

INSTRUCTION MANUAL (ATEX / IECEx)

BExDCTS110-05D

Electronic Sounder / Beacon with Call Relay

For use in Flammable Gas and Dust Atmospheres

1) Introduction

The BExDCTS110-05D is a flameproof combined electronic Sounder / Beacon with Call Relay which is certified to meet the requirements of the ATEX directive 94/9/EC and the IECEx Scheme. The combined Sounder / Beacon produces a loud audible signal and a visual signal, when triggered by a telephone ringing signal and can be used in hazardous areas where potentially flammable gas and dust atmospheres may be present. Thirty-two different sounds can be selected by internal switches, (see *tone table on Page 5*). The electronic sounder produces output levels in the 110dB(A) range and the beacon produces an output level of 5 joules. The unit can be used in Zone 1 and Zone 2 areas with gases in groups IIA and IIB and with Temperature Classifications of T1, T2, T3, and T4 and can also be used in Zone 21 and Zone 22 areas for combustible dusts and have an IP rating of IP 67 and a surface temperature rating of T115°C (T100°C at +55°C).

2) Marking

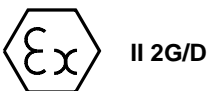
All units have a rating label, which carries the following important information:

Unit Type No. BExDCTS110-05D

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

Codes: Ex d IIB T4 for Ta –50°C to +70°C
 Ex tD A21 IP6X T115°C based on max Ta of +70°C

Certificate No. KEMA 01ATEX2223X
 IECEx KEM 10.0025X

Epsilon x:
 Equipment Group and
 Category: 

CE Marking:  0518
 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
 CABLEGLANDS (Rated 110°C) AT
 AMB. TEMPERATURES OVER 40°C

Year of Construction /
 Serial No. i.e. 10 / 1DCTS21000001

3) Type Approval Standards

The units have an EC Type examination certificate issued by DEKRA 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'
EN61241-0:2006	IEC61241-0:2004 (Ed1)	Dust General Requirements
EN61241-1:2004	IEC60079-1:2004 (Ed1)	Dust Enclosures tD

4) Installation Requirements

The unit must be installed in accordance with the latest issues of the relevant parts of the EN 60079 specifications or the equivalent IEC specifications – 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 unit 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 BExDCTS110-05D unit has been certified Ex d IIB T4 for Ta –50°C to +70°C for gas and Ex tD A21 IP6X 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

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: IP67 T100°C Ta ≤ +55°C
T115°C Ta ≤ +70°C

Equipment Category: 2G/D

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

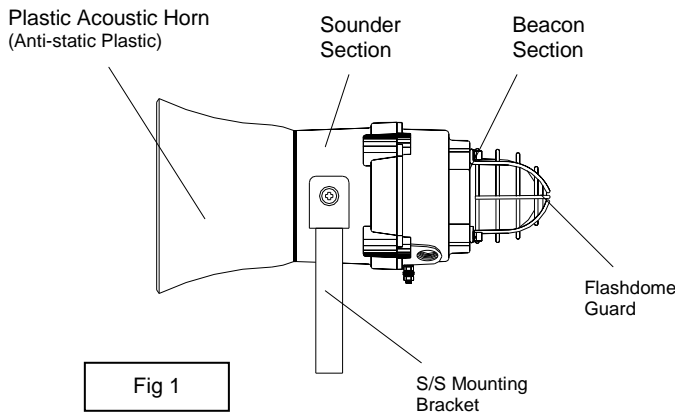
6) Location and Mounting

The location of the unit should be made with due regard to the area over which both the sounder and beacon warning signals must be audible and visible. The unit should only be fixed to services that can carry the weight of the unit.

The unit 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 such that its warning signals can be both heard and seen. 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 unit cannot move in service.

SAFETY WARNING:

The flashdome guard must not be removed from the unit at any time.



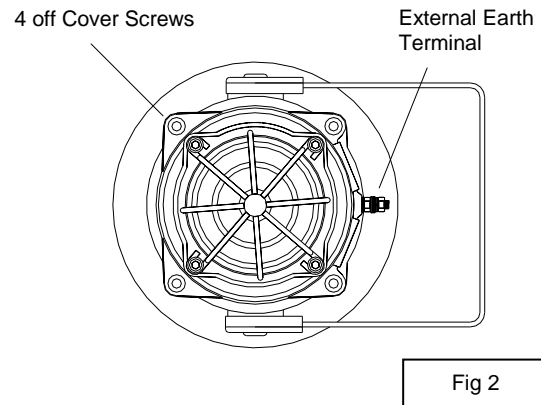
7) Access to the Flameproof Enclosure

In order to connect the electrical supply cables to the unit it is necessary to remove the beacon 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 beacon section 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 units.** It is therefore important that these screws and their spring washers are kept in a safe place during installation.

On completion of the cable wiring installation the flameproof joints should be inspected to ensure that they are clean and that they have not been damaged during installation. Also check that the earth bonding wire between the two casting sections is secure and the 'O' ring seal is in place. When replacing the beacon section casting, ensure that it is square with the sounder section chamber casting before inserting. Carefully push the beacon section in place allowing time for the air to be expelled. Only after the beacon section casting is fully in place should the four M6 Stainless Steel A4-80 cover bolts and their spring washer be inserted and tightened down. If the beacon section jams while it is being inserted, carefully remove it and try again. Never use the cover bolts to force the beacon section casting into position.

In case of repair, contact the manufacturer for information on the dimensions of the flameproof joints.



8) Power Supply Selection

It is important that a suitable power supply is used to run the unit. The power supply selected must have the necessary capacity to provide the input current to all of the units connected to the system. The sounder and beacon sections are both wired to the same power supply.

The following table shows the input current taken by the sounder section and beacon section of the various units:-

Unit Type	Input Voltage	Sounder Current	Max. I/P Volts
BExDCTS110-05D	24V DC	265mA	30V
BExDCTS110-05D	12V DC	195mA	15V
BExDCTS110-05D	48V DC	130mA	58V
BExDCTS110-05D	230V AC	56mA	264V
BExDCTS110-05D	115V AC	110mA	126V

Unit Type	Input Voltage	Beacon Current	Max. I/P Volts
BExDCTS110-05D	24V DC	300mA	30V
BExDCTS110-05D	12V DC	750mA	15V
BExDCTS110-05D	48V DC	180mA	58V
BExDCTS110-05D	230V AC	55mA	264V
BExDCTS110-05D	115V AC	140mA	126V

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

Sounder Section

The input current to the sounder section 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 and 115V 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.

Beacon Section

The input current to the beacon section will vary according to the voltage input level. The current levels shown above are for nominal input voltage. The 12V, 24V and 48V DC units have a converter 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.

9) 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 units 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 units connected to the line.

SAFETY WARNING: If the unit is 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.

10) Earthing

Both AC and DC 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 beacon section of the unit (see figures 2 and 3).

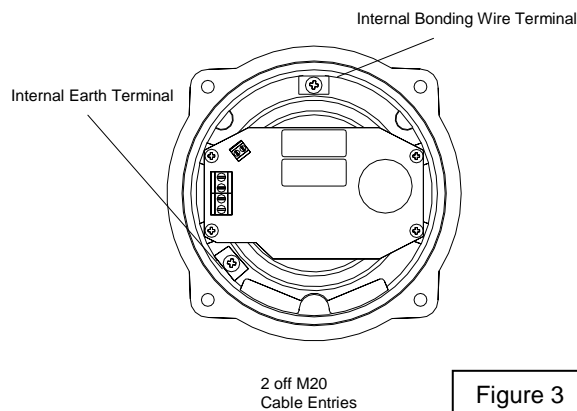


Figure 3

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 wire ensures that a good quality earth is maintained between the sounder section casting and the beacon section casting.

11) Cable Glands

The BEXDCTS110-05D unit has dual cable gland entries which have an M20 x 1.5 entry thread as standard. Only cable glands approved for Ex 'd' applications can be used, which must be suitable for the type of cable being used and also meet the requirements of the Ex 'd' flameproof installation standard EN 60079-14:2008 / IEC60079-14:2007.

When only one cable entry is used the other one must be closed with an Ex 'd' flameproof 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 unit is 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.

12) Cable Connections

The combined sounder / beacon unit BEXDCTS110-05D has separate printed circuit boards in the sounder and beacon sections. The terminals for the incoming power supply and telephone signal are on the printed circuit board in the sounder section and the terminals for the beacon are on the printed circuit board in the beacon section (see figures 4&5 and 6&7). See section 7 of this manual for access to the enclosure and the wiring diagrams at the end of this manual.

The incoming cables must be wired to the terminals on the electronics assembly in the sounder and beacon section of the unit.

POWER CONNECTIONS TO SOUNDER AND BEACON SECTION

The power input cable should enter the enclosure via one of the M20 cable entries and be connected to the following terminals.

The power input (L) AC units or (+ve) DC units is connected to the telephone board (L/+) terminal (see figures 8 & 9)

The power input (N) AC units or (-ve) DC units is connected to the beacon board (N) AC or (-ve) DC units terminal (see figures 8 & 9)

(L & N) AC units (+ve & -ve) DC units in the sounder section of the unit (see figures 6 and 7).

The telephone signal cable should enter the enclosure via the other M20 entry and be connected to the telephone terminal in the sounder section of the units (see figures 6,7 and 8,9) and wiring diagrams on pages four and five.

A single wire with a cross sectional area of up to 4mm² can be connected to each terminal way. When connecting wires to the terminals great care should be taken to dress the wire so that when the beacon section 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 and above.

BExDCTS110-05D AC Beacon Section

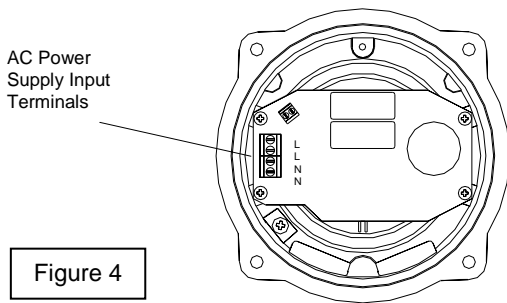


Figure 4

BExDCTS110-05D DC Beacon Section

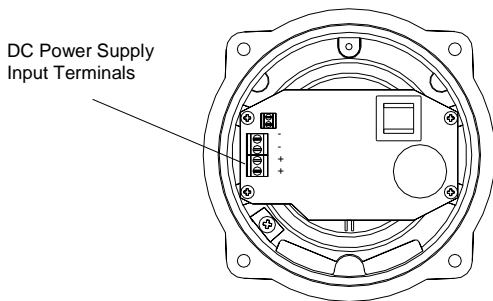


Figure 5

BExDCTS110-05D AC Sounder Section

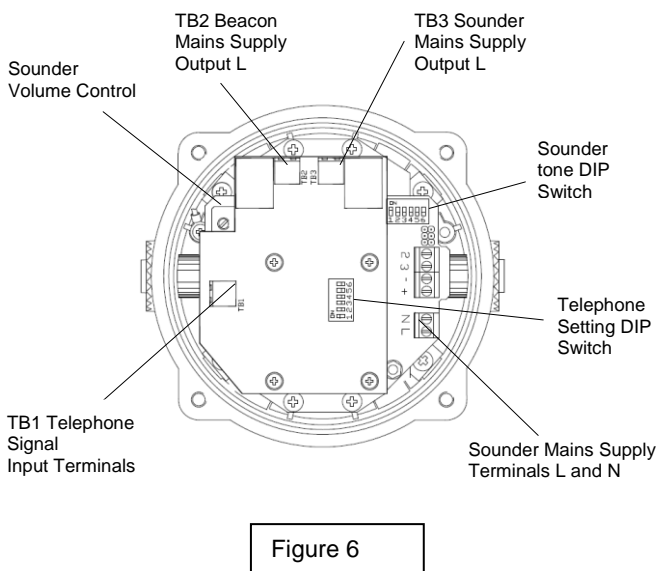


Figure 6

BExDCTS110-05D DC Sounder

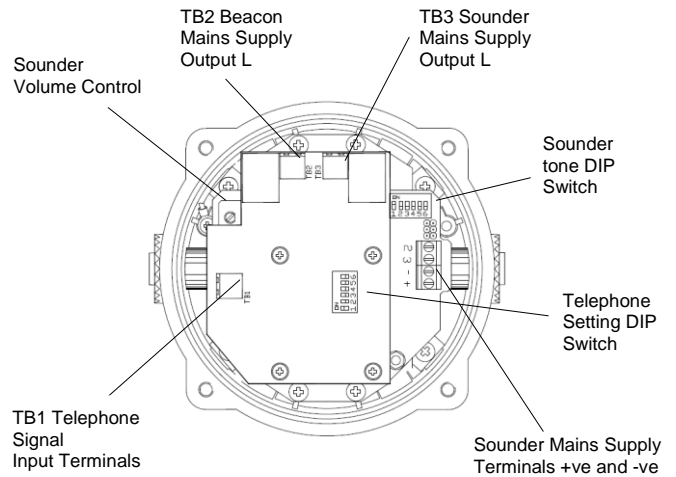


Figure 7

13) Sounder Tone Selection

The BExDCTS110-05D combined sounder / beacons have 32 different tones that can be selected by the DIP switches on the sounder pcb (see figures 6 and 7). The tone table on page five shows the switch positions for the 32 tones.

14) Sounder Volume Control

The BExDCTS110-05D combined sounder / beacon has a volume control to adjust the output level. To set the required output level, adjust the potentiometer on the sounder pcb (see figure 6 & 7). For maximum output level the potentiometer should be set to the fully clockwise position.

15) Telephone Setting DIP & Continuous or Pulse Sounder Beacon Operation

The BExDCTS110-05D combined sounder / beacon has a number of modes of operation. The sounder and beacon can be set individually to either run continuously or pulsed at the cadence of the ringing tone. This is set by setting the DIP switches on the Telephone pcb (see figures 6 and 7).

The Telephone Selection Table on page six shows the switch positions 1 - 4 for the country setting and switch 5 for the beacon continuous or pulse mode and switch 6 for the sounder continuous or pulse mode. **When making any changes to the country selection, the unit needs to be de-energised for a minimum of 2 minutes for the changes to take effect.**

When pulse mode of operation is selected the tone pattern will pulse on and off following the telephone input signal. Note if pulsed tone operation is selected it is advisable not to select any of the intermittent tones, such as tone 11. The beacon will flash at the ringing cadence if pulse is selected.

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

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

BExDCTS110-05D AC Wiring Diagram

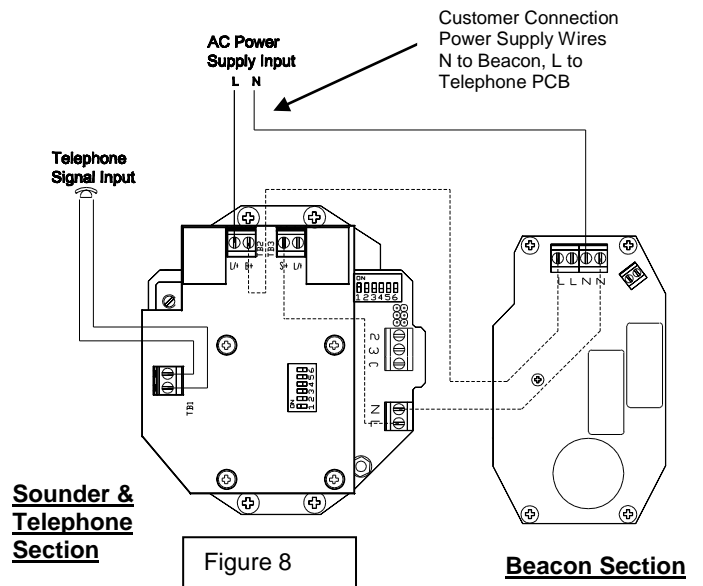


Figure 8

BExDCTS110-05D DC Wiring Diagram

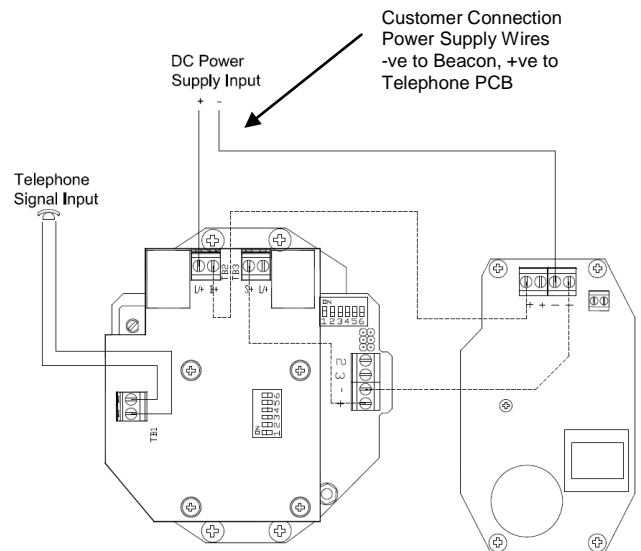


Figure 9

16) CAUTION! - Ensure correct orientation of Beacon Housing onto Sounder housing when closing unit

Please note that due to the tight spacing internally the Beacon housing can only be closed in one orientation relative to the Sounder housing, otherwise PCB boards may become damaged.

The M20 entries on the Beacon housing must be aligned with the product labels on the side of the Sounder housing (both M20 entries and labels on the same side).

TELEPHONE DIALING COUNTRY AND CONTINUOUS OR PULSE SELECTION TABLE

Telephone Selection Settings	DIP Switch Settings	DIP Switch Settings
<u>Dialing Country Setting</u>	1 2 3 4	5 6
Australia Ireland New Zealand Singapore South Africa UK	0 0 0 0	
Belgium Canada Cyprus Hong Kong Spain Turkey USA	1 0 0 0	
Czech Republic Finland France Germany Greece Italy Luxemburg Netherlands Norway Switzerland	0 1 0 0	
Austria Iceland Portugal Sweden	1 1 0 0	
Denmark	0 0 1 0	
<u>Pulse or Continuous Setting</u>		
Beacon & Sounder Continuous		0 0
Beacon Continuous, Sounder Pulsed		0 1
Beacon Pulsed, Sounder Continuous		1 0
Beacon & Sounder Pulsed		1 1