



INSTRUCTION MANUAL (ATEX / IECEx)

BExDS120E and BExDS110E

Flameproof / Increased Safety Sounders

For use in Flammable Gas and Dust Atmospheres

1) Introduction

The BExDS120E and BExDS110E are flameproof / increased safety sounders which are certified to meet the requirements of the ATEX directive 94/9/EC and the IECEx scheme. The sounders produce loud warning signals and can be used in hazardous areas where potentially flammable gas and dust atmospheres may be present. Thirty-two different first stage alarm sounds can be selected by internal switches, and each one can be externally changed to a second or third stage alarm sound (see *tone table on Page 4*). The BExDS120E unit produces output levels in the 117dB(A) range and the BExDS110E unit produces output levels in the 110dB(A) range. Both sounders can be used in Zone 1 and Zone 2 areas with gases in groups IIA, IIB and IIC and temperature Classifications of T1, T2, T3 and T4. For ambient temperatures over +55°C the gas groups are limited to IIA and IIB. They can also be used in Zone 21 and Zone 22 areas for combustible dusts and have an IP rating of IP 66 and a surface temperature of T115°C based on max Ta of +70°C.

2) Marking

All units have a rating label, which carries the following important information:-

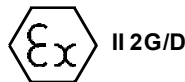
Unit Type No. BExDS120E or BExDS110E

Input Voltage: DC Units 12V or 24V or 48V
AC Units 230V or 110V or 115V

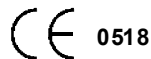
Codes: Ex de IIC T4 for Ta -50°C to +55°C
Ex de IIB T4 for Ta -50°C to +70°C
Ex tD A21 IP66 T115°C based on max Ta of +70°C

Certificate No's KEMA 99ATEX6312
IECEX KEM 10.0003

Epsilon x:
Equipment Group and
Category:



CE Marking:
Notified Body No.



“Warnings” DO NOT OPEN WHEN AN EXPLOSIVE
GAS OR DUST ATMOSPHERE IS PRESENT

COVER BOLTS CLASS A4-80

USE HEAT RESISTING CABLES AND CABLE GLANDS
(Rated 110°C) AT AMB. TEMPERATURES OVER 40°C

Year of Construction /
Serial No. i.e. 10 / 1DS3200001

3) Type Approval Standards

The sounders have EC Type Examination and IECEx certificates issued by KEMA and have been approved to the following standards:-

EN60079-0:2006	IEC60079-0:2004 (Ed4)	General Requirements
EN60079-1:2007	IEC60079-1:2007 (Ed6)	Flameproof Enclosure 'd'
EN60079-7:2003	IEC60079-7:2001 (Ed3)	Increased Safety 'e'
EN61241-0:2006	IEC61241-0:2004 (Ed1)	Dust General Requirements
EN61241-1:2004	IEC61241-1:2004 (Ed1)	Dust Enclosures tD

4) Installation Requirements

The sounders must be installed in accordance with the latest issues of the relevant parts of the EN60079 and IEC60079 standards – Selection, Installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacture):-

EN60079-14:2008 Electrical Installations in Hazardous
IEC60079-14:2007 (Ed4) Areas (other than mines)

EN60079-10:2003 Classification of Hazardous Areas
IEC60079-10:2008 (Ed1)

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.

5) Zones, Gas Group, Category, IP Rating and Temperature Classification

The BExDS120E and BExDS110E sounders have been certified Ex de IIC T4 for Ta -50°C to +55°C and Ex de IIB T4 for Ta -50°C to +70°C for gas and Ex tD A21 IP66 T115°C based on max. Ta of +70°C for dust. This means that the units can be installed in locations with the following conditions:-

Area Classification Gas:

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.

Gas Groupings:

Group IIA	Propane
Group IIB	Ethylene
Group IIC (Up to +55°C only)	Hydrogen and Acetylene

Temperature Classification:

T1	400° C
T2	300° C
T3	200° C
T4	135° C

Area Classification Dust:

Zone 21	Explosive dust air mixture likely to occur in normal operation.
Zone 22	Explosive dust air mixture not likely to occur, and if it does, it will only exist for a short time.

IP Rating IP66 T100°C Ta ≤ +55°C
T115°C Ta ≤ +70°C

Ambient Temperature Range:

-50°C to +55°C Gas Groups IIA, IIB and IIC
-50°C to +70°C Gas Group IIA and IIB

Equipment Category: 2G/D

6) Sounder Location and Mounting

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

The sounder should be securely bolted to a suitable surface using the 7mm diameter boltholes in the stainless steel U shaped mounting bracket (see figure 1). The angle can then be adjusted in the direction that the sound is primarily required to cover. This can be achieved by loosening the two large bracket screws in the side of the unit, which allow adjustment 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 sounder cannot move in service.

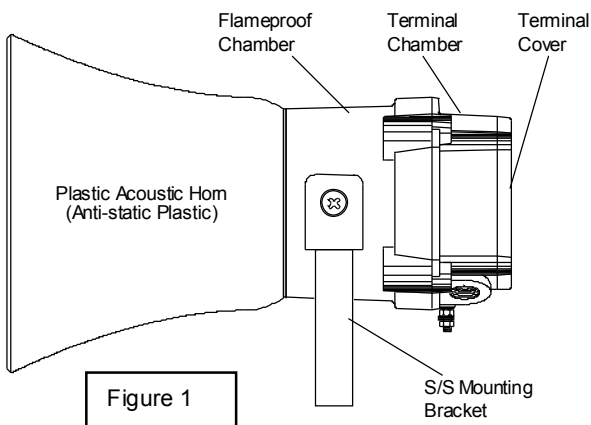


Figure 1

7) Access to the Flameproof Enclosure

In order to change the tone or adjust the output level of the sounder it is necessary to remove the terminal chamber section to gain access to the flameproof chamber. To achieve this remove the four M6 hexagon socket head screws (see

figure 2) and withdraw the terminal chamber taking extreme care not to damage the flameproof joints in the process.

Note the four **M6 screws are Class A4-80 stainless steel and only screws of this category can be used on these sounders.** It is therefore important that these screws and their spring washers are kept in a safe place during installation.

On completion of the tone selection and adjustment the flameproof joints should be inspected to ensure that they are clean and that they have not been damaged during installation.

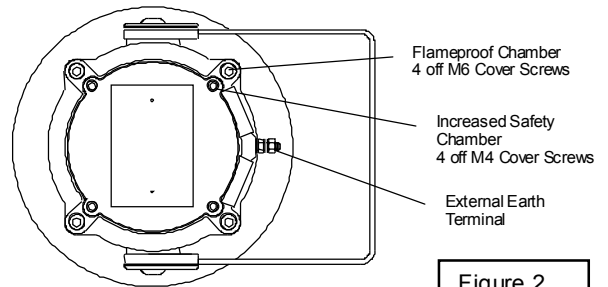


Figure 2

Also check that the earth bonding wire between the two casting sections is secure and that the 'O' ring seal is in place. When replacing the terminal chamber section casting, ensure that it is square with the flameproof chamber casting before inserting. Carefully push the section in place allowing time for the air to be expelled. Only after the section is fully in place should the four M6 Stainless Steel A4-80 cover bolts and their spring washers be inserted and tightened down. If the section jams while it is being inserted, carefully remove it and try again. Never use the M6 cover bolts to force the cover into position.

8) Access to the Increased Safety Terminal Chamber

To connect the cables to the sounder it is necessary to remove the terminal cover to gain access to the termination chamber. To achieve this remove the four M4 hexagon socket head screws (see figure 2). The four M4 screws and their spring washers are grade A4 stainless steel and they should be kept in a safe place during installation. Before replacing the terminal cover ensure that the earth bonding wire between the two castings is secure and that the 'O' ring seal is in place. Insert the four M4 hexagon screws and their spring washers and tighten them down.

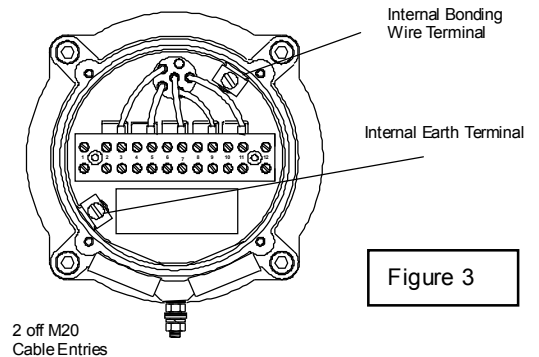


Figure 3

9) 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.

The following table shows the input current taken by the various sounder units:-

Unit Type	Input Voltage	Input Current	Max. I/P Volts
BExDS120E	24V DC	800mA	30V
BExDS120E	12V DC	850mA	15V
BExDS120E	48V DC	420mA	58V
BExDS120E	230V AC	90mA	264V
BExDS120E	110V AC	200mA	121V
BExDS120E	115V AC	180mA	126V
BExDS110E	24V DC	265mA	30V
BExDS110E	12V DC	195mA	15V
BExDS110E	48V DC	130mA	58V
BExDS110E	230V AC	56mA	264V
BExDS110E	110V AC	93mA	121V
BExDS110E	115V AC	110mA	126V

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 440Hz Continuous tone @ nominal input voltage. The 24V and 48V DC units and the 230V AC, 115V AC and 110V AC units have a switching voltage regulator circuit and therefore the input current level will decrease slightly as the input voltage is increased and will increase slightly as the input voltage is reduced. The 12V units do not have a voltage regulator and therefore their input current will increase when the input voltage is increased.

The above table also shows the maximum voltages at which the sounders can be operated.

10) Cable Selection

When selecting the cable size consideration must be given to the input current that each unit draws (see table above), 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.

SAFETY WARNING: If the high output BExS120E sounders are used at high ambient temperatures, i.e. over +40°C, then the cable entry temperature may exceed +70°C and therefore suitable heat resisting cables must be used, with a rated service temperature of at least 110°C.

11) Earthing

Both AC and DC sounder units must be connected to a good quality earth. The units are provided with internal and external earthing terminals which are both located on the terminal chamber section of the unit (see figures 2 and 3).

When using the internal earth terminal ensure that the stainless steel M4 flat washer is between the incoming earth wire and the enclosure.

When using the external earth terminal a cable crimp lug must be used. The cable lug should be located between the two M5 stainless steel flat washers. The M5 stainless steel spring washer must be fixed between the outer flat washer and the M5 stainless steel nut to ensure that the cable lug is secured against loosening and twisting.

The internal earth bonding wires ensure that a good quality earth is maintained between the flameproof chamber casting, the terminal section casting and the terminal cover casting.

12) Cable Glands

The BExDS120E and BExDS110E sounders have dual cable gland entries which have an M20 x 1.5 entry thread as standard. Only cable glands approved for Ex 'e' applications or better (i.e. Ex 'd' applications) can be used. They must be suitable for the type of cable to be used and also meet the requirements of the Ex equipment installation standards EN60079-14:2008 / IEC60079-14:2007.

When only one cable entry is used the other one must be closed with an Ex 'e' blanking plug, which must be suitably approved for the installation requirements.

For combustible dust applications, the cable entry device and blanking elements shall be in type of explosion protection increased safety "e" or flameproof enclosure "d" and shall have an IP 6X rating according to EN60529:1992.

SAFETY WARNING: If the high output BExDS120E sounders are used at high ambient temperatures, i.e. over +40°C, then the cable entry temperature may exceed +70°C and therefore suitable heat resisting cable glands must be used, with a rated service temperature of at least 110°C.

13) Cable Connections

The cable connections are made into an Ex e II approved twelve way terminal block which is located in the Increased Safety Area terminal chamber (see figure 3). See section 8 of this manual for access to the terminal chamber. When wiring into Increased Safety Area terminal enclosures, you are only permitted to connect one wire into each way on the terminal block. Therefore in order that sounders can be connected in a parallel line, the terminal block is fitted with approved connecting combs so that each electrical connection has two terminals in parallel. Terminal No's. 1 and 12 must not be used on either AC or DC sounders. Cables with a cross-sectional area of up to 4mm² can be connected to the terminal block. Cables that have a small cross-sectional area should be fitted with crimp ferules.

The wiring connections to the sounders are the same for both the BExDS110E units and BExDS120E units and are as follows:-

Terminal No's	DC Units	AC Units
2 and 3	Not Used	S3
4 and 5	+ve	S2
6 and 7	-ve	C
8 and 9	S2	N
10 and 11	S3	L

Tone Selection and 2nd & 3rd Stage Alarms

The BExDS120E and BExDS110E sounders have 32 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 in the flameproof enclosure for both DC and AC units (see figures 4 and 5). For access to the flameproof enclosure see section 8 of this instruction manual.

The tone table on page four shows the switch positions for the 32 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 normal supply terminals (+ve and -ve for DC units, L and N for AC units), see connection detail in section 12 of this instruction manual.

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

DC Units Second and Third Stage Tone Selection

The BExDS120E and BExDS110E DC sounders have the facility to use either +ve or -ve switching to change the tone to the second and third stages. For -ve switching connect the two headers on the pcb to the left-hand (marked -ve) and centre pins. For +ve switching connect the headers to the right hand (marked +ve) and the centre pins. To change to the second stage tone, connect either a -ve or +ve supply line to terminal S2 in the terminal chamber, depending on which switching mode is being used, while maintaining the dc supply to the +ve and -ve terminals. Similarly for the third stage tone, connect a -ve or +ve supply line to terminal S3. The supply to the S3 terminal will automatically override a supply to the S2 terminal.

AC Units Second and Third Stage Tone Selection

To select the second and third stage tones on the BExDS120E and BExDS110E AC sounders the Common (C) terminal on the terminal block in the terminal chamber is connected to the S2 terminal for the second stage tone and the S3 terminal for the third stage tone.

14) Volume Control

All BExDS120E and BExDS110E sounders, with the exception of 12V DC units, have a volume control to adjust the output level. To set the required output level, adjust the potentiometer on the pcb in the flameproof enclosure. See section 7 of this instruction manual for access to the flameproof enclosure. For maximum output level the potentiometer should be set to the fully clockwise position.

15) End of Line Monitoring (DC Units)

On BExDS120E and BExDS110E DC sounders, dc reverse line monitoring can be used if required. All DC sounders have a blocking diode fitted in their supply input lines.

BExDS110E Sounder

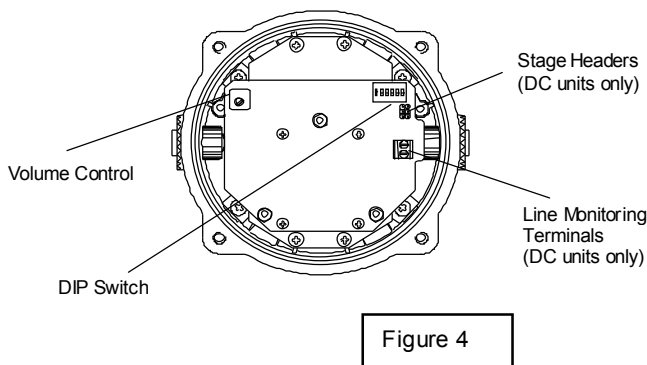


Figure 4

BExDS120E Sounder

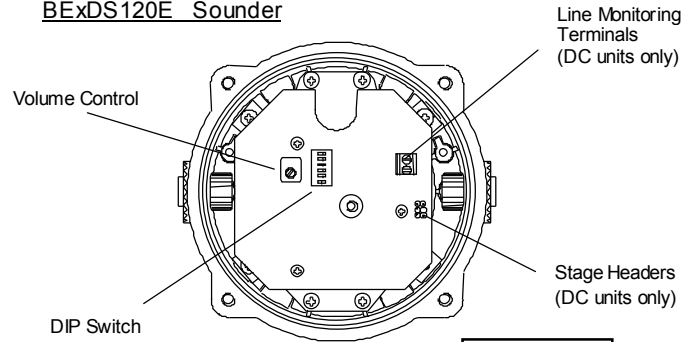


Figure 5

An end of line monitoring diode or an end of line monitoring resistor can be connected across the terminals provided in the flameproof enclosure.

Note monitoring components must not be connected to the terminal block in the Increased Safety terminal chamber. See section 7 of this instruction manual for access to the flameproof enclosure.

If an end of line resistor is used it must have a minimum resistance value of 3k3 ohms and a minimum wattage of 0.5 watts or a minimum resistance value of 500 ohms and a minimum wattage of 2 watts.

TONE SELECTION TABLE *Note Switch No. 6 is not used*

Tone Selection		DIP Switch Settings	Stage Selection	
Stage 1	Frequency Description	1 2 3 4 5	Stage 2	Stage 3
1	Continuous 1000Hz <i>Toxic gas alarm</i>	0 0 0 0 0	Tone 31	Tone 11
2	Alternating 800/1000Hz at 0.25s intervals	1 0 0 0 0	Tone 17	Tone 5
3	Slow Whoop 500/1200Hz at 0.3Hz with 0.5s gap repeated	0 1 0 0 0	Tone 2	Tone 5
4	Sweeping 800/1000 at 1Hz	1 1 0 0 0	Tone 6	Tone 5
5	Continuous at 2400Hz	0 0 1 0 0	Tone 3	Tone 27
6	Sweeping 2400/2900Hz at 7Hz	1 0 1 0 0	Tone 7	Tone 5
7	Sweeping 2400/2900Hz at 1Hz	0 1 1 0 0	Tone 10	Tone 5
8	Siren 500/1200/500Hz at 0.3Hz	1 1 1 0 0	Tone 2	Tone 5
9	Sawtooth 1200/500Hz at 1Hz	0 0 0 1 0	Tone 15	Tone 2
10	Alternating 2400/2900Hz at 2Hz	1 0 0 1 0	Tone 7	Tone 5
11	Intermittent 1000Hz at 0.5Hz <i>General alarm</i>	0 1 0 1 0	Tone 31	Tone 1
12	Alternating 800/1000Hz at 0.875Hz	1 1 0 1 0	Tone 4	Tone 5
13	Intermittent 2400Hz at 1Hz	0 0 1 1 0	Tone 15	Tone 5
14	Intermittent 800Hz 0.25s on 1s off	1 0 1 1 0	Tone 4	Tone 5
15	Continuous at 800Hz	0 1 1 1 0	Tone 2	Tone 5
16	Intermittent 660Hz 150mS on, 150mS off	1 1 1 1 0	Tone 18	Tone 5
17	Alternating 544Hz (100mS)/440Hz(400mS)	0 0 0 0 1	Tone 2	Tone 27
18	Intermittent 660Hz 1.8s on, 1.8s off	1 0 0 0 1	Tone 2	Tone 5
19	1400Hz to 1600Hz sweep up over 1s - 1600Hz to 1400Hz sweep down over 0.5s	0 1 0 0 1	Tone 2	Tone 5
20	Continuous 660Hz	1 1 0 0 1	Tone 2	Tone 5
21	Alternating 554/440Hz at 1Hz	0 0 1 0 1	Tone 2	Tone 5
22	Intermittent 554Hz at 0.875Hz	1 0 1 0 1	Tone 2	Tone 5
23	800Hz pulsing at 2Hz	0 1 1 0 1	Tone 6	Tone 5
24	Sweeping 800/1000Hz at 50Hz	1 1 1 0 1	Tone 29	Tone 5
25	Sweeping 2400/2900Hz at 50Hz	0 0 0 1 1	Tone 29	Tone 5
26	Simulated bell sound	1 0 0 1 1	Tone 2	Tone 1
27	Continuous 554Hz	0 1 0 1 1	Tone 26	Tone 5
28	Continuous 440Hz	1 1 0 1 1	Tone 2	Tone 5
29	Sweeping 800/1000Hz at 7Hz	0 0 1 1 1	Tone 7	Tone 5
30	420Hz repeating 0.625s on, 0.625s off <i>Australian alert signal</i>	1 0 1 1 1	Tone 32	Tone 5
31	1200/500Hz at 1Hz <i>Prepare to abandon platform</i>	0 1 1 1 1	Tone 11	Tone 1
32	Sweeping 500/1200Hz 3.75s on, 0.25s off 15Hz	1 1 1 1 1	Tone 26	Tone 1

EC DECLARATION OF CONFORMITY



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

Equipment Type: BExS110D, BExS120D, BExS110E, BExS120E,
BExDS120D, BExDS110D, BExDS120E, BExDS110E,
BExL25D, BExL15D, BExL25E, BExL15E,
BExDL25D, BExDL15D, BExDL25E, BExDL15E,
BExA110D, BExA120D, BExA110E, BExA120E,
BExDA110D, BExDA120D, BExDA110E, BExDA120E,
BExTS110D, BExDTS110D, BExH120D, BExDH120D, BExL25GD, BExDL25GD

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

Notified Body for EC type Examination: KEMA Quality B.V.
Notified Body No.: 0344
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands

EC-type Examination Certificate: KEMA 99ATEX6312

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: II 2 G Ex d IIB or IIC T4 or
II 2 G Ex de IIB or IIC T4
II 2 D Ex tD A21 IP66 or IP67 T100 °C or T115 °C

Standards applied: EN 60079-0:2006
EN 60079-1:2007
EN 60079-7:2003
EN 61241-0:2006
EN 61241-1:2004

Directive 89/106/EEC: Construction Products Directive (CPD) – BExS110D24DC / BExS120D24DC (tones 2, 3, 9, 15, 16, 17) only

Notified Body for EC type Examination: VdS Schadensverhütung GmbH
Notified Body No.: 0786
Amsterdamer Str 172-174, 50735 Köln, Germany

EC-type Examination Certificate: 0708-CPD-20225

Standards applied: EN 54-3:2001 + A1:2002

Directive 2009/26/EC: Marine Equipment Directive (MED) – BExS110D24DC-M only

Notified Body for EC type Examination: Germanischer Lloyd SE
Notified Body No.: 0098
Brooktorkai 18, 20457 Hamburg, Germany

EC-type Examination Certificate: 19 702 - 11 HH

Standards applied: EN 54-3:2001 + A1:2002 + A2:2006
IEC 60092-504: 2001
IEC 60533: 1999

Directive 2004/108/EC: Electromagnetic Compatibility Directive (EMC)

Standards applied: EN 61000-6-1:2007
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 61000-6-4:2007

The standards EN 60079-0: 2006, EN 60079-7:2003, EN 61241-0:2006 and EN 61241-1:2004 are no longer harmonized. The requirements of these standards have been checked against the harmonized standards EN 60079-0:2009, EN 60079-7:2007 and EN 60079-31:2009 and there were no major technical changes affecting the latest technical knowledge for the products listed above.

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.

A handwritten signature in black ink, appearing to read 'Martin Streetz'.

Martin Streetz
Quality Assurance Manager

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