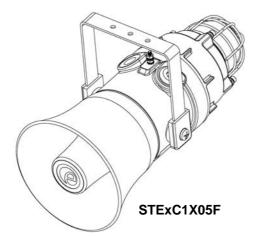


INSTRUCTION MANUAL (ATEX / IECEx)

STExC1 Combined Sounder & Beacon For use in Flammable Gas and Dust Atmospheres





 DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT



 POTENTIAL ELECTROSTATIC CHARGING HAZARD

 ALL ENTRIES M20 X 1.5 - IF TEMPERATURE
 EXCEEDS 70°C AT ENTRY OR 80°C AT BRANCHING POINT USE SUITABLE RATED CABLE AND CABLE GLANDS

2) Rating & Marking Information

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

Model No.: STExC1X05F

STExC1X05R

Input Voltage: DC Units 12V or 24V or 48V

AC Units 230V 50/60Hz

GNExC1 Codes:

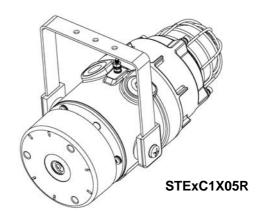
Ex db IIC Gb T6 Ta -50°C to +40°C Ex db IIC Gb T5 Ta -50°C to +55°C Ex db IIC Gb T4 Ta -50°C to +70°C Ex tb IIIC Db T110°C Ta -50°C to +70°C

Certificate No. DEMKO 16 ATEX 1466X IECEx ULD 16.0017X

Epsilon x Equipment Group and Category: $\langle \xi_{\rm X} \rangle$

II 2G

CE Marking Notified Body No. 0518



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 in normal operation, and if it does, it will only exist for a short time.

Gas Groupings:

Group IIA	Propane
Group IIB	Ethylene
Group IIC	Hydrogen and Acetylene

Temperature Classification:

T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C (up to 55°C ambient)
T6	85°C (up to 40°C ambient)

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 in normal operation, and if it does, it will only exist for a short time.			

Dust Groupings:

Group IIIA	Combustible Flyings
Group IIIB	Non-conductive Dust
Group IIIC	Conductive Dust

Maximum Surface Temperature for Dust Applications:

110°C

IP Rating: IP6X to EN/IEC60079-0 and IP66 to EN/IEC60529

Equipment Category: 2G / 2D

Equipment Protection Level: Gb, Gc, Db, Dc

Ambient Temperature Range: -50°C to +70°C

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3) Type Approval Standards

The equipment carries an EC Type Examination Certificate and IECEx Certificate of Conformity, and have been certified to comply with the following standards:

EN60079-0:2012+A11:2013 / IEC60079-0:2011 (Ed 6): Explosive Atmospheres - Equipment. General requirements

EN60079-1:2014 / IEC60079-1:2014 (Ed 7): Explosive Atmospheres - Equipment protection by flameproof enclosures "d"

BS EN 60079-31:2014 / IEC 60079-31:2013 (Ed 2): Explosive Atmospheres - Equipment dust ignition protection by enclosure "t"

4) Installation Requirements

The combined sounder beacon must only be installed by suitably qualified personnel in accordance with the latest issues of the relevant 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

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) Special Conditions of Use

Repair of the flamepath / flameproof joints is not permitted.

The metallic enclosure has a non-conductive coating. These 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.

6) Location and Mounting

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

The STEx combined sounder beacon should be secured to any flat surface using the three 7mm fixing holes. The angle can then be adjusted as required but the mounting restrictions must be observe. See Fig 1c. This can be achieved by loosening the two large bracket screws in the side of the unit, which allow adjustments in steps of 18°. The enclosure provides IP66 protection and is suitable for installation in exterior locations providing it is positioned so that water cannot collect in the horn, and the cable entry is sealed.

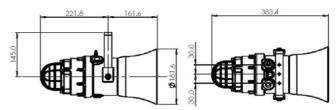


Fig 1a. Fixing Location for Small Horn

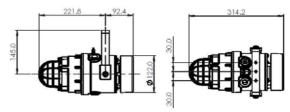


Fig. 1b Fixing Locations for Radial Horn



Fig. 1c Mounting Restrictions

7) Access to the Flameproof 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.

In order to connect the electrical supply cables to the sounder it is necessary to remove the flameproof cover to gain access to the flameproof chamber. To access the Ex d chamber, loosen the M4 grub screw on the sounder cover. Open the enclosure by turning the beacon cover counterclockwise and remove the cover, taking extreme care not to damage the flameproof threads in the process (See figure 2).

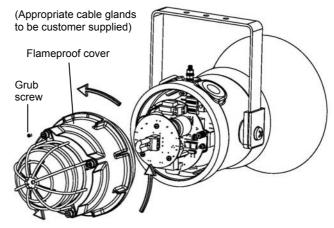


Fig. 2 Accessing the Explosion proof Enclosure.

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On completion of the installation, the flameproof threaded joint should be inspected to ensure that they are clean and that they have not been damaged during installation. Repair of the flamepath / flameproof joints is not permitted. Also check that the 'O' ring seal is in place. When fitting the flameproof cover ensure the thread is engaged correctly. Fully tighten the cover all the way, ensure no gap is visible between the cover and base of the beacon enclosure. Tighten the M4 grub screw.

8) Power Supply Selection

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

The following table shows the input current taken by the various beacons:

Model No.	Nominal Voltage	Voltage Range	Nominal Current	
STExC1X05DC012	12Vdc	10-14Vdc	944mA	
STExC1X05DC024	24Vdc	20-28Vdc	540mA	
STExC1X05DC048	48Vdc	42-54Vdc	332mA	
STExC1X05AC230	230Vac	220-240Vac 50/60Hz	132mA	

Max rated current at worst case supply voltage and flash rate.

A supply voltage variation of +/-10% outside the voltage range is permissible.

Nominal current at nominal voltage and 1Hz flash rate

Selection of Cable. Cable Glands & Blanking Elements

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

For ambient temperatures over +40°C the cable entry temperature may exceed +70°C and therefore suitable heat resisting cables and cable glands must be used, with a rated service temperature of at least 110°C

STExC1:

Ambient Temp.	50°C	55°C	60°C	65°C	70°C
Min. Rating of cables and cable glands	70°C	75°C	80°C	85°C	90°C

The cable entries have an M20 x 1.5-6H entry thread. If the installation is made using cable glands, only suitably rated and ATEX / IECEx certified cable glands must be used. They must be suitable for the type of cable being used and also meet the requirements of the current installation standards EN 60079-14 / IEC60079-14.

Any unused cable entries must be closed with suitably rated and ATEX / IECEx certified blanking plugs.

If the installation is made using conduit, openings must have a sealing fitting connected as close as practical to the wall of the enclosure, but in no case more than the size of the conduit or 50mm, whichever is the lesser. If a high IP (Ingress Protection) rating is required then a suitable sealing washer must be fitted under the cable glands or blanking plugs. A minimum ingress protection rating of IP6X must be maintained for installations in explosive dust atmospheres.

For combustible dust applications,¬ the cable entry device and blanking elements shall be in type of explosion protection and shall have an IP 6X rating.

The STEx beacon range can be supplied with the following types of adapters:

M20 to ½" NPT M20 to ¾" NPT M20 to M25

It is important to note that stopping plugs cannot be fitted onto adapters, only directly onto the M20 entries.

Any other adapters used must be suitably rated and ATEX / IECEx certified adapters.

If the installation is made using conduit, openings must have a sealing fitting connected as close as practical to the wall of the enclosure, but in no case more than the size of the conduit or 50mm, whichever is the lesser.

10) Earthing

Both AC and DC combined sounder beacon units must be connected to an earth according to EN/IEC 60079/14. The units are provided with internal and external earth terminals which are both located on the terminal chamber section of the unit

Internal earthing connections should be made to the Internal Earth terminal in the base of the housing using a ring crimp terminal to secure the earth conductor under the earth clamp. The earth conductor should be at least equal in size and rating to the incoming power conductors.

External earthing connections should be made to the M5 earth stud, using a ring crimp terminal to secure the earth conductor to the earth stud. The external earth conductor should be at least 4mm2 in size.

11) Cable Connections

Electrical connections are to be made into the terminal blocks on the PCBA located in the flameproof enclosure. See section 7 of this manual for access to the flameproof 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.

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12) AC Wiring

A 8-way terminal block is provided on the AC Sounder. There are 2-off Live, 2-off Neutral, 2-off Earth terminals, 1-off stage 2, 1-off stage 3 terminals in total.

11.1 Wiring Diagrams

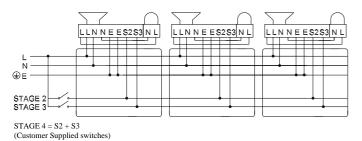
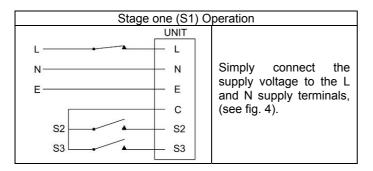


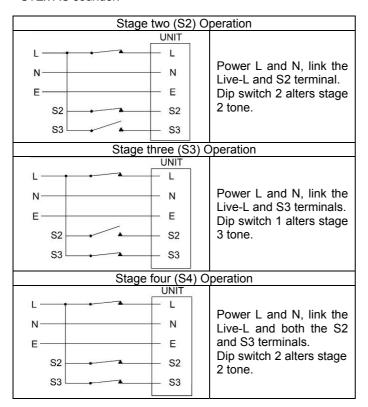
Fig 5a. STExC1AC Simplified Block Diagram

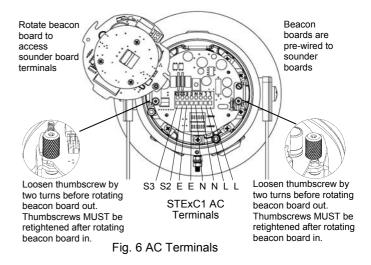
12.2 Units First Stage Tones



12.3 AC Units Second, Third and Fourth Stage Tone Selection

To select the second, third and fourth stage tones on the STEx AC sounder:





13) DC Wiring

STAGE 4 = S2 + S3

A 6-way terminal block is provided on the DC Beacon. There are 2-off +ve, 2-off -ve, 1-off stage 2 and 1-off stage 3 terminals in total.

13.1 Wiring Diagrams ++-- S2 S3-+ ++-- S2 S3-+ * STAGE 2 STAGE 3

(Customer Supplied switches)

Fig. 7a DC Simplified Block Diagram (negative switching)

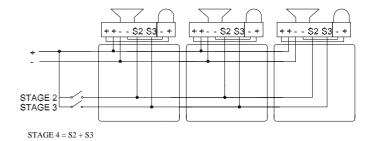
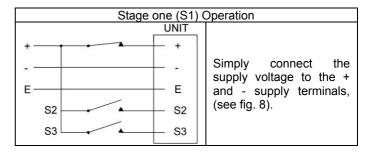


Fig. 7b DC Simplified Block Diagram (positive switching

13.2 Stage Switching

13.2.1 Units First Stage Tones

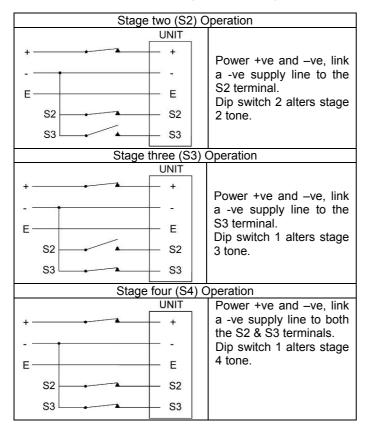


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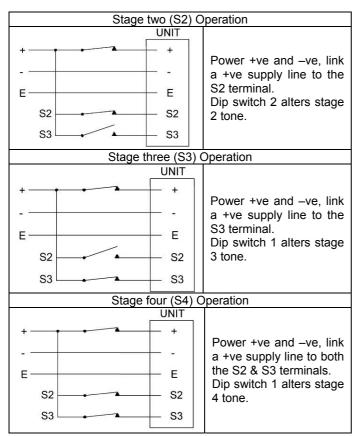
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13.2.2 DC Units Second, Third and Fourth Stage Tone Selection

For units set up for -ve switching (default setting):



For units set up for +ve switching (refer to 13.3):



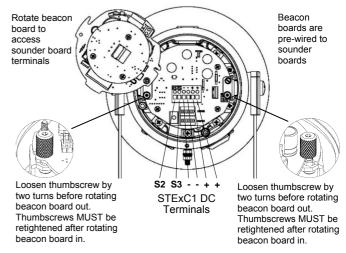


Fig. 8 DC Terminals

13.3 Stage Switching Polarity (DC Units Only)

The STExC1 DC sounder boards have the facility to use either +ve or –ve switching to change the tone to the second, third and fourth 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. (Refer to Fig. 4)

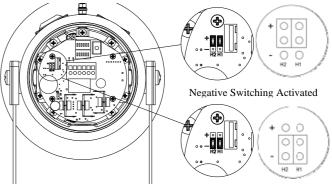


Fig. 7 Stage Switching Polarity

12.4 End Of Line Monitoring (DC Units Only)

On STExC1DC 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 diode or 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 a minimum resistance value of $3k3\Omega$ and a minimum power rating of 0.5 watts or a minimum resistance value of 500Ω and a minimum power rating of 2 watts.

The resistor must be connected directly across the +ve and -ve terminals as shown in the following drawing. The resistor leads should be kept as short as possible.

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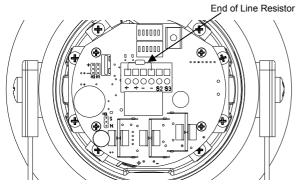


Fig. 9 End Of Line Resistor Placement

14) Wiring into the sounder and beacon separately

The sounder PCBA and beacon PCBA are linked as a default setting. They can be wired in separately by removing the link wires.

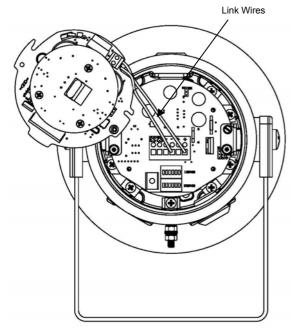


Fig. 10 STExC1 sounder terminal and beacon terminal linked

Loosen the thumbscrews and rotate the beacon board out of the way see figure 8. Untighten the wires from each terminal and remove wires.

15) Settings

14.1 Tone Selection

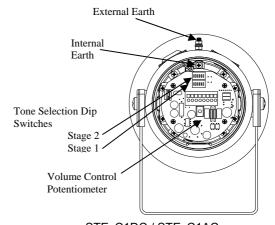
The STExS1 & STExS2 units have 64 different tones that can be selected independently for the first and second stage alarms. The tones are selected by operation of the tone setting DIP switches 1 & 2 (see Fig. 3) on the PCB. The sounders can also be switched to sound the third and fourth stage alarm tones. The tone table (Table 1) shows the switch positions for the 64 tones on first and second stages and which tones are available for the third and fourth stages dependent on the Stage 1 DIP switch setting.

14.2 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 STEx sounder can be set by adjusting the volume control potentiometer (see Fig 3). For maximum output, set the potentiometer fully clockwise.



STExC1DC / STExC1AC

Fig. 11 Location of field controls

16) Flash Rate Settings

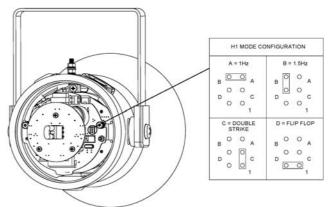


Fig. 12 DC Flash Settings

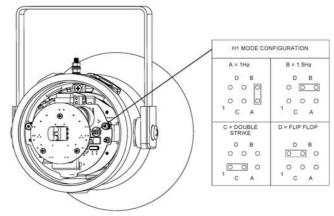


Fig. 13 AC Flash Settings

(Flip-Flop Mode not available on STExC1X05)

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17) Interchangeable & Spare Parts



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

The beacon lens are interchangeable, contact European Safety Systems Ltd for a replacement lens available in various colours.

The guard is an integral part of the protection and must be reassembled exactly the same way as it was disassembled.

To change the lens, unscrew the M5 socket head screws and remove the M5 screws, M5 spring & flat washers.

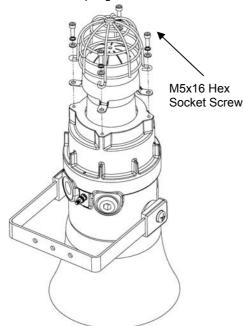


Fig 7. Removal of Lens Remove the guard and replace the old lens with the new lens.

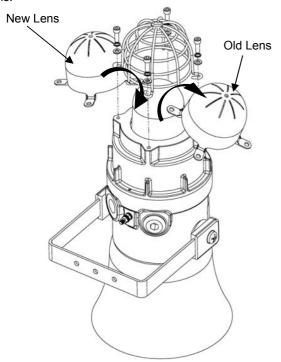


Fig 8. Changing of Lens

Fit the guard back on to the lens and casting, align the holes of the guard, lens and casting. To reattach the lens, the fixings MUST be in the order shown in figure 6.

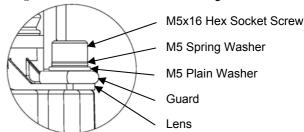


Fig 9. Lens & Guard fixings order

18) Maintenance, Overhaul and 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

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.

Flameproof threaded joints and cemented joints are not permitted to be repaired.

Electrostatic charging hazard - Clean only with a damp cloth.

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Tone Selection – To select the required first stage tone set the tone Set DIP switch 1 (6 way DIP see Fig 3) to the required tone setting shown in the table below. The table also shows the second stage tone can be set independently with the Stage 2 DIP switch to select the required tone. The 3rd and 4th stage tones are available if more than two tone output stages are required, they are set/linked via the first stage tone selection.

Stage 1 Set DIP Switch 1	o tone output stages are require Tone Description	ed, they are set/linked via the first stage tone selection. Tone Visual	Stage 1 & 2 DIP Switch Settings	Stage 2 Set DIP Switch 2 Tone	Stage 3 Set DIP Switch 1 Tone	Stage 4 Set DIP Switch 1 Tone
Tone No			123456	(S2)	(S3)	(S2 + S3)
1	1000Hz PFEER Toxic Gas	1000Hz	000000	1	2	44
2	1200/500Hz @ 1Hz DIN / PFEER P.T.A.P.	1200Hz 500Hz 1s	100000	2	3	44
3	1000Hz @ 0.5Hz(1s on, 1s off) PFEER Gen. Alarm	1000Hz 1s	010000	3	2	44
4	1.4KHz-1.6KHz 1s, 1.6KHz-1.4KHz 0.5s NF C 48-265	1600Hz 1s 0.5s	110000	4	24	1
5	544Hz(100mS)/440Hz (400mS) NF S 32-001	544Hz 0.1s 440Hz 0.4s	001000	5	19	1
6	1500/500Hz - (0.5s on , 0.5s off) x3 + 1s gap AS4428	1500Hz 0.5s 0.5s 0.5s 0.5s 1.5s	101000	6	44	1
7	500-1500Hz Sweeping 2 sec on 1 sec off AS4428	1500Hz 2s 1s	011000	7	44	1
8	500/1200Hz @ 0.26Hz(3.3s on, 0.5s off) Netherlands - NEN 2575	1200Hz 3.3s 0.5s	111000	8	24	35
9	1000Hz (1s on, 1s off)x7 + (7s on, 1s off) IMO Code 1a	1000Hz 1s 1s 1s 1s 1s 1s 7s	000100	9	34	1
10	1000Hz (1s on, 1s off)x7 + (7s on, 1s off) IMO Code 1a		100100	10	34	1
11	420Hz(0.5s on, 0.5s off)x3 + 1s gap ISO 8201 Temporal Pattern	420Hz 0.5s 0.5s 0.5s 1.5s	010100	11	1	8
12	1000Hz(0.5s on, 0.5s off)x3 + 1s gap ISO 8201 Temporal Pattern	1000Hz 0.5s 0.5s 0.5s 0.5s 1.5s	110100	12	1	8
13	422/775Hz - (0.85 on, 0.5 off) x3 + 1s gap NFPA - Temporal Coded	775Hz 422Hz 0.85s 0.5s 0.85s 0.5s 0.85s 1.5s	001100	13	1	8
14	1000/2000Hz @ 1Hz Singapore	2000Hz 1000Hz 1s	101100	14	3	35
15	300Hz Continuous	300Hz ———	011100	15	24	35
16	440Hz Continuous	440Hz ————	111100	16	24	35
17	470Hz Continuous	470Hz ————	000010	17	24	35
18	500Hz Continuous IMO code 2 (Low)	500Hz ————	100010	18	24	35
19	554Hz Continuous	554Hz	010010	19	24	35
20	660Hz Continuous	660Hz	110010	20	24	35
21	800Hz IMO code 2 (High)	800Hz	001010	21	24	35
22	1200Hz Continuous	1200Hz ———	101010	22	24	35
23	2000Hz Continuous	2000Hz	011010	23	3	35
24	2400Hz Continuous	2400Hz	111010	24	20	35
25	440 @0.83Hz (50 cycles/minute) Intermittent	440Hz 0.6s 0.6s	000110	25	44	8
26	470 @0.9Hz - 1.1s Intermittent	470Hz 0.55s 0.55s	100110	26	44	8
27	470Hz @5Hz - (5 cycles/second) Intermittent	470Hz 0.1s 0.1s	010110	27	44	8
28	544Hz @ 1.14Hz - 0.875s Intermittent	470Hz 0.43s 0.44s	110110	28	24	8
29	655Hz @ 0.875Hz Intermittent	655Hz 0.57s 0.57s	001110	29	44	8
30	660Hz @0.28Hz - 1.8sec on, 1.8sec off Intermittent	660Hz 1.8s 1.8s	101110	30	24	8
31	660Hz @3.34Hz - 150mS on, 150mS off Intermittent	660Hz 0.15s 0.15s	011110	31	24	8

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32	745Hz @ 1Hz Intermittent	745Hz 0.5s 0.5s	111110	32	24	8
33	800Hz - 0.25sec on, 1 sec off Intermittent	800Hz 0.25s 1s	000001	33	24	8
34	800Hz @ 2Hz IMO code 3.a (High) Intermittent	800Hz 0.25s 0.25s	100001	34	24	8
35	1000Hz @ 1Hz Intermittent	1000Hz 0.5s 0.5s	010001	35	24	8
36	2400Hz @ 1Hz Intermittent	2400Hz 0.5s 0.5s	110001	36	24	8
37	2900Hz @ 5Hz Intermittent	2900Hz 0.1s 0.1s	001001	37	24	8
38	363/518Hz @ 1Hz Alternating	518Hz 0.5s 0.5s 363Hz 0.5s	101001	38	8	19
39	450/500Hz @ 2Hz Alternating	500Hz 450Hz 0.25s	011001	39	8	19
40	554/440Hz @ 1Hz Alternating	554Hz 0.5s 0.5s	111001	40	24	19
41	554/440Hz @ 0.625Hz Alternating	554Hz 0.8s 440Hz 0.8s	000101	41	8	19
42	561/760Hz @0.83Hz (50 cycles/minute) Alternating	760Hz 0.6s 0.6s	100101	42	8	19
43	780/600Hz @ 0.96Hz Alternating	780Hz 0.52s 600Hz 0.52s	010101	43	8	19
44	800/1000Hz @ 2Hz Alternating	1000Hz 800Hz 0.25s	110101	44	24	19
45	970/800Hz @ 2Hz Alternating	970Hz 0.25s 800Hz 0.25s	001101	45	8	19
46	800/1000Hz @ 0.875Hz Alternating	1000Hz 0.57s 800Hz 0.57s	101101	46	24	19
47	2400/2900Hz @ 2Hz Alternating	2900Hz 0.25s 2400Hz 0.25s	011101	47	24	19
48	500/1200Hz @ 0.3Hz Sweeping	1200Hz 500Hz 3,34s	111101	48	24	12
49	560/1055Hz @ 0.18Hz Sweeping	1055Hz 560Hz 5,47s	000011	49	24	12
50	560/1055Hz @ 3.3Hz Sweeping	1055Hz 560Hz 0.3s	100011	50	24	12
51	600/1250Hz @ 0.125Hz Sweeping	1250Hz 600Hz 8s	010011	51	24	12
52	660/1200Hz @ 1Hz Sweeping	1200Hz 660Hz 1s	110011	52	24	12
53	800/1000Hz @ 1Hz Sweeping	1000Hz 800Hz 1s	001011	53	24	12
54	800/1000Hz @ 7Hz Sweeping	1000Hz 800Hz 0.14s	101011	54	24	12
55	800/1000Hz @ 50Hz Sweeping	1000Hz 800Hz 0.02s	011011	55	24	12
56	2400/2900Hz @ 7Hz Sweeping	2900Hz 2400Hz 0.14s	111011	56	24	12
57	2400/2900Hz @ 1Hz Sweeping	2900Hz 2400Hz 1s	000111	57	24	12
58	2400/2900Hz @ 50Hz Sweeping	2900Hz 2400Hz 0.02s	100111	58	24	12
59	2500/3000Hz @ 2Hz Sweeping	2400Hz 0.02s 3000Hz 0.5s	010111	59	24	12
60	2500/3000Hz @ 7.7Hz Sweeping	2500Hz 0.13s	110111	60	24	12
61	800Hz Motor Siren	800Hz 1.6s	001111	61	24	12
62	1200Hz Motor Siren	1200Hz 2s	101111	62	24	12
63	2400Hz Motor Siren	2400Hz	011111	63	24	12
64	Simulated Bell	1450Hz 0.25s	111111	64	21	12

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