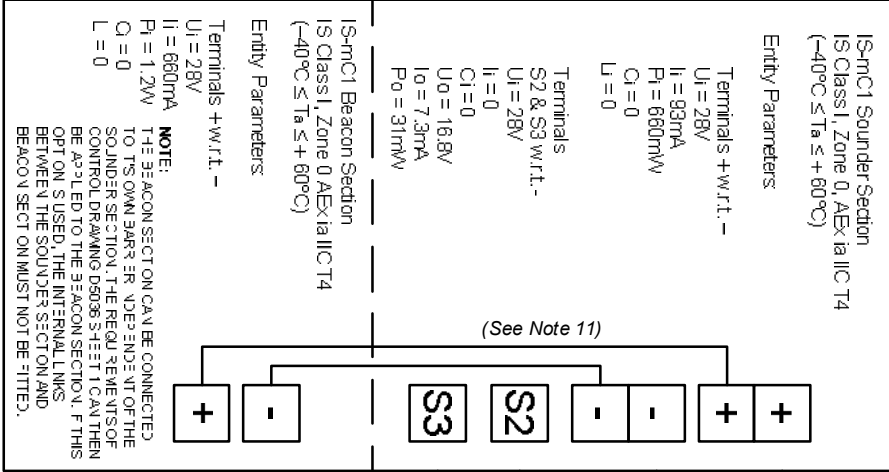
IS Class I, Division 1, Groups A, B, C, D

See the Control Drawings D 5037 Sheets 1 and 2 for installation details and entity parameters.



Hazardous (Classified) Location
Class I, Division 1, Groups A, B, C, D
Class I, Zone 0, Groups IIA, IIB, IIC

Unclassified Location



Associated Apparatus - Shunt Zener Diode Barrier with Entity Parameters:
 $U_o \leq 28V$
 $I_o \leq 93mA$
 $P_o \leq 660mW$
 $C_o \geq \text{Cable (see note 10)}$
 $L_o \geq \text{Cable}$

Associated Apparatus - Diode Return Barrier with Entity Parameters:
 $U_o \leq 28V$
 $I_o = 0$
 $C_o \geq \text{Cable}$

Associated Apparatus - Diode Return Barrier with Entity Parameters:
 $U_o \leq 28V$
 $I_o = 0$
 $C_o \geq \text{Cable}$

1. No revision to drawing with out prior FM approval.
2. The associated apparatus must be FM approved.
3. The associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
4. Installation should be in accordance with ANS/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
5. The resistance between the intrinsically safe ground and the earth ground must be less than 1 ohm.
6. The Shunt Zener Diode Barrier must be a FM approved, resistively limited, single channel barrier having parameters less than, or equal to, those quoted, and for which the output is non-ignition capable for the Class, Division or Zone and Group of use.
7. The IS-mC1 Combined Unit enclosure has an ingress protection rating of IP 65. If supplied without cable entry devices then metallic or plastic cable glands, or conduit hubs, shall be fitted that provide the required environmental protection.
8. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
9. Substitution of components may impair safety.
10. The total capacitance connected to terminals +4- of the sounder, i.e. Cable plus any other capacitance, shall not exceed 83nF.
11. If the sounder and beacon +4- supply terminals are connected internally then the wiring used for such a connection shall have a minimum radial thickness of insulation of 0.5mm.

Notes:
CAUTION - Bonding between conduit connections is not automatic and must be provided as part of this installation.
CAUTION - The clearance between sounder terminals S2 and S3 is less than 6mm.

SCHEDULE DRAWING
No modification permitted without reference to the "Modified Body"

| | | | | | | | |
|--------|---|-----|----------|--------|-----|-------|----------|
| Issue: | A | MRS | 10-01-07 | Drawn: | MRS | Date: | 21-04-06 |
| Appd. | | | | | | | |

Title
IS-mC1 Combined SOUNDER/BEACON
Control Drawing for shunt zener
diode barrier / diode return barrier.

Drawing No.
D 5037 Sheet 1 of 2

European Safety Systems Ltd.
Impress House
Marshall Road
Acton
London W9 7QH
Computer Ref: 35037a.dwg

Hazardous (Classified) Location
Class I, Division 1, Groups A, B, C, D
Class I, Zone 0, Groups IIA, IIB, IIC

Unclassified Location

IS-mC1 Sounder Section
IS Class I, Zone 0, AEx ia IIC T4
(-40°C ≤ Ta ≤ +60°C)

Entity Parameters:

Terminals + w.r.t. -

U_f = 28V
I_f = 93mA
P_f = 660mW
C_f = 0
L = 0

Terminals

S2 & S3 w.r.t. -

U_f = 28V
I_f = 0
C_f = 0
U₀ = 16.8V
I₀ = 7.3mA
P₀ = 31mW

IS-mC1 Beacon Section
IS Class I, Zone 0 AEx ia IIC T4
(-40°C ≤ Ta ≤ +60°C)

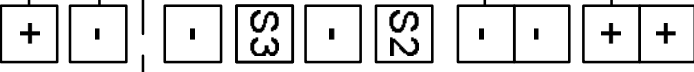
Entity Parameters:

Terminals + w.r.t. -

U_f = 28V
I_f = 660mA
R_f = 1.2M
C_f = 0
L = 0

NOTE: THE BEACON SECTION CAN BE CONNECTED TO ITS OWN BARRIER DEVICE INDEPENDENT OF THE SOUNDER SECTION. THE REQUIREMENTS OF CONTROL DRAWING D5037 SHEET 2 CANNOT THEN BE APPLIED TO THE BEACON SECTION. IF THIS OPTION IS USED, THE INTERNAL LINKS BETWEEN THE SOUNDER SECTION AND BEACON SECTION MUST NOT BE FITTED.

(See Note 11)



Associated Apparatus - Galvanically Isolated Supply with Entity Parameters:
U₀ ≤ 28V
I₀ ≤ 93mA
P₀ ≤ 660mW
Co ≥ Cable (see note 9)
Lo ≥ Cable

Associated Apparatus - Galvanically Isolated Relay with Entity Parameters:
U₀ = 0
I₀ = 0
(See Note 10)

Associated Apparatus - Galvanically Isolated Relay with Entity Parameters:
U₀ = 0
I₀ = 0
(See Note 10)

SCHEDULE DRAWINGS
No modification permitted without reference to the "Notified Body"

1. No revision to drawing without prior FM approval.
2. The associated apparatus must be FM approved.
3. The associated apparatus manufacturer's installation drawing must be followed when installing this equipment.

4. Installation should be in accordance with ANS/ISA RPI12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).

5. The Galvanically Isolated Supply must be a FM approved, resistively limited, single channel supply having parameters less than, or equal to, those quoted, and for which the output is non-ignition capable for the Class, Division or Zone and Group of use.

6. The IS-mC1 Combined Unit enclosure has an ingress protection rating of IP 65. If supplied without cable entry devices then metallic or plastic cable glands, or conduit hubs, shall be fitted that provide the required environmental protection.

7. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

8. Substitution of components may impair safety.

9. The total capacitance connected to terminals +/- of the sounder, i.e. Cable plus any other capacitance, shall not exceed 68nF.

10. The Cable and Leads of the cables connecting the galvanically isolated relays to sounder terminals S2- and S3- shall be less than, or equal to, the Cable and Leads of the cable connecting the galvanically isolated supply to sounder terminals +/-.

11. If the sounder and beacon +/- supply terminals are connected internally then the wiring used for such a connection shall have a minimum radial thickness of insulation of 0.5mm.

Notes:

CAUTION - Bonding between conduit connections is not automatic and must be provided as part of this installation.

CAUTION - The clearance between sounder terminals S2 and S3 is less than 6mm.

Title

IS-mC1 Combined SOUNDER/BEACON
Control Drawing for galvanically
isolated supply / isolated relay
installation.



European Safety Systems Ltd.
Inpress House
Marshall Road
Aston
London W8 7QH

Drawing No.

D 5037 Sheet 2 of 2

Computer Ref: D5037a.dwg

Computer Ref: MRS

Date: 21-04-06

Date: 10-01-07

Appd. MRS

Issue: A

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