INSTRUCTION & SERVICE MANUAL
E2xS121UL ALARM HORN SOUNDERS
For Use In Hazardous Locations

- 45 Tones 3 stage Alarm Horn Sounder
- Automatic Synchronisation
- Volume control
- Type 4 / 4X / 13
- Operating Temperature Range
  -20ºC to +55ºC

7KA1

Unit Type No. E2xS121UL

Input Voltages: DC Units 10-30V or 48V
AC Units 120V or 230V 50/60Hz

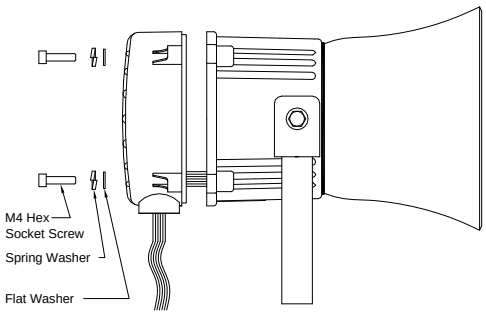
Max. Operating Temperature / Code at +55ºC Ambient	
Hazardous Location	**Temperature Code**
Class I, Division 2, Groups A, B, C, D	T3C (160ºC)
Class II, Division 2, Groups F and G	T6 (85ºC)
Class III, Divisions 1 and 2	T6 (85ºC)

Max. Operating Temperature / Code at +40ºC Ambient	
Hazardous Location	**Temperature Code**
Class I, Division 2, Groups A, B, C, D	T4 (135ºC)

The equipment is suitable for use in the hazardous locations listed above or non-hazardous locations only.

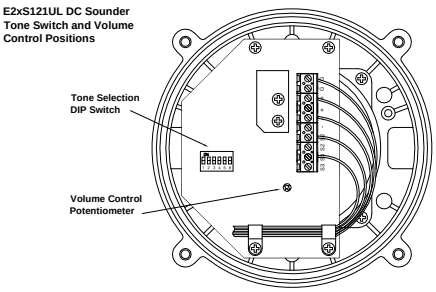
PRE-INSTALLATION

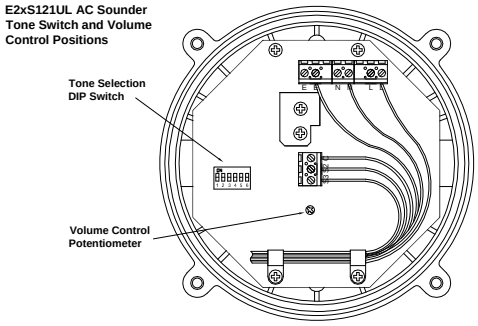
WARNING - Before the E2xS121UL sounder is installed the required tone and output volume must be set. *Note the units are factory set to tone 2 (800/1000Hz alternating at 2Hz) and maximum output*. If necessary the unit should be connected to a suitable power supply in a safe area to determine what tone pattern and output level is required.



WARNING – DO NOT OPEN WHEN ENERGISED

CAUTION - DO NOT OPEN WHEN AN EXPLOSIVE GAS OR DUST ATMOSPHERE IS PRESENT

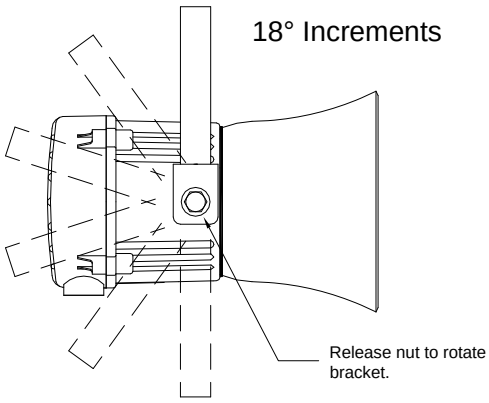




WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, II DIVISION 2.

MOUNTING

The E2xS121UL sounder must be mounted using the rotating bracket as shown. If the cover has been removed to set the tone or volume control ensure that it has been correctly replace before the sounder is mounted.



WIRING INSTALLATION

The E2xS121UL sounder is provided with 2 off M20 x 1.5 cable entries.
1 x ½" NPT adaptor and 1 x M20 stopping plug are provided.

Installation using Field Wiring Leads and Conduit

If the sounder is supplied pre-wired with flying leads, these are colour coded and should be connected as shown in the diagram below.
The conduit running from the supply to the sounder must include an equipment grounding conductor that is at earth potential to facilitate ground connection of the device. A number of sounders can be connected in a chain to the same supply using field installed wiring compartments that are appropriate for the hazardous location, provided that the conductor at earth potential can be readily connected to the ground lead on each sounder in the chain.

Installation using Cable Glands without Field Wiring Leads

If the sounder is supplied without field wiring leads, the cable connections are made into the terminal blocks on the electronic PCB assembly. Terminal blocks are suitable for field wiring (AWG 18-12). Strain relief has to be ensured by installation with

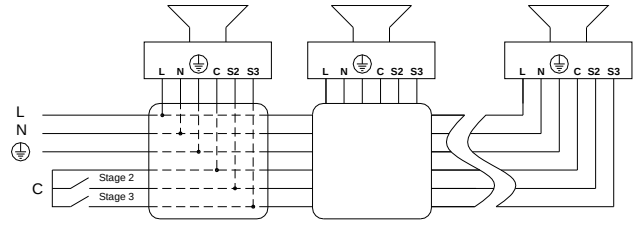
a suitable cable gland. Follow the markings for the terminals on the PCB and install wiring as shown in the diagram below.

Cable glands need to be UL certified to ANSI/UL 2225 or C22.2 NO. 174-M1984. and to UL514B / CSA-C22.2 No. 18.3-12, ratings for hazardous locations must be equal to or better than the rating of the sounder used.
If a high IP (Ingress Protection) rating is required then a suitable sealing washer must be fitted under the cable gland.

WARNING - ALL ELECTRICAL WIRING MUST BE INSTALLED IN ACCORDANCE TO THE NATIONAL ELECTRICAL CODE

AC SOUNDERS

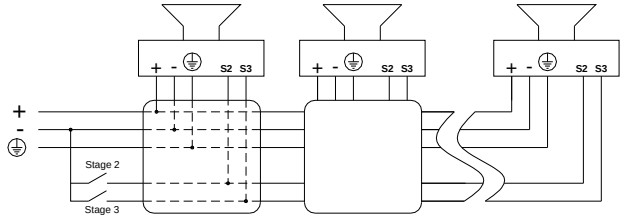
Black	Live	Violet	C
White	Neutral	Orange	S2
Green/Yellow	Ground	Yellow	S3



NOTE if the second and third stage wires are not used they must be individually insulated to ensure that cannot make contact to any other wires.

DC SOUNDERS

Red	Positive	Orange	S2
Black	Negative	Yellow	S3
Green/Yellow	Ground		



NOTE if the second and third stage wires are not used they must be individually insulated to ensure that cannot make contact to any other wires.

POWER SUPPLY SELECTION

It is important that a suitable power supply is used to run the sounders. The power supply selected must have the necessary capacity to provide the input current to all of the sounders connected to the system.

Unit Type	Input Voltage	Input @ 1kHz Current	Max. I/P Volts
E2xS121UL	24V DC	280mA	30V
E2xS121UL	48V DC	215mA	58V
E2xS121UL	230V 50/60Hz AC	76mA	253V
E2xS121UL	120V 50/60Hz AC	142mA	132V

TONE SELECTION

The E2xS121UL 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 opposite 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 one simply connect the supply voltage to the flying leads (Red and Black for DC units, Black, White and Green/Yellow for AC units).

The operation of the second and third stages is different for DC and AC units.

DC Units Second and Third Stage Tone Selection

To activate the second stage, remotely switch the S2 orange wire to the negative supply. To activate the third stage, remotely switch the S3 orange wire to the negative supply. NOTE the DC power supply to the Red and Black wires must be maintained for 2nd and 3rd stages.

AC Units Second and Third Stage Tone Selection

To select the second and third stages on the E2xS121UL AC sounders the Common (C) Violet wire must be remotely connected to the S2 orange wire for the second stage and to the S3 yellow wire for third stage. NOTE the AC power supply to the Black and White lead must be maintained for 2nd and 3rd stages.

VOLUME CONTROL

The volume on the E2xS121UL sounder can be set using the volume control (see figures 2 and 3). For maximum output level the potentiometer should be set to the fully clockwise position.

WARNING – HIGH VOLUME MAY CAUSE HARM TO PERSONNEL IN CLOSE PROXIMITY

END OF LINE MONITORING

On E2xS121UL 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

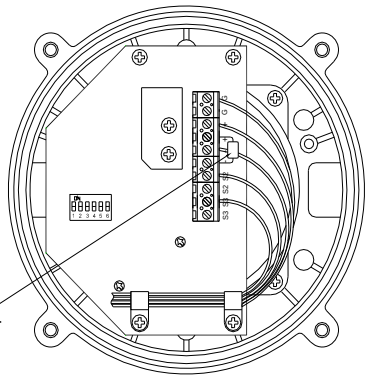
Minimum Resistance 3k9 ohms	Minimum wattage 0.5W
Minimum Resistance 1k ohms	Minimum wattage 2.0W

48V DC Sounders

Minimum Resistance 15k ohms	Minimum wattage 0.5W
Minimum Resistance 3k9 ohms	Minimum wattage 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 inch (1.58mm) must be provided through air and over surfaces between uninsulated live parts.

E2xS121UL DC Sounder End of Line Resistor



TONE SELECTION 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

SWITCH POSITION EXPLANATION

1 = Switch in the ON position.
0 = Switch in the OFF position..

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For Use In Hazardous Locations

1) Introduction

The E2xS121 is an ATEX, IECEx and UL certified Sounder which produces a loud warning signal in a hazardous area. 45 first stage alarm sounds can be selected by internal switches and each one can be externally changed to a second and third stage alarm sound. The alarm horn may be used for Gas applications in Zone 2 as well as for Dust applications in Zone 22.

2) Warnings

POTENTIAL ELECTROSTATIC CHARGING HAZARD –
CLEAN ONLY WITH A DAMP CLOTH
DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

3) Ratings and Markings ATEX/IECEx

The E2xS121 Sounder complies with the following standards:

EN60079-0:2012 / IEC60079-0 ed.6.0 (2011-06)
EN60079-15:2010 / IEC60079-15 ed 4.0 (2010-01)
EN60079-31:2009 / IEC60079-31 ed2.0 (2013-11)

The Type Examination Certificate DEMKO 06ATEX0421554X / IECEx ULD 14.0012X has been issued by UL. This confirms compliance with the European ATEX Directive 94/9/EC for Group II, Category 3G/D equipment. The alarm horn 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 the current issue of EN60079-14/IEC60079-14 Electrical Installation in Hazardous Areas; EN60079-10-1 / IEC 60079-10-1 Explosive Atmospheres - Classification of Areas. Explosive Gas Atmospheres; EN60079-10-2 / IEC 60079-10-2 Explosive Atmospheres - Classification of Areas. Explosive Dust Atmospheres. When designing systems for installation, the local Code of Practice should be consulted.

The E2XS121 Sounder is rated as follows:

II 3G Ex nA IIC T4 Gc Tamb -20°C to 55°C
II 3D Ex tc IIIC 85°C Dc Tamb -20°C to 55°C

CE Marking

Zones, Gas / Dust Groups and Temperature Classification

When connected to an approved system the E2xS121 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

3.5 Ambient Temperature Range:

-20ºC to +55ºC

3.6 Ingress Protection Ratings

The product is rated for ingress Protection as follows:
IP rating per EN60529: IP66

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

3.7 Electrical Ratings

Model No.	Nominal Voltage	Voltage Range	Current draw
E2xS121UL 24DC	24Vdc	10-30Vdc	280mA
E2xS121UL 48DC	48Vdc	38-58Vdc	215mA
E2xS121UL 115AC	115Vac	115Vac +/- 10% 50/60Hz	142mA
E2xS121UL 230AC	230Vac	230Vac +/- 10% 50/60Hz	76mA

4) Special Conditions for Safe Use

Special Condition for safe Use as stated on the Type Examination Certificate DEMKO 06ATEX0421554X / CoC IECEx ULD 14.0012X

4.1 Installation

The product must only be installed by suitably qualified personnel in accordance with the latest issues of the relevant standards.

The installation of the units must also be in accordance with any local codes that may apply and should only be carried out by a competent electrical engineer who has the necessary training.

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 (such as high-pressure steam) which may cause a built-up of electrostatic charges on non-conducting surfaces.

The equipment has not been assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).

To maintain the ingress protection rating and mode of protection, the cable entries must be fitted with suitably rated ATEX / IECEx certified cable glands and/or suitably rated ATEX / IECEx certified blanking devices during installation according to EN / IEC60079-14. If a high IP (Ingress Protection) rating is required then a suitable sealing washer must be fitted under the cable gland.

For use in explosive gas atmospheres, a minimum ingress protection rating of IP54 must be maintained. For use in explosive dust atmospheres, a minimum ingress protection rating of IP64 must be maintained.

The enclosure is accessed by removing the 4 M4 Hex cover bolts fastening the enclosure. Do not open other joints of the enclosure for installation, service and maintenance.

Connections are to be made into the terminal blocks using solid wire, sizes 0.5-4mm^2 or stranded wire, sizes 0.5-2.5 mm^2. Wire insulation needs to be stripped 8mm. Stranded wires may be fitted securely with crimped ferrules. Terminal screws need to be tightened down with a tightening torque of 0.45 Nm.

Earthing connections should be made to the Internal Earth terminal on the PCBA. The internal earth bonding wire connects the PCBA earth terminal to the internal earth terminal in the enclosure.

Check that the earth bonding wire between the two enclosure parts is secure and the ‘O’ ring seal is in place before closing.

4.2 Maintenance, Repair and Overhaul

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

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.

Electrostatic charging hazard - Clean only with a damp cloth

EU Declaration of Conformity

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

Equipment Type: E2xS112UL, E2xS121UL
E2xB05UL, E2xB10UL
E2xCS1125UL
E2xL15UL, E2xL25UL

Directive 94/9/EC: Electrical and Mechanical equipment for use in explosive atmospheres (ATEX)

Notified Body for Type Examination:	UL International Demko A/S Notified Body No.: 0539 Borupvang 5A, 2750 Ballerup, Denmark
Type Examination Certificate:	DEMKO 06 ATEX 0421554X
Notified Body for Quality Assurance Notification:	Sira Certification Service Notified Body No.: 0518 Rake Lane, Eccleston, Chester CH4 9JN, UK
Quality Assurance Notification:	SIRA 05 ATEX M342
Provisions fulfilled by the equipment:	Ex na IIC T4/T3/T2 Gc (Ta -20°C to +55°C) Ex tc IIIC T85°C/100°C Dc (Ta -20°C to +55°C)
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: RoHS Directive

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.

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.

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

Martin Streetz
Quality Assurance Manager

Document No.: DC-062_Issue_A
Date and Place of Issue: London, 02/03/2015