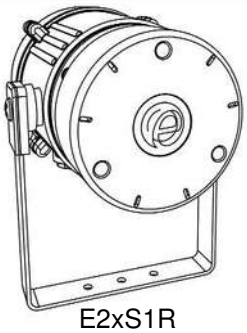
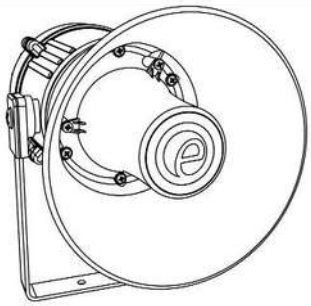
INSTRUCTION MANUAL
E2xS1R & E2xS1F Sounder
For use in Hazardous Locations



E2xS1R



E2xS1F

1) Warnings



- DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
- DO NOT OPEN WHEN ENERGISED
- POTENTIAL ELECTROSTATIC CHARGING HAZARD - CLEAN ONLY WITH A DAMP CLOTH
- HIGH VOLTAGE SHOCK HAZARD. WAIT 5 MINUTES AFTER REMOVING POWER BEFORE OPENING THE ENCLOSURE

Avertissement:

- NE PAS OUVRIR UN PRESENCE D'ATMOSPHERE EXPLOSIVE
- NE PAS OUVRIR ENERGIE
- DANGER POTENTIEL CHARGE ÉLECTROSTATIQUE - NETTOYER UNIQUEMENT AVEC UN CHIFFON HUMIDE
- HAUT TENSION, RISK DE CHOC. ATTENDEZ 5 MINUTES APRES AVOIR DEBRANCHE L'ALIMENTATION AVANT D'OUVRIR LA BOITIER

2) Rating & Marking Information

2.1 ATEX / IECEx certification

The E2xS1 alarm horn complies with the following standards:

EN60079-0:2012+A11:2013 / IEC60079-0: ed. 6.0 (2011-06)
EN60079-15:2010 / IEC60079-15: ed. 4.0 (2010-01)
EN60079-31:2014 / IEC60079-31:2013 ed. 2.0 (2013-11)

Certificate No. DEMKO 06ATEX 0421554X
IECEx ULD 14.0012X

The E2XS1 Alarm horn is rated as follows:



II 3G Ex nA IIC T4 Gc Ta -20°C to +55°C
II 3D Ex tc IIIC T85°C Dc Ta -20°C to +55°C

CE Marking



0518

Zones, Gas / Dust Groups and Temperature Classification

When connected to an approved system the E2XS1 alarm horn may be installed in:

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

Zone 22 explosive dust air mixture not likely to occur in normal operation, and if it does, it will only exist for a short time.

May be used with gases in groups:

Group IIA	propane
Group IIB	ethylene
Group IIC	hydrogen / acetylene

Having a temperature classification (for Gas applications) of:

T1	450ºC
T2	300ºC
T3	200ºC
T4	135ºC

May be used with Dust types:

Group IIIA	combustible flyings
Group IIIB	non-conductive dust
Group IIIC	conductive dust

Maximum Surface Temperature for Dust Applications:

85ºC

Installation must be carried out in compliance with the latest issue of the following standards:

EN60079-14 / IEC60079-14: Explosive atmospheres - Electrical installations design, selection and erection
EN60079-10-1 / IEC60079-10-1: Explosive atmospheres - Classification of areas. Explosive gas atmospheres
EN60079-10-2 / IEC60079-10-2: Explosive atmospheres – Classification of areas. Explosive dust atmospheres

2.2 NEC Class / Zone ratings US

The E2xS1 alarm horn complies with the following standards:

UL 60079-0-2013
UL 60079-15-2013
UL 60079-31-2015

The E2XS1 Alarm horn is rated as follows:

Class I Zone 2 AEx nA IIC T4 Gc Ta -20°C to +55°C
Zone 22 AEx tc IIIC T85°C Dc Ta -20°C to +55°C

Installation must be carried out in compliance with the National Electric Code.

2.3 CEC Class / Zone ratings Canada

The E2xS1 alarm horn complies with the following standards:

CAN/CSA C22.2 No. 60079-0:2015
CAN/CSA C22.2 No. 60079-15:2016
CAN/CSA C22.2 No. 60079-31:2015

The E2XS1 Alarm horn is rated as follows:

Ex nA IIC T4 Gc Ta -20°C to +55°C
Ex tc IIIC T85°C Dc Ta -20°C to +55°C

Installation must be carried out in compliance with the Canadian Electric Code

2.4 NEC & CEC Class / Division Ratings for US / Canada

The E2xS1 alarm horn complies with the following standards:

ANSI/ISA 12.12.01-2015
CSA C22.2 No. 213-16

The E2XS1 Alarm horn is rated as follows:

Class I, Div 2,	ABCD	T3C Ta -20°C to +55°C
Class I, Div 2,	ABCD	T4 Ta -20°C to +40°C
Class II, Div 2,	FG	T6 Ta -20°C to +55°C
Class III		T6 Ta -20°C to +55°C

Installation must be carried out in compliance with the National Electric Code / Canadian Electric Code

2.5 Ingress Protection Ratings

The product is rated for ingress Protection as follows:

IP rating per EN60079-0: IP64
IP rating per EN60529: IP66
Type rating per UL50E / NEMA250: 4 / 4X / 13

To maintain the ingress protection rating, the two off cable entries must be fitted with suitably rated, certified cable entry and/or blanking devices during installation.

2.6 Electrical Ratings

Part No.	Voltage	Current
E2xS1FDC024 / E2xS1RDC024	24Vdc	284mA
E2xS1FDC048 / E2xS1RDC048	48Vdc	146mA
E2xS1RAC115 / E2xS1RAC115	115-120Vac 50/60Hz	104mA
E2xS1FAC230 / E2xS1RAC230	220-230Vac 50/60Hz	54mA

It is important that a suitable power supply is used to run the equipment. The power supply selected must have the necessary capacity to provide the input current to all the units.

The input current will vary according to the voltage input level and the frequency of the tone selected. The current levels shown above are for the tone resulting in max. current draw (tone 1 - 340Hz Continuous).

3) Special Conditions of Use

When used for a Group III application, the surface of the enclosure may store electrostatic charge and become a source of ignition in applications with a low relative humidity <~30% relative humidity where the surface is relatively free of surface contamination such as dirt, dust, or oil.

Guidance on protection against the risk of ignition due to electrostatic discharge can be found in EN TR50404 and IEC TR60079-32.

End user shall adhere to the manufacturer's installation and instruction when performing housekeeping to avoid the potential for hazardous electrostatic charges during cleaning, by using a damp cloth.

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably rated, certified cable entry and/or blanking devices during installation. If conduit is used for installation, seal conduit within 18 inches from the enclosure.

Equipment with the flare horn shall not be installed with the flare higher than horizontal (to avoid accumulation of dust).

The equipment incorporates metal parts isolated from earth, having capacitance values exceeding the limits permitted in the standards of certification. Mounting bracket – 10.33pF.

4) Location and Mounting

The location of the sounder should be made with due regard to the area over which the warning signal must be audible. They should only be fixed to services that can carry the weight of the unit.

The E2x sounder should be secured to any flat surface using the three 7mm fixing holes on the stainless steel U shaped mounting bracket. See Figure 1. The required angle can be achieved by loosening the two large bracket screws in the side of the unit, which allow adjustment of the sounder in steps of 18°. On completion of the installation the two large bracket adjustment screws on the side of the unit must be fully tightened to ensure that the unit cannot move in service.

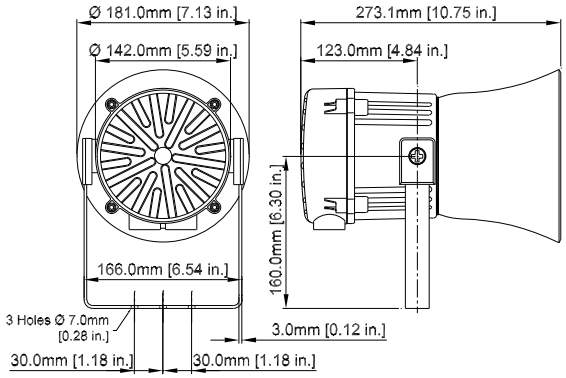


Fig. 1a Fixing Location for Sounder Flare

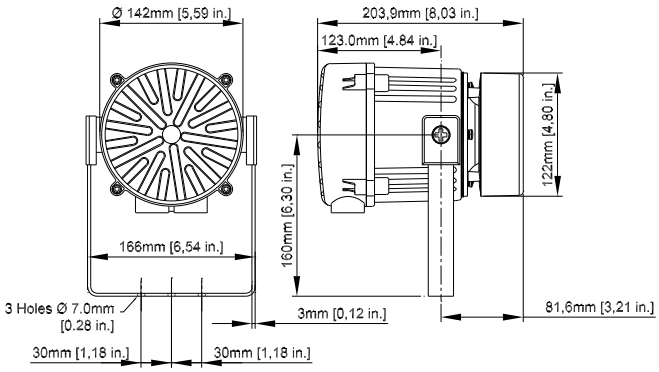


Fig. 1b Fixing Location for Sounder Radial

5) Access to the Enclosure

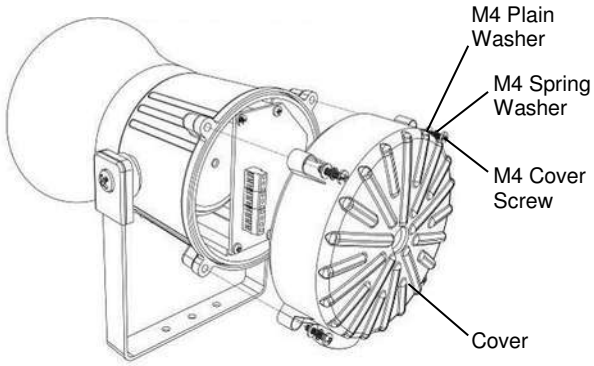


Warning – High voltage may be present, risk of electric shock. DO NOT open when energised, disconnect power before opening.



Warning – Hot surfaces. External surfaces and internal components may be hot after operation, take care when handling the equipment.

To access the enclosure, remove the four M4 posi pan head screws, M4 spring and plain washers and withdraw the cover.



(Appropriate cable entry devices to be customer supplied)

Fig. 2 Accessing the Enclosure.

To replace cover, check that the 'O' ring seal is in place. Carefully push the cover in place. Insert and tighten down M4 screws, spring and plain washers in the order shown above and tighten down.

6) Selection of Cable, Cable Glands, Blanking Elements & Adapters

When selecting the cable size, consideration must be given to the input current that each unit draws (see Table 1), the number of sounders on the line and the length of the cable runs. The cable size selected must have the necessary capacity to provide the input current to all of the sounders connected to the line.

The dual entries can be ordered with one of the following options:

2-off M20 x 1.5 thread
2-off ½" NPT thread
1-off M20 x 1.5 & 1-off ½" NPT thread

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably rated, certified cable entry and/or blanking devices during installation. If conduit is used for installation, seal conduit within 18 inches from the enclosure.

For ambient temperatures over +40ºC the cable entry temperature may exceed +70ºC or the cable branching temperature may exceed +80ºC. Therefore suitable heat resisting cables and cable glands must be used as per table below

Ambient Temp.	40ºC	45ºC	50ºC	55ºC
Min. Rating of cables and cable glands	90ºC	95ºC	100ºC	105ºC

If a high IP (Ingress Protection) rating is required then a suitable sealing washer must be fitted under the cable glands or blanking plugs.

For use in explosive dust atmospheres, a minimum ingress protection rating of IP6X must be maintained.

For use in explosive gas atmospheres, a minimum ingress protection rating of IP54 must be maintained.

7) Cable Connections

Electrical connections are to be made into the terminal blocks on the PCBA located in the enclosure. See section 5 of this manual for access to the enclosure.

Wires having a cross sectional area between 0.5 mm² to 2.5mm² can be connected to each terminal way. If an input and output wire is required the 2-off Live/Neutral or +/- terminals can be used. If fitting 2-off wires to one terminal way the sum of the 2-off wires must be a maximum cross sectional area of 2.5mm². Strip wires to 8mm. Wires may also be fitted using ferrules. Terminal screws need to be tightened down with a tightening torque of 0.45 Nm / 5 Lb-in. When connecting wires to the terminals great care should be taken to dress the wires so that when the cover is inserted into the chamber the wires do not exert excess pressure on the terminal blocks. This is particularly important when using cables with large cross sectional areas such as 2.5mm².

8) AC Wiring

A 6-way terminal block is provided on the AC Sounder for power. There are 2-off Live, 2-off Neutral and 2-off Earth terminals in total. A 3-way terminal is provided for stage switching with a stage 2, a stage 3 and a common terminal.

8.1 Wiring Diagrams

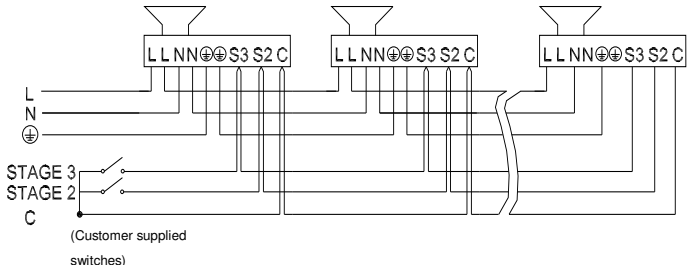
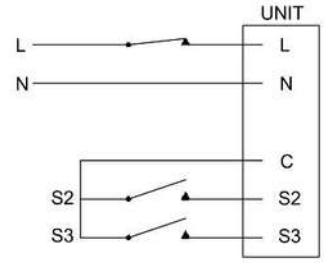


Fig 3. E2xS1 AC Simplified Block Diagram

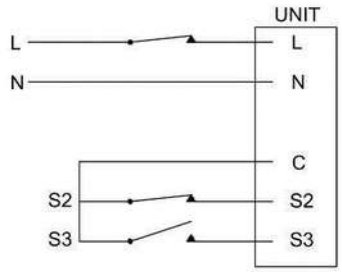
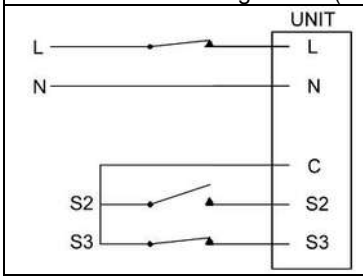
8.2 Stage Switching

8.2.1 Units First Stage Tones

Stage one (S1) Operation	
	Simply connect the supply voltage to the L and N supply terminals, (see fig. 4).

8.2.2 AC Units Second & Third Stage Tone Selection

To select the second and third stage tones on the E2xS1 AC sounder.

Stage two (S2) Operation	
	Power L and N. Link the Common-C and S2 terminal. Dip switch alters stage 2 tone.
Stage three (S3) Operation	
	Power L and N. Link the Common-C and S3 terminals. Dip switch alters stage 3 tone.

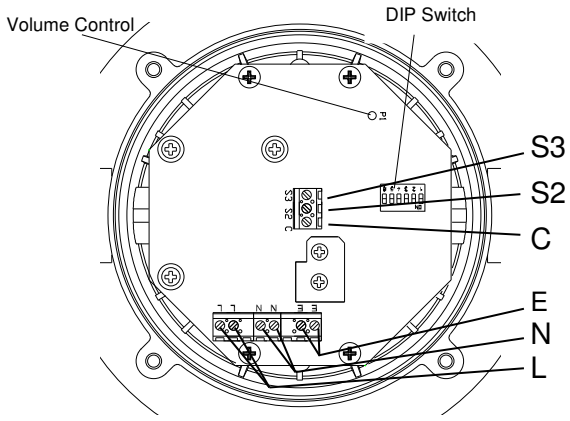


Fig. 4 AC Terminals

9) DC Wiring

A 10-way terminal block is provided on the DC Sounder. There are 2-off +ve, 2-off -ve, 2-off stage 2, 2-off stage 3 and 2-off Earth terminals in total.

9.1 Wiring Diagrams

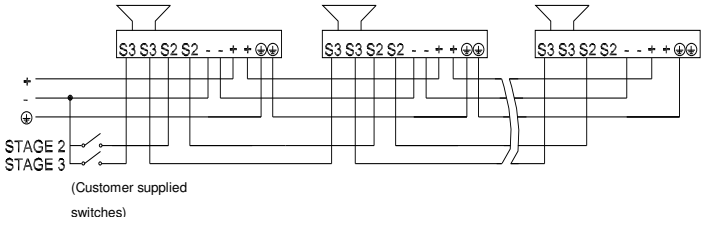
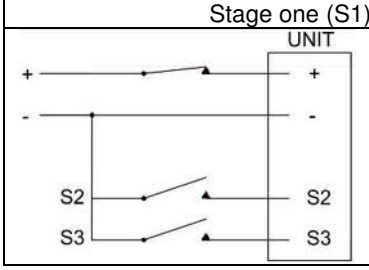


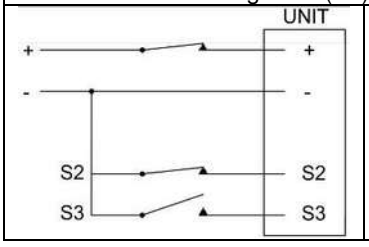
Fig. 5 DC Simplified Block Diagram

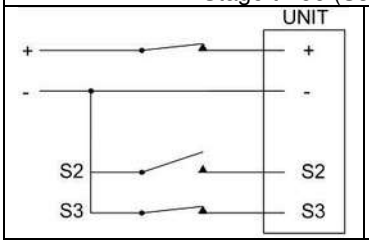
9.2 Stage Switching

9.2.1 Units First Stage Tones

Stage one (S1) Operation	
	Simply connect the supply voltage to the + and - supply terminals, (see fig. 6).

9.2.2 DC Units Second & Third Stage Tone Selection

Stage two (S2) Operation	
	Power +ve and –ve. Link a -ve supply line to the S2 terminal. Dip switch alters stage 2 tone.

Stage three (S3) Operation	
	Power +ve and –ve. Link a -ve supply line to the S3 terminal. Dip switch alters stage 3 tone.

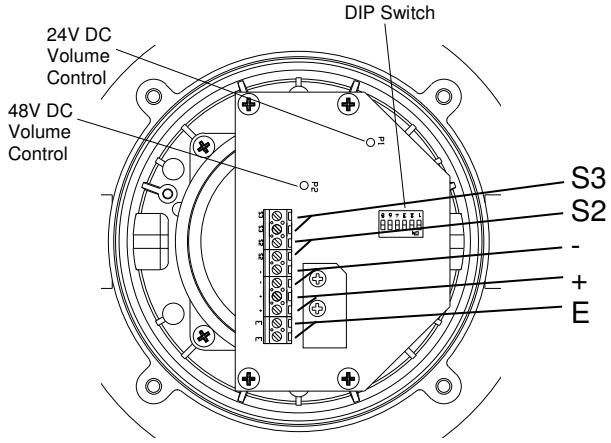


Fig. 6 DC Terminals

12.3 Line Monitoring

On E2xS1 DC units, DC reverse line monitoring can be used if required. All DC sounders have a blocking diode fitted in their supply input lines. An end of line monitoring resistor can be connected across the +ve and –ve terminals. If an end of line resistor is used it must have the following values:

24V DC Sounders

Minimum resistance 3K9 Ohms	Minimum Power 0.5W
Minimum resistance 1K Ohms	Minimum Power 2.0W

48V DC Sounders

Minimum resistance 15K Ohms	Minimum Power 0.5W
Minimum resistance 3K9 Ohms	Minimum Power 2.0W

The resistor must be connected directly across the +ve and -ve terminals as shown in the following drawing. Whilst keeping its leads as short as possible, a spacing of at least 1/16" (1.58mm) must be provided through air and over surfaces between uninsulated live parts.

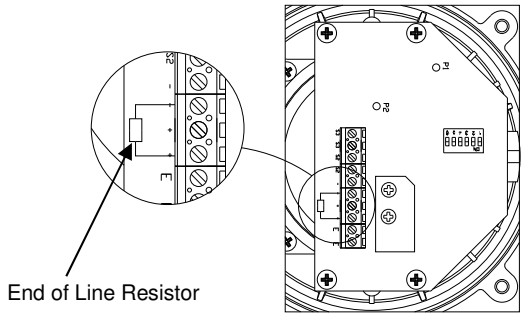


Fig. 8 End of Line Resistor Placement

10) Settings

10.1 Tone Selection

The sounders have 45 different tones that can be selected for the first stage alarm. The sounders can then be switched to sound second and third stage alarm tones. The tones are selected by operation of a DIP switch on the PCB for both DC and AC units. The tone table on page six shows the switch positions for the 45 tones and which tones are available for the second and third stages. To operate the sounder on stage 1 simply connect the supply voltage to the normal supply terminals (+ve and –ve for DC units, L and N for AC units).

10.2 Volume Control



Warning - High noise levels above 85dB(A) during operation. High levels of noise may cause hearing loss, wear suitable ear protection when equipment is in operation.

The output level of the E2x sounder can be set by adjusting the volume control potentiometer (see Fig 4 for AC & Fig 6 for DC). For maximum output, set the potentiometer fully clockwise.

11) Maintenance, Overhaul & Repair

Maintenance, repair and overhaul of the equipment should only be carried out by suitably qualified personnel in accordance with the current relevant standards:

EN60079-19 IEC60079-19	Explosive atmospheres - Equipment repair, overhaul and reclamation
EN 60079-17 IEC60079-17	Explosive atmospheres - Electrical installations inspection and maintenance

To avoid a possible ELECTROSTACTIC CHARGE the unit must only be cleaned with a damp cloth.

Units must not be opened while an explosive atmosphere is present.

If opening the unit during maintenance operations a clean environment must be maintained and any dust layer removed prior to opening the unit.

12) Tone Table

Stage 1	Frequency Description	Switch 1 2 3 4 5 6	Stage 2	Stage 3
1	340Hz Continuous	0 0 0 0 0 0	Tone 2	Tone 5
2	800/1000Hz @ 0.25 sec Alternating	1 0 0 0 0 0	Tone 17	Tone 5
3	500/1200Hz @ 0.3Hz sec Slow Whoop	0 1 0 0 0 0	Tone 2	Tone 5
4	800/1000Hz @ 1Hz Sweeping	1 1 0 0 0 0	Tone 6	Tone 5
5	2400Hz Continuous	0 0 1 0 0 0	Tone 3	Tone 20
6	2400/2900Hz @ 7Hz Sweeping	1 0 1 0 0 0	Tone 7	Tone 5
7	2400/2900Hz @ 1Hz Sweeping	0 1 1 0 0 0	Tone 10	Tone 5
8	500/1200/500Hz @ 0.3Hz Sweeping	1 1 1 0 0 0	Tone 2	Tone 5
9	1200/500Hz @ 1Hz - DIN *PFEER P.T.A.P.*	0 0 0 1 0 0	Tone 15	Tone 2
10	2400/2900Hz @ 2Hz Alternating	1 0 0 1 0 0	Tone 7	Tone 5
11	1000Hz @ 1Hz Intermittent	0 1 0 1 0 0	Tone 2	Tone 5
12	800/1000Hz @ 0.875Hz Alternating	1 1 0 1 0 0	Tone 4	Tone 5
13	2400Hz @ 1Hz Intermittent	0 0 1 1 0 0	Tone 15	Tone 5
14	800Hz 0.25 sec on, 1 sec off Intermittent	1 0 1 1 0 0	Tone 4	Tone 5
15	800Hz Continuous	0 1 1 1 0 0	Tone 2	Tone 5
16	660Hz 150mS on, 150mS off Intermittent	1 1 1 1 0 0	Tone 18	Tone 5
17	544Hz (100mS)/440 Hz (400m/S) - NF S 32-001	0 0 0 0 1 0	Tone 2	Tone 27
18	660Hz 1.8 sec on, 1.8 sec off Intermittent	1 0 0 0 1 0	Tone 2	Tone 5
19	1.4KHz - 1.6KHz 1s, 1.6KHz - 1.4 KHz 0.5s - NFC48-265	0 1 0 0 1 0	Tone 2	Tone 5
20	660Hz Continuous	1 1 0 0 1 0	Tone 2	Tone 5
21	554Hz/440Hz @ 1Hz Alternating	0 0 1 0 1 0	Tone 2	Tone 5
22	544Hz @ 0.875 sec Intermittent	1 0 1 0 1 0	Tone 2	Tone 5
23	800Hz @ 2Hz Intermittent	0 1 1 0 1 0	Tone 6	Tone 5
24	800/1000Hz @ 50Hz Sweeping	1 1 1 0 1 0	Tone 29	Tone 5
25	2400/2900Hz @ 50Hz Sweeping	0 0 0 1 1 0	Tone 29	Tone 5
26	Bell	1 0 0 1 1 0	Tone 2	Tone 15
27	554Hz Continuous	0 1 0 1 1 0	Tone 26	Tone 5
28	440Hz Continuous	1 1 0 1 1 0	Tone 2	Tone 5
29	800/1000Hz @ 7Hz Sweeping	0 0 1 1 1 0	Tone 7	Tone 5
30	300Hz Continuous	1 0 1 1 1 0	Tone 2	Tone 5
31	660/1200Hz @ 1Hz Sweeping	0 1 1 1 1 0	Tone 26	Tone 5
32	Two tone chime	1 1 1 1 1 0	Tone 26	Tone 15
33	745Hz @ 1Hz Intermittent	0 0 0 0 0 1	Tone 2	Tone 5
34	1000 & 2000Hz @ 0.5 sec Aletrnating - Signapore	1 0 0 0 0 1	Tone 38	Tone 45
35	420Hz @ 0.625 Sec Australian Alert	0 1 0 0 0 1	Tone 36	Tone 5
36	500-1200Hz 3.75 sec /0.25 sec Australian Evac.	1 1 0 0 0 1	Tone 35	Tone 5
37	1000Hz Continuous - *PFEER Toxic Gas*	0 0 1 0 0 1	Tone 9	Tone 45
38	2000Hz Continuous	1 0 1 0 0 1	Tone 34	Tone 45
39	800Hz 0.25 sec on, 1 sec off Intermittent	0 1 1 0 0 1	Tone 23	Tone 17
40	544Hz (100mS)/440Hz (400mS) - NF S 32-001	1 1 1 0 0 1	Tone 31	Tone 27
41	Motor Siren - slow rise to 1200Hz	0 0 0 1 0 1	Tone 2	Tone 5
42	Motor Siren - slow rise to 800Hz	1 0 0 1 0 1	Tone 2	Tone 5
43	1200Hz Continuous	0 1 0 1 0 1	Tone 2	Tone 5
44	Motor Siren - slow rise to 2400Hz	1 1 0 1 0 1	Tone 2	Tone 5
45	1KHz 1s on, 1s off Intermittent - *PFEER Gen. Alarm*	0 0 1 1 0 1	Tone 38	Tone 34

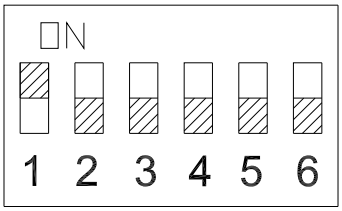


Fig. 9 Dip Switch

1=ON; 0=OFF
Example shown: 100000 = Tone 2 (Default setting)

EU Declaration of Conformity

Manufacturer: European Safety Systems Ltd.
Impress House, Mansell Road, Acton
London, W3 7QH, United Kingdom

Equipment Type: E2xS1, E2xS2
E2xB05, E2xB10, E2xBL2
E2xC1X05, E2xC1LD2,
E2xL15, E2xL25

Directive 2014/34/EU: Equipment and Protective Systems for use in Potentially Explosive Atmospheres (ATEX)

Notified Body for EU type Examination (Module B):	UL International Demko A/S Notified Body No.: 0539 Borupvang 5A, 2750 Ballerup, Denmark
EU-type Examination Certificate (Module B):	DEMKO 06 ATEX 0421554X
Notified Body for Quality Assurance Notification / Conformity to EU-type based on quality assurance of the production process (Module D):	Sira Certification Service Notified Body No.: 0518 Rake Lane, Eccleston, Chester CH4 9JN, UK
Quality Assurance Notification (Module D):	SIRA 05 ATEX M342
Provisions fulfilled by the equipment:	II 3G Ex na IIC T4/T3/T2 Gc II 3D Ex tc IIIC 85°C...120°C Dc IP6X Dust Protection to EN60079-0 / EN60079-31
Standards applied:	EN60079-0:2012 + A11:2013 EN60079-15:2010 EN60079-31:2014

Directive 2014/30/EU: Electromagnetic Compatibility Directive (EMC)

Standards applied:	EN 61000-6-1:2007 EN 61000-6-2:2005 EN 61000-6-3:2007 / A1:2011 / AC: 2012 EN 61000-6-4:2007 / A1: 2011

Directive 2011/65/EU: Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

The product and all the components contained within it are in accordance with the restriction of the use of hazardous substances in electrical and electronic equipment.

Regulation (EC) 1907/2006: Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

The product and all the components contained within it are free from substances of very high concern.

Other Standards and Regulations

EN 60529:1992+A2:2013 - Degrees of protection provided by enclosures (IP code) – **enclosure rated IP66/IP67**

On behalf of European Safety Systems Ltd., I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment conforms with all technical and regulatory requirements of the above listed directives, regulations and standards.

This Declaration is issued under the sole responsibility of the manufacturer.

Martin Streetz
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