

# BExCL15-05 / BExDCL15-05

## Combination PA Loudspeaker

The flameproof BExCL15-05 combination PA loudspeakers and Xenon beacons are suitable for Zone 1 & Zone 2 applications and the BExDCL15-05 versions also for Zone 21 & 22.

### COMSEC PROTECTION SYSTEMS LTD.

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#### Features:

- Glass dome with optically enhanced prismatic PC lens
- Stainless Steel guard
- Very large termination area.
- Ratchet adjustable stainless steel 'U' bracket.
- The sounder & beacon may be connected from a single supply for simultaneous operation or from separate supplies for independent operation
- 'Programmable' version available:
  - 45 alarm tones
  - 4 remotely selectable stages
  - Any tone can be assigned to any stage
  - User configurable continuous frequency tone

#### Approvals:

- ATEX certificate: KEMA 01ATEX2223X, EN 60079-0 : 2006, EN 60079-1 : 2007, EN 61241-0 : 2006, EN 61241-1 : 2004
- IECEx certificate: IECEx KEM 10.0025, IEC 60079-0 : 2004 (Ed4), IEC 60079-1 : 2007 (Ed6), IEC 61241-0 : 2004 (Ed1), IEC 61241-1 : 2004 (Ed1)
- GOST-R certificate: POCC GB.JB05.B02205
- Safety-integrity suitability: SIL1

#### Xenon Beacon Current consumption:

Version:	Voltage range:	Current:
12V dc	10-14V	750mA
24V dc	20-28V	300mA
48V dc	42-54V	180mA
115V ac 50/60Hz	+/-10%	140mA
230V ac 50/60Hz	+/-10%	55mA

#### Part codes:

Part Code:	Classification:
BExCL1505D****	ATEX / IECEx: II 2G Ex d IIB T4 Ta. -50° to +70°C GOST-R: 1ExdIIBT4 Ta. -50° to +55°C
BExDCL1505D****	ATEX / IECEx: II 2G Ex d IIB T4 Ta. -50°C to. +70°C II 2D Ex tD A21 IP67 T115°C based on max Ta. of +70°C GOST-R: 1ExdIIBT4 Ta. -50° to +55°C DIP A21 Ta T5

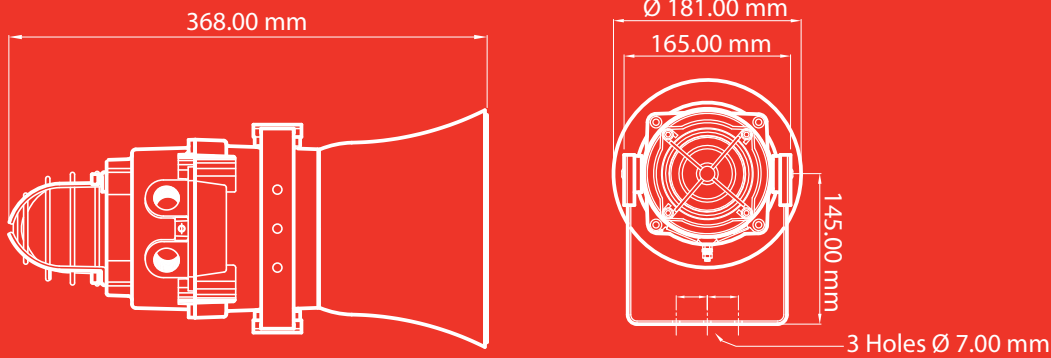
\*\*\*\* = type reference:

Options:	70V	70V Line transformer
	100V	100V Line transformer
	8R	8 Ohm low impedance
	16R	16 Ohm low impedance



GOST-R





### Specification:

#### Loudspeaker:

SPL:	102dB +/-3dB @ 1w @ 1m - Pink noise 113dB +/-3dB @ 15w (rated power) @ 1m
Rated power:	15 Watts RMS
70v line tapings:	15w / 7.5w / 3w / 1w (z=336.67 Ohms / 653.33 Ohms / 1.6k Ohms / 4.9k Ohms)
100v line tapings:	15w / 7.5w / 3w / 1w (z=666.87 Ohms / 1.34k Ohms / 3.34k Ohms / 10k Ohms)
Low impedance:	8 Ohm or 16 Ohm
Dispersion:	120° @ 1kHz & 32° @ 4kHz
Frequency range:	400Hz to 8000 Hz
DC Line monitoring:	2.2µF Capacitor (Transformer version) 470µF Capacitor (Impedance version)

#### Beacon:

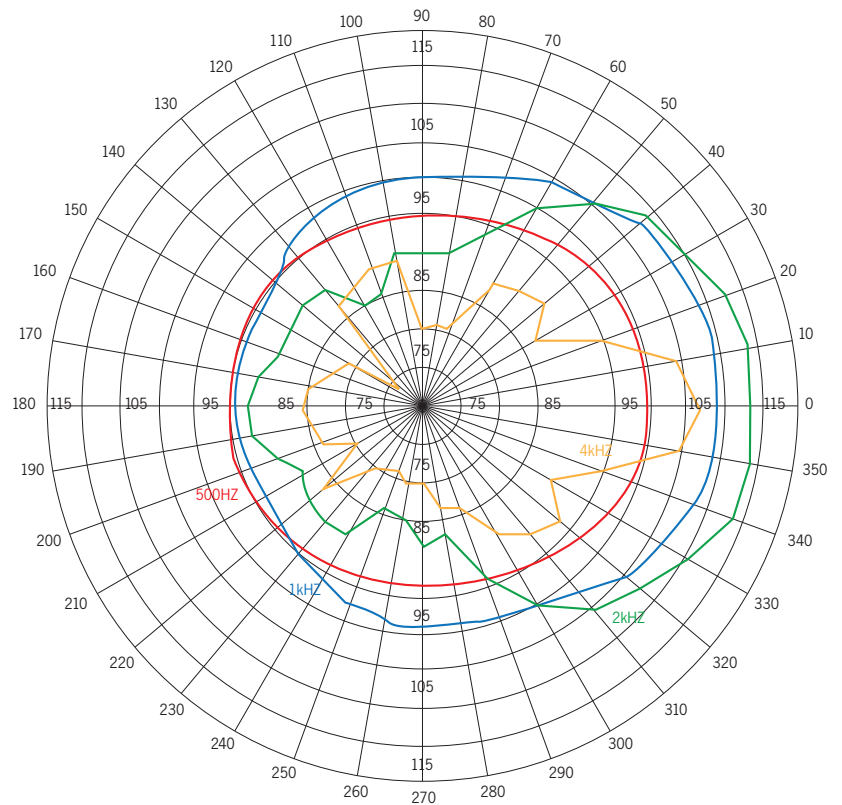
Energy:	5 Joules (5Ws)
Flash rate:	1Hz (60 fpm)
Peak Candela:	34,812 cd
Effective Intensity cd:	105 cd*
Lens colours:	Amber, Blue, Clear, Green, Red & Yellow
Tube life :	Emissions are reduced to 70% after 8 million flashes

#### General:

Ingress protection:	IP66/67
Housing material:	Marine grade copper free LM6 Aluminium
Housing finish:	Phosphated & powder coated
BEXCL15-05 flare:	High impact UL94 V0 & 5VA FR ABS (Red)
BEXDCL15-05 flare:	Anti-Static High impact ABS (Black)
Cable entries:	Dual M20 ISO (one stopping plug included)
Terminals:	0.5 to 4.0mm <sup>2</sup> cables.
Line monitoring :	Min. 500 Ohm 2w, or 3k3 Ohm 0.5w res. or diode (dc versions).
Weight :	5.00kg

\*SPL data +/-3dB(A). Measured at optimum voltage.

\*Candela measurements representative of performance with clear lens at optimum voltage.





# INSTRUCTION MANUAL (ATEX / IECEx)

## BExCL15-05D

### Flameproof Combined Loudspeaker / Beacon

## 1) Introduction

The BExCL150-05D is a flameproof combined loudspeaker / beacon which is certified to meet the requirements of the ATEX directive 94/9/EC and the IECEx Scheme. The loudspeaker section produces a 15 watt audio signal and the beacon section produces a synchronised visual warning signal. There are three loudspeaker section versions, 8 ohm, 16 ohm or 100V Line transformer. On 100V line transformer units there are four output tapings and the unit produces output levels in the 112dB(A) range. The unit can be used in hazardous areas where potentially flammable atmospheres may be present. 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.

## 2) Marking

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

Unit Type No. BExCL15-05D

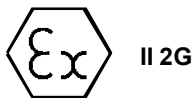
Loudspeaker Impedance: 8 ohm or 16 ohm  
100V Line

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

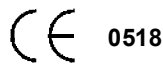
Code: Ex d IIB T4 for Ta -50°C to +70°C

Certificate No. KEMA 01ATEX2223X  
IECEx KEM 10.0025X

Epsilon x:  
Equipment Group  
and Category:



CE Marking:  
Notified Body No.



**“Warnings”** DO NOT OPEN WHEN AN EXPLOSIVE  
GAS 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 / 1CL21000001

## 3) Type Approval Standards

The units have an EC Type examination certificate 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'

## 4) Installation Requirements

The unit must be installed in accordance with the latest issues of the relevant parts of the EN60079 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 and Temperature Classification

The BExCL15-05D unit has been certified Ex d IIB T4 for Ta -50°C to +70°C. This means that the units can be installed in locations with the following conditions:-

### Area Classification:

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

Equipment Category: 2G

### Temperature Classification:

T1	400°C
T2	300°C
T3	200°C
T4	135°C

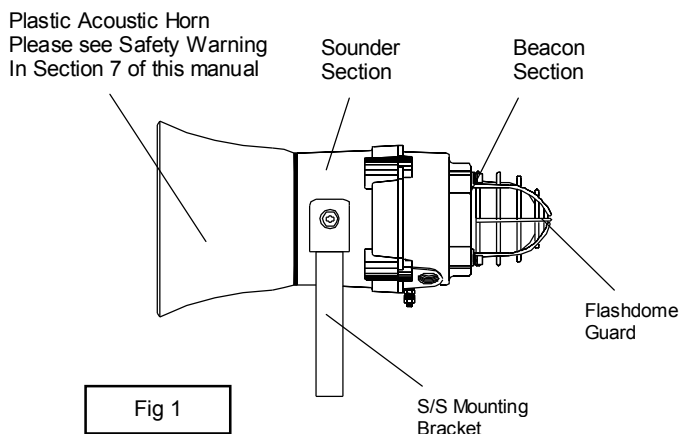
### Ambient Temperature Range:

-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 loudspeaker and beacon warning signal 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 bolt holes in the stainless steel U shaped mounting bracket (see figure 1). The angle can then be adjusted in the direction such that its warning signal 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.



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.

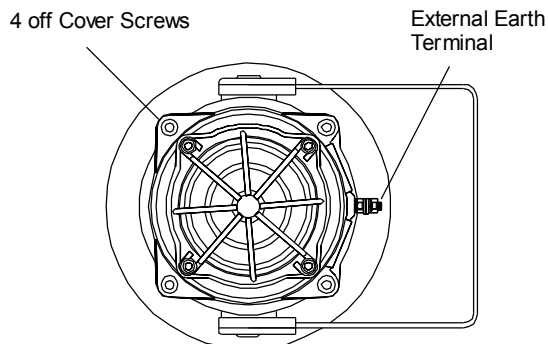


Fig 2

## 9) Power Amplifier Selection

It is important that the loudspeaker section is connected to a power amplifier that has outputs that are compatible to the type of loudspeaker being used. Loudspeakers with a 100V Line matching transformer fitted must be connected to a power amplifier with a 100V line output. Low impedance 8 ohm or 16 ohm loudspeakers must be connected to amplifiers with a suitable low impedance output. When selecting the cable size consideration must be given to the current that each unit draws, the number of loudspeakers on the line and the length of the cable runs.

The following table shows the range of loudspeakers:-

Unit Type	Input	Wattage	Max. I/P Volts
BExCL15-05D	100V Line	15W	100V
BExCL15-05D	8 ohm	15W	10.95V
BExCL15-05D	16 ohm	15W	15.49V

The above table also shows the maximum AC signal voltages at which the loudspeakers can be operated.

The current levels taken by the each loudspeaker will depend on which output tapping has been selected (see section 14 of this instruction manual). The 100V Line units have output levels of 15W, 7.5W, 3W and 1W.

## 10) Beacon Power Supply Selection

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

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

## 7) Safety Warning (Electrostatic Hazard)

The acoustic horn section is made of ABS Plastic, therefore to avoid a possible ELECTROSTATIC CHARGE the unit must only be cleaned with a damp cloth.

## 8) 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 sounders.** 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 loudspeaker section chamber casting before inserting. Carefully push the beacon section in place allowing

Unit Type	Input Voltage	Beacon Current	Max. I/P Volts
BExCL15-05D	24V DC	300mA	30V
BExCL15-05D	12V DC	750mA	15V
BExCL15-05D	48V DC	180mA	58V
BExCL15-05D	230V AC	55mA	264V
BExCL15-05D	115V AC	140mA	126V

### 13) Cable Glands

The BExCL15-05D unit has dual cable gland entries which have an M20 x1.5 entry thread as standard or a PG13.5 thread as a special. 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 EN60079-14:2008 / IEC60079-14:2007.

**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.

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

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.

### 14) Cable Connections

The combined sounder beacon unit BExCL15-05D has separate printed circuit boards in the loudspeaker and beacon sections. The terminals for the loudspeaker are on the printed circuit board in the loudspeaker 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 8 of this manual for access to the enclosure and the wiring diagrams at the end of this manual.

#### LOUDSPEAKER CONNECTIONS (100V Line)

The 100V Line loudspeakers are fitted with a five way terminal block. Terminal A is common and one of the other terminals B, C, D or E should be selected depending on what output level is required (see table below).

Terminals	Wattage
A - B	15W
A - C	7.5W
A - D	3W
A - E	1W

A single wire with a cross sectional area of up to 4mm<sup>2</sup> can be connected to each terminal way or if an input and output wire is required two 2.5mm<sup>2</sup> wires 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 2.5mm<sup>2</sup> and above.

#### LOUDSPEAKER CONNECTIONS (Low Impedance)

BExCL15-05D 8 ohm and 16 ohm low impedance loudspeakers have dual input terminals on the pcb assembly for input and output wiring. A cable of up to 2.5mm<sup>2</sup> can be connected to each terminal. If dc line monitoring is used cut the link on the board (see figure 7 and section 14 of this manual).

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.

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

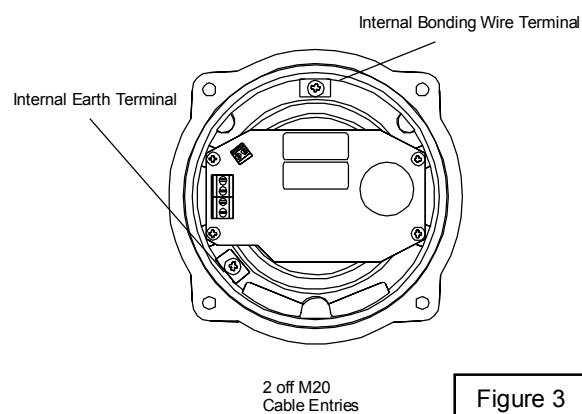
### 11) Cable Selection

When selecting the cable size consideration must be given to the input current that each unit draws (see tables 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.

### 12) 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).



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 loudspeaker section casting and the beacon section casting.

**BEACON CONNECTIONS**

The cable connections are made into the terminal blocks on the electronic pcb assembly located in the beacon section enclosure. A four-way terminal block is provided on both AC and DC beacons. Therefore there are two live terminals and two neutral terminals for the input and output wiring on AC units. On the DC units there are two +ve terminals and two -ve terminals for the input and output wiring.

Wires having a cross sectional area of up to 4mm<sup>2</sup> can be connected to each terminal way. When connecting wires to the terminals great care should be taken to dress the wires so that wires do not exert excess pressure on the terminal blocks. This is particularly important when using cables with large cross sectional areas such as 2.5mm<sup>2</sup>.

BExCL15-05D AC Beacon Section

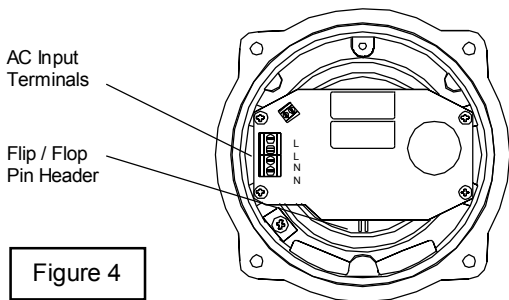


Figure 4

BExCL15-05D DC Beacon Section

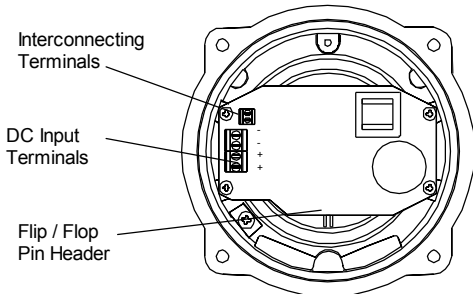


Figure 5

**15) Synchronised Operation**

All BExCL15-05D beacon units that are connected to the same supply line will have a synchronised flash rate at one flash every second. To ensure that the units will be synchronised check that the pin header is not fitted, i.e. the two header pins are not shorted together (see Figures 4 and 5).

**16) Flip / Flop Operation**

Two units can be mounted close to each other to form a flip-flop operation, where the beacons will flash alternately. To achieve this mode of operation, fit a pin header to the flip-flop header pins on the electronics board, i.e. the two header pins are shorted together, (see figures 4 and 5) on one of the

two beacons. The first flash on the beacon that has the header fitted will be delayed by ½ second. The two beacons will then flash alternately every ½ a second.

BExCL15-05D 100V Line Loudspeaker Section

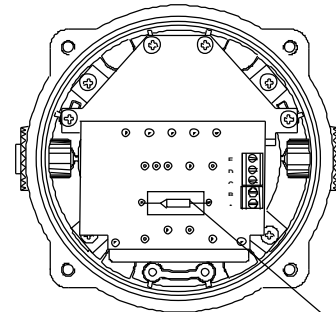


Figure 6

Thermal Fuse 84°C

BExCL15-05D 8 ohm and 16 ohm Loudspeaker Section

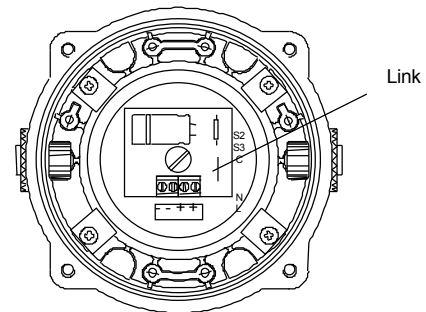


Figure 7

**17) Beacon End of Line Monitoring (DC Units)**

On BExCL15-05D DC units, dc reverse line monitoring can be used on the beacon section if required. All DC units have a blocking diode fitted in their beacon supply input lines and 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 ohms and a minimum wattage of 0.5 watts or a minimum resistance value of 500 ohms and a min. wattage of 2 watts.

**18) Loudspeaker End of Line Monitoring**

On the BExCL15-05D loudspeaker section, dc line monitoring can be used if required. Both the 100V Line units and the Low Impedance units have a blocking capacitor fitted. It should be noted that each loudspeaker has a 1M ohm bleed resistor connected across the blocking capacitor and this should be taken into account when selecting the value of the end of line monitoring resistance.

The end of line monitoring resistor can be connected across the terminals on the end of line unit. On the low impedance units care must be taken with the polarity of the monitoring voltage.

On 100V line units the end of line resistor used must have a minimum resistance value of 4k7 ohms and a minimum wattage of 2.5 watts

On low impedance units the end of line resistor used must have a minimum resistance value of 2k ohms and a minimum wattage of 0.5 watts or a minimum resistance value of 500 ohms and a minimum wattage of 2 watts. On the low impedance units care must be taken with the polarity of the monitoring voltage. If an end of line resistor is fitted to a unit the links on the printed circuit boards of all loudspeakers in the line must be cut for the dc blocking capacitors to be in circuit in order to dc monitor the line (see figure 7).

