



# Professional 100v Line Loudspeaker Solutions

# Introduction

CIE-Group – one of the UK's most experienced suppliers of high quality Commercial Sound and AV products – are the exclusive UK supply partners for many of the industry's most respected professional installation audio brands. By combining IC Audio, Atlas Sound and Majorcom products, our customers benefit from a complete range of quality, reliable 100v line loudspeaker options to meet the most diverse and demanding of commercial audio installations for voice, background music and AV.

Within many leading supermarkets, stores, airports, bus & train terminals, sports & education applications and acoustically challenging areas such as distribution, manufacturing and public access areas; you will find high quality, trusted sound reinforcement from IC Audio, Atlas Sound and Majorcom loudspeakers.



T: 0115 9770075 E: [audio@cie-group.com](mailto:audio@cie-group.com)  
F: 0115 9770081 W: [www.cie-group.com](http://www.cie-group.com)

## 'Professional 100v Line Loudspeaker Solutions'



# Contents

- Majorcom's IMC250T Omni-Directional Loudspeakers provide effective sound dispersion in open, reflective spaces.



05~09 Omni Directional



10~16 • Horns & Projectors



17~20 Ceiling Speakers



21 Fashion Speakers



22 VA Compliant



23 Volume Controls



24~26 Installation Advice & Information



27 Rackbuild Design & Build Facility

# Exclusive UK Supply Partners

CIE-Group are the exclusive UK supply partners for **IC Audio**, **Atlas Sound** and **Majorcom** loudspeakers.

Key to CIE-Group's success is our absolute commitment to both the quality of product and service to our customers; reflected by our team of pre- and post-sales technical advisors, UK-based stockholding, service & repair and our Rack Design & Build Service – consistently producing some of the UK's highest quality, ready-to-install PA racks to your own specifications (see page 27 for further information).

The close relationship between manufacturers, our customers and CIE-Group also ensures direct access to an expert team of sales, training and technical advisers, as well as showroom and demonstration facilities...



## Engineering

CIE-Group's technical and after-sales service department provides system advice, service, repair and re-manufacture facilities to ensure a unique UK-based, fast and efficient resource.

## Demonstrations

Our dedicated team of sales and technical support staff are also on hand to provide full product and user training either at our own facilities or on-site.

## Showroom

Our showroom, centrally located in Nottingham, gives customers and clients immediate access to over 200 of our key products.



## ○ B170T EN: 6W Suspended Ball Speaker

Compact, metal Suspended Ball Speaker ideal for retail, warehouse and open plan applications. Termination is made by binding posts and tappings controlled via a screwdriver-adjustable switch. The product's two-way driver gives excellent voice and music reproduction.

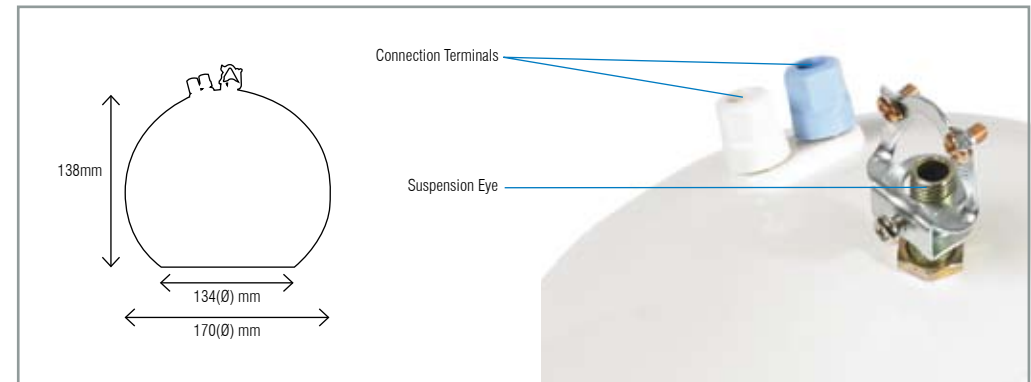
### Features:

- Compact size
- Binding post terminal connection
- Adjustable tapping selector
- Suspension eye
- White RAL9010 colour
- Two-way, full-range driver
- 100v Power Tappings



### Specifications:

Model:	B170T EN:
100v Power Tappings	2, 4, 6W
Frequency Response	100Hz ~ 15kHz
SPL@1w/1m	89dB
Colour	White
Material	Metal
Approx. coverage	45m <sup>2</sup> @ 3m height
Dimensions	170(Ø) x 138(H) mm
Weight	1.3kg



### ◦ B250T EN: 15W Suspended Ball Speaker

The industry standard for the distribution and retail 'shed' sectors, the B250T EN offers excellent voice clarity and music reproduction. The unit features a 17cm bass unit with coaxial tweeter, within a robust, yet lightweight ABS housing.

Cable termination is via binding posts and tappings adjusted via multi-step switch. The unit is supplied with a suspension eye for safety and security.

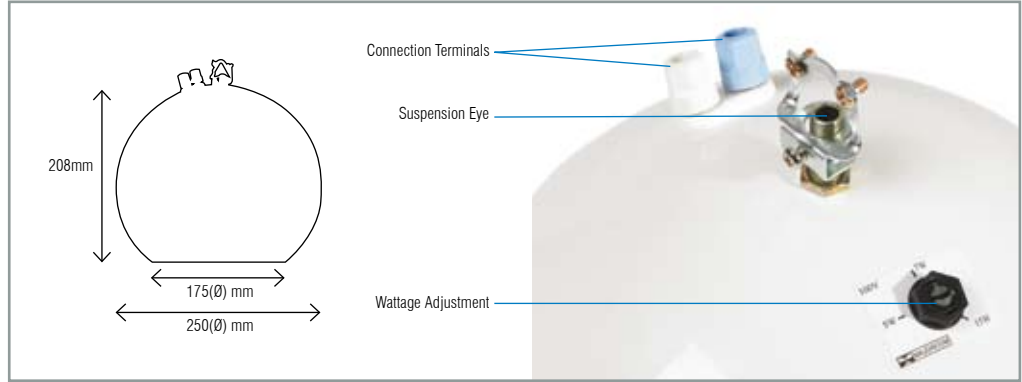
**Features:**

- Lightweight ABS construction
- Screw terminal connection
- Suspension eye
- White colour
- Full range coaxial driver
- 100v Power Tappings



**Specifications:**

Model:	B250T EN:
100v Power Tappings	5, 7, 15W
Frequency Response	70Hz ~ 20kHz
SPL@1w/1m	91dB
Colour	White
Material	ABS
Approx. coverage	60m <sup>2</sup> @ 4.5m height
Dimensions	250(Ø) x 208(H) mm
Weight	3.5kg



## ◦ IMC250T EN: 30W Omni-suspended Loudspeaker

Using a parabolic dish to distribute the sound over a larger area, the IMC250T EN is ideal in larger retail outlets, shopping centres, distribution warehouses, etc.

Screw terminals and adjustable wattage selection are standard features of this cost effective choice, which provides up to 5 times more coverage than conventional loudspeakers. Supplied with suspension eye for safety and security.

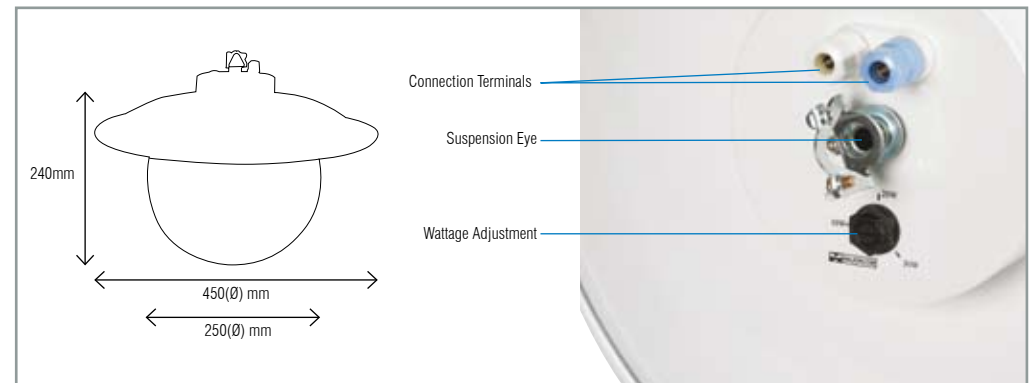
### Features:

- ABS (Ball) / Metal (Dish)
- Screw terminal connection
- Suspension eye
- White colour
- Full-range, two-way driver
- 100v Power Tappings



### Specifications:

Model:	IMC250T EN:
100v Power Tappings	10, 20, 30W
Frequency Response	70Hz ~ 20kHz
SPL@1w/1m	90dB
Colour	White
Material	ABS/Metal
Approx. coverage	200m <sup>2</sup> @ 6m height
Dimensions	Ball 250(Ø) / Dish 450(Ø) x 240(H) mm
Weight	3.5kg



◦ **IMC300T / IMC400T: 30W, 60W Low Profile Omni-suspended Loudspeakers**

Offering the same advantages as the IMC250TEN, the IMC300T/400T models are designed for installation in environments with lower height ceilings such as car parks and mezanine areas, but are just as effective in regular installations.

Fitted with 3-way loudspeaker systems, both models offer HiFi quality sound.

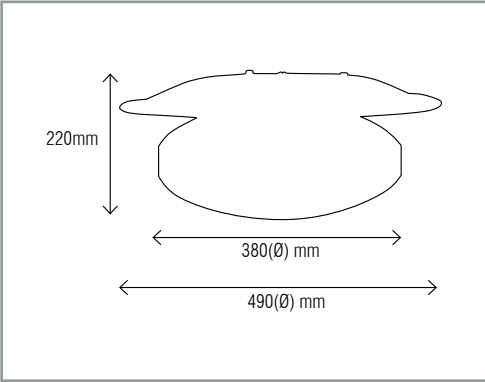
**Features:**

- ABS (Ball) / Metal (Dish)
- Multicore termination
- Multi-suspension points
- White colour
- HiFi quality sound
- 100v Power Tappings
- Low profile



**Specifications:**

Model:	IMC300T:	IMC400T:
100v Power Tappings	10, 20, 30W	20, 40, 60W
Frequency Response	50Hz ~ 20kHz	50Hz ~ 20kHz
SPL@1w/1m	89dB	89dB
Colour	White	White
Material	ABS/Metal	ABS/Metal
Approx. coverage	200m <sup>2</sup> @ 6m height	300m <sup>2</sup> @ 6m height
Dimensions	490(Ø) x 220(H) mm	490(Ø) x 220(H) mm
Weight	4.5kg	5.0kg



## ◦ IMC500T: 120W Omni-suspended Loudspeaker

Largest of the Omni Series, the IMC500T is at home covering large areas such as sports halls, ice rinks, large warehouses, exhibition halls, etc.

This speaker provides a full range of music and high intelligibility voice reproduction; ideal for large scale, acoustically challenging environments.

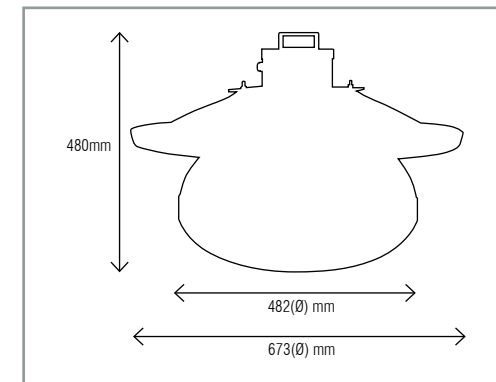
### Features:

- ABS
- Screw terminal connection
- Suspension eye
- White colour
- Full range two-way driver
- 100v Power Tappings



### Specifications:

Model:	IMC500T:
100v Power Tappings	60, 120W
Frequency Response	50Hz ~ 20kHz
SPL@1w/1m	97dB
Colour	White
Material	ABS
Approx. coverage	500m <sup>2</sup> @ 7m height
Dimensions	673(Ø) x 480(H) mm
Weight	15kg



◦ AP15T / AP30T:  
15W, 30W Re-entrant Horn Loudspeakers

Renowned as the leading industry standard paging horn series, AP15T/30T horns are utilised in many applications such as transport terminals, industrial paging, marine, nuclear and warning systems throughout the world.

Robust metal / ABS construction, multi-tapping wattage selection, flexible mounting brackets and full weather resistance for outdoor use completes the package.

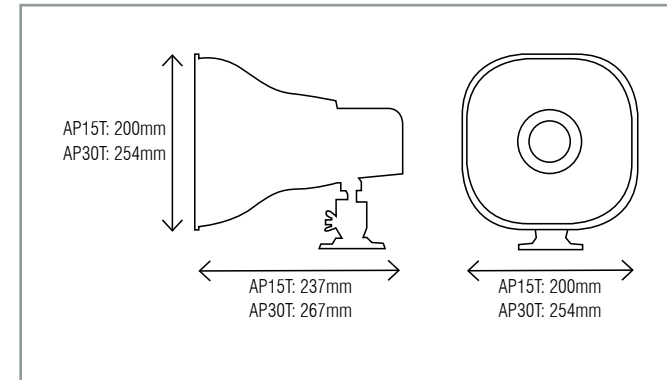
Features:

- Weather / ingress resistance (IP67 rated when used with the BX range of glands)
- Robust metal/ABS construction
- Screwdriver adjustable Tappings
- High intelligibility
- Optional Gland / Termination - (BX1G for AP30T / BX2G for AP15T)



Specifications:

Model:	AP15T:	AP30T:
100v Power Tappings	2, 4, 7.7, 15W	4, 7, 15, 30W
Frequency Response	400Hz ~ 14kHz	300Hz ~ 12kHz
SPL @1w/1m	106dB	108dB
Colour	Grey	Grey
Material	Metal	Metal
Dimensions	200(H) x 200(W) x 237(D) mm	254(H) x 254(W) x 267(D) mm
Weight	2.27kg	2.86kg



## DK15T / DK30T: 15W, 30W Re-entrant Horn Loudspeakers

The DK Horn loudspeaker range is ideal for indoor and outdoor applications requiring high intelligibility and clarity in paging, warning and information systems.

IP66 approved, the units offer multi-tapping, 100v line transformer options as well as a Low Z, 20 $\Omega$  setting.

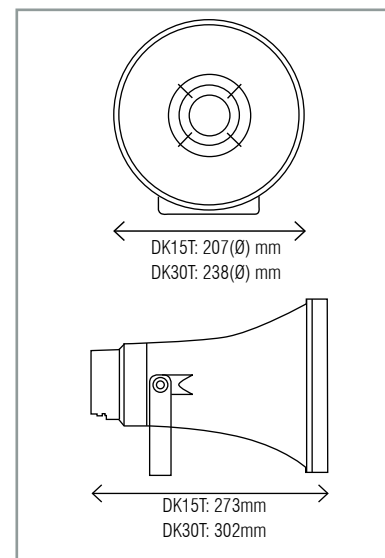
### Features:

- Weather / ingress resistance (IP66 rated)
- Robust ABS material
- Rotary 100v power tapping selector
- 1m cable (glanded)
- High SPL



### Specifications:

Model:	DK15T:	DK30T:
100v Power Tappings	1.87, 3.75, 7.5, 15W	5, 10, 20, 30W
Frequency Response	300Hz ~ 12.5kHz	300Hz ~ 6kHz
SPL@1w/1m	107dB	110dB
Colour	Grey RAL7035	Grey RAL7035
Material	ABS	ABS
Dimensions	207(Ø) x 273(D) mm	238(Ø) x 302(D) mm
Weight	1.9kg	2.6kg



### • McShed Distribution Centre

As part of a £1.5 million electrical fit-out into a newly-built 'McShed' Distribution Centre, a range of IC Audio loudspeakers have been specified throughout to meet the acoustic requirements of the varying departments.

The Centre features DK15T Horns in the plant rooms, DL06-165T Ceiling Speakers in the office areas and IP-65-rated DAP20 Projectors throughout the warehouse areas.

### ◦ CJ-46: Wide Dispersion Horn/Flare Assembly

Extensively used in stadiums and outdoor events, the CJ46 offers maximum sound penetration in adverse sound conditions.

Units can be mounted individually or grouped / clustered and securely fixed using the heavy duty bracket. Standard 1 3/8" / 35mm thread allows the fitting of most industry-standard compression drivers (HD-35 / HD-50 recommended).

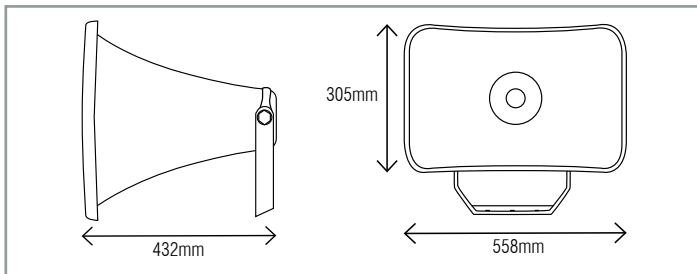
**Features:**

- Robust glass fibre / metal construction
- Environment resistant for both indoor and outdoor use
- Fully serviceable components
- Operational temperature range of -35° ~ +66°C
- Multi-position mounting bracket



**Specifications:**

Model:	CJ-46:
Colour	Black
Dispersion	120° x 60°
Dimensions	558(W) x 305(H) x 432(D) mm
Weight	6.58kg



### ◦ HD35 / HD50: 35W & 50W Compression Driver Assemblies

Supplied with industry standard 1 3/8" / 35mm threads, the HD35 and HD50 are compatible with most flares and horns on the market.

Manufactured from cast aluminum and ABS, the units are robust and weatherproof. Multi-tappings 100v transformers and field replaceable voice coils complete the package.

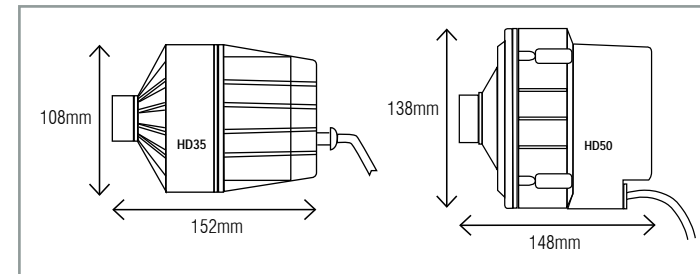
**Features:**

- Robust ABS construction
- 100v power tapping options
- Field replaceable voice coils (HDVC35 / HDVC50)



**Specifications:**

Model:	HD35:	HD50:
100v Power Tappings	10, 15, 20, 35W	15, 30, 50W
Frequency Response	510Hz ~ 3.27kHz	319Hz ~ 2.96kHz
SPL@1w/1m	113dB	111.5dB
Colour	Grey RAL9007	Grey RAL9007
Material	Aluminium / ABS	Aluminium / ABS
Dimensions	108(Ø) x 152(D) mm	138(Ø) x 148(D) mm
Weight	2.5kg	2.9kg



## DK-MH 30/T PLUS: Outdoor Music Horn

For applications which require high quality, high volume background music and paging, such as sports stadiums, race tracks and public venues.

The DK-MH 30/T is IP66 rated so can be mounted outside in the open and offers 100v and Low Z 20Ω options.

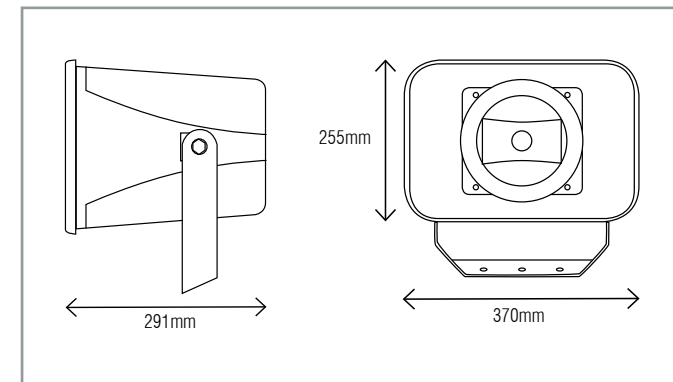
### Features:

- Weather / ingress resistance (IP66 rated)
- Robust ABS construction
- Multi-tapping 100v and low impedance versions
- Voice & music compatible
- High SPL
- Aluminum mounting bracket
- RAL 7035 grey



### Specifications:

Model:	DK-MH 30/T PLUS:
100v Power Tappings	3.75, 7.5, 15, 30W
Frequency Response	80Hz ~ 14kHz
SPL@1w/1m	105.5dB
Colour	Grey RAL7035
Material	ABS
Dimensions	370(W) x 255(H) x 291(D) mm
Weight	4.3kg





## DA10-260/T: Bi-directional Loudspeaker

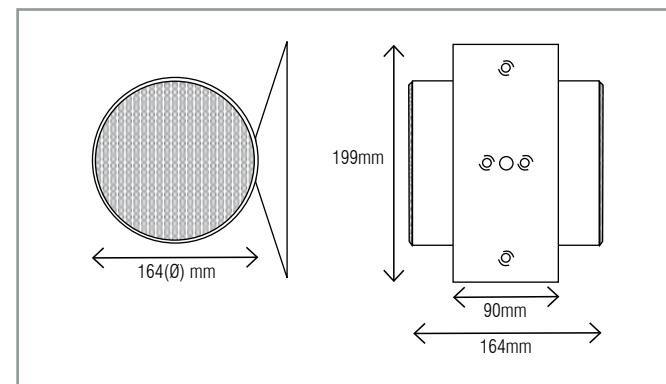
Ideal for installation in corridors, concourses, transport terminals and plant rooms. Practical, vandal resistant and incorporating multi-tapping 100v transformer, the DA10 is ideal for voice messages and low level BGM reproduction.

### Features:

- Vandal resistant
- White - RAL9010
- Multi-tapping 100v settings
- Integral mounting bracket

### Specifications:

Model:	DA10-260/T:
100v Power Tappings	1.5, 3, 6, 10W
Frequency Response	150Hz ~ 14kHz
SPL@1w/1m	90.9dB
Colour	White RAL9010
Material	Metal
Dimensions	164(Ø) x 164(W) mm, Bracket 199(L) x 90(W) mm
Weight	2.2kg



## ○ DAP20-130T: Sound Projector

The DAP20 is a general, all-purpose loudspeaker which provides excellent music reproduction and clear voice announcements.

IP65-rated, it will effectively operate indoors or outdoors in transport terminals, shopping centres, retail, warehousing and many other applications.

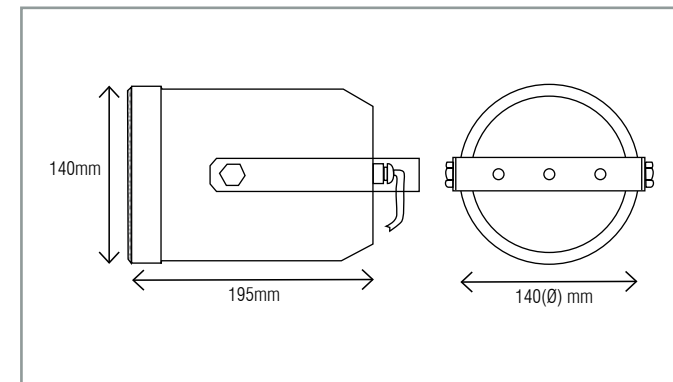
### Features:

- Weather / ingress resistance (IP65 rated)
- Robust plastic housing
- Multi-tapping 100v options
- Voice & music capable
- White RAL 9010



### Specifications:

Model:	DAP20-130T:
100v Power Tappings	2.5, 5, 10, 20W
Frequency Response	150Hz ~ 20kHz
SPL@1w/1m	99.5dB
Colour	White RAL9010
Material	ABS
Dimensions	140(Ø) x 195(D) mm
Weight	1.35kg



## ○ DAS10-130T: Metal Sound Projector

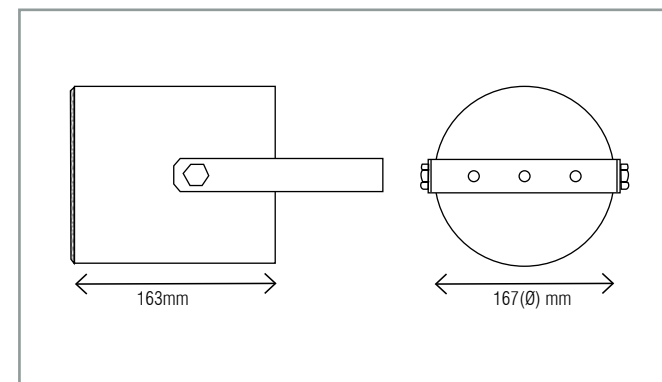
More robust metal version of the DAP Series projector, providing the same features and benefits but in a metal housing for added vandal resistance.

### Features:

- Robust metal case
- Weather / ingress resistance (IP65 rated)
- Multi-tapping 100v options
- Voice & music capacity
- White RAL9010

### Specifications:

Model:	DAS10-130T:
100v Power Tappings	1.5, 3, 6, 10W
Frequency Response	200Hz ~ 16kHz
SPL@1w/1m	94.1dB
Colour	White RAL9010
Material	Metal
Dimensions	167(Ø) x 163(D) mm
Weight	3.10kg



## DL06-165T: Quick-Fit Ceiling Speaker

An all-round performer, the DL06-165T is ideal for any paging and low ambient background music reproduction in many applications such as offices, retail, waiting rooms, corridors, etc.

Metal construction and high quality 100v transformer complete this installation-friendly ceiling speaker system.

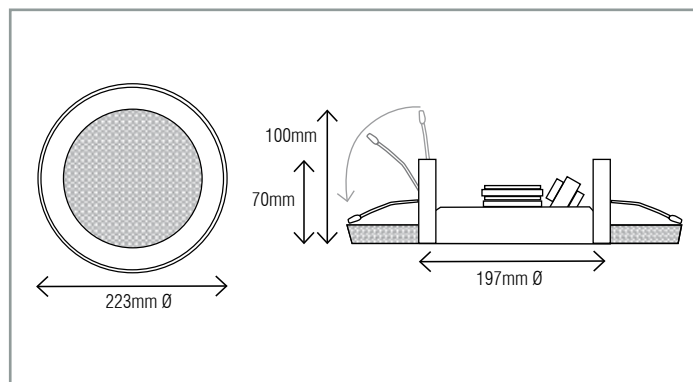
### Features:

- Metal construction
- White RAL9010
- Quick-fit mounting system
- High quality 100v transformer
- Full range 6½" driver
- Optional steel backbox - F165



### Specifications:

Model:	DL06-165T:
100v Power Tappings	1.5, 3, 6W
Frequency Response	100Hz ~ 16kHz
SPL@1w/1m	97.9dB
Colour	White RAL9010
Material	Metal
Dimensions	223(Ø) x 100(H) mm
Weight	1.3kg



## DL-BR15-100T PLUS / DL-BR30-165T PLUS: 15W, 30W Full Range Ceiling Speakers

The DL-BR Series provides very high quality, full range music and voice reproduction.

One piece construction (backbox fixed to grille) and easy to install mounting system makes the DL-BR ideal for applications in retail, pubs, bars, night clubs, audio visual and entertainment venues.

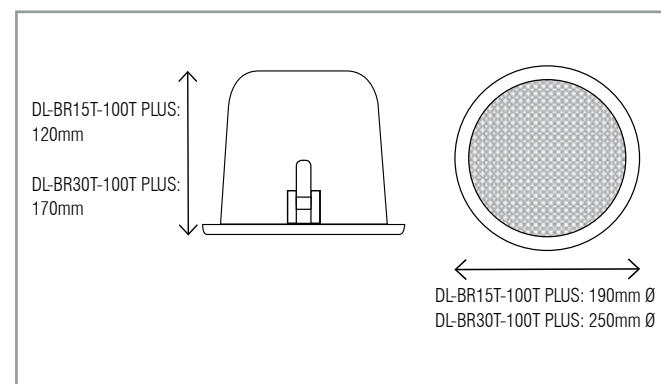
In / Out Phoenix connectors and Low Z ( $8\Omega$ ) output option, 100v Wattage is adjustable using a screwdriver switch behind the front grille.

### Features:

- One piece construction
- White RAL9010
- Multi-tapping 100v transformer
- Full range driver

### Specifications:

Model:	DL-BR15-100T PLUS:	DL-BR30-165T PLUS:
100v Power Tappings	1.9, 3.75, 7.5, 15W	3.75, 7.5, 15, 30W
Frequency Response	85Hz ~ 23kHz	75Hz ~ 24kHz
SPL@1w/1m	90.9dB	93.6dB
Colour	White RAL9010	White RAL9010
Material	Metal/ABS	Metal/ABS
Dimensions	190(Ø) x 120(D) mm	250(Ø) x 170(D) mm
Weight	1.63kg	3.58kg



## DL-SF06-100T: Moisture-Proof Ceiling Speaker

This IP55 approved unit is ideal for installation in damp, humid environments such as changing rooms, bathrooms or even outdoors in protected areas.

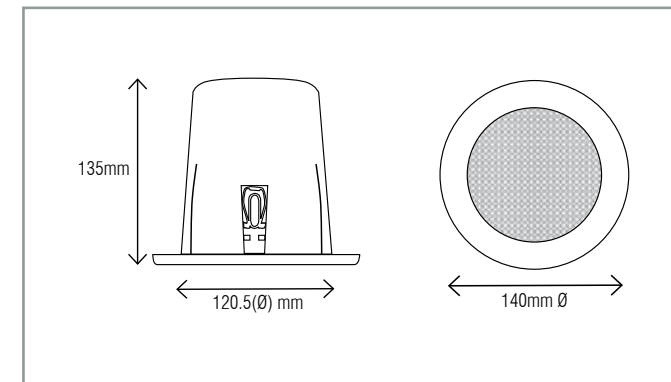
One-piece construction and quick-fit spring mounting system complete a versatile package.

### Features:

- Water / ingress resistance (IP55 rated)
- One-piece construction
- White RAL9010
- Multi-tapping 100v transformer
- Low impedance 8Ω option
- Quick-fit mounting system

### Specifications:

Model:	DL-SF06-100T:
100v Power Tappings	1.5, 3, 6W
Low Z Power (8Ω)	6W
Frequency Response	150Hz ~ 20kHz
SPL@1w/1m	88dB
Colour	White RAL9010
Material	ABS
Dimensions	140(Ø) x 135(D) mm
Weight	1.0kg



## CS-1000 Series / PRO Panel Series: 8W, 30W i-ceilings Sound Panel Loudspeakers

i-ceilings - a unique range of 'Ceiling Tile' Sound Panel Loudspeakers - use state-of-the-art NXT technology to provide exceptional sound qualities, without compromising the aesthetic consistency of the ceiling plane.

i-ceiling Sound Panels are designed to simply replace a standard Armstrong acoustic ceiling tile with high quality, wide dispersion loudspeakers which exactly match the rest of the suspended ceiling, effectively providing an 'invisible' ceiling speaker solution.

### Features:

- Visually 'unidentifiable' ceiling speaker solution
- Matches over 90% of Armstrong suspended ceilings
- Installed up to 75% faster than standard ceiling speakers
- Superior dispersion of sound
- Compatible with 100v line and low impedance systems (100v line / low Z selector switch)
- Variable wattage tap for localised volume control

### Finishes:

i-ceilings Sound Panels are currently available in Armstrong's most popular ceiling tile finishes: Ultima, Optima, Dune, Fine Fissured, Orcal, Neeva and Reno.

For details of non-standard, bespoke units, please call the CIE-Group sales office on +44 (0)115 9770075.

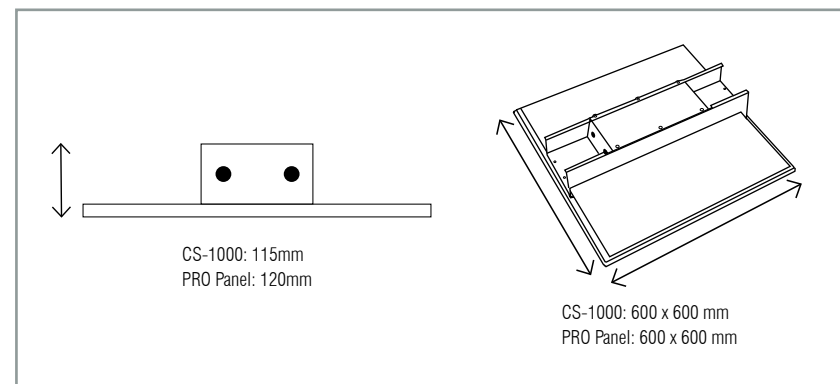


### Specifications:

Model:	CS-1000:	PRO Panel:
Sensitivity	86.9dB @ 1W, 1m / Max 95.9dB	93dB @ 1W, 1m
Impedance	100v: 1, 2, 4 & 8W or 8Ω low impedance	100v: 7.5, 15, 30W or or 8Ω low impedance
Exciters	1	4
Power Capacity	8W	30W
Dimensions	600(W) x 600(D) x 115(H) mm	600(W) x 600(D) x 120(H) mm
Panel Weight	4.4kg per panel	5.5kg per panel



- i-ceilings Sound Panels are now also available as powered versions - 'AMP' and 'Pwr'd'



## MO15-100T / MO30-130T: 15W, 30W Fashion Monitor Loudspeakers

The modern rounded design of the MO Series makes it ideal for installation in contemporary, modern environments such as bars, pubs, audio visual, conference, education or retail sites and are proofed for use in outdoor or damp environments.

Units are available in black or white and are supplied with a versatile multi-position mounting bracket. Wattage tapings are via a multi-way removable Phoenix-type screw terminal block on the rear.

### Features:

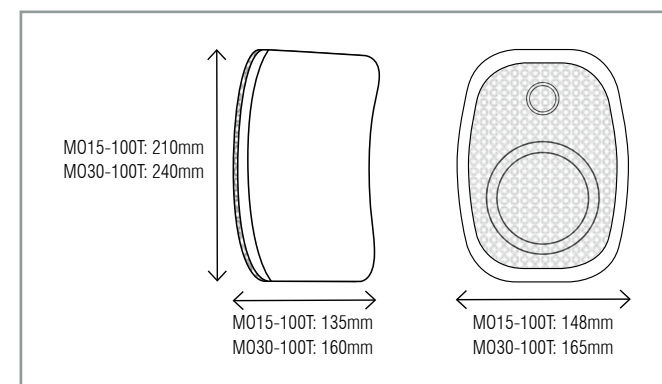
- Contemporary design
- Black or white options
- Multi-position mounting bracket
- High quality full-range driver
- Removable 'Phoenix' connection block
- Multi-tapping 100v transformer
- Low Z 8Ω option
- Weatherproof housing/driver

◦ Supplied with multi-position mounting bracket:



### Specifications:

Model:	MO15-100T:	MO30-130T:
100v Power Tappings	3.75, 7.5, 15W	2.5, 7.5, 15, 30W
Low Z 8Ω	15W	30W
Frequency Response	95Hz ~ 19.5kHz	100Hz ~ 20kHz
SPL@1w/1m	86.9dB	89.0dB
Colour Options	White (W) or Black (B)	White (W) or Black (B)
Material	ABS	ABS
Dimensions	210(H) x 148(W) x 135(D) mm	240(H) x 165(W) x 160(D) mm
Weight	1.9kg	2.6kg



## BS5839-compliant VA/BS-standard Models

Some of the popular models in the IC Audio range are also available with a specification suitable for use in installations compliant with the requirements of BS5839 Pt 8. All incorporate ceramic terminal block, heat sensitive fuse and heat-resistant cables.

Models include:

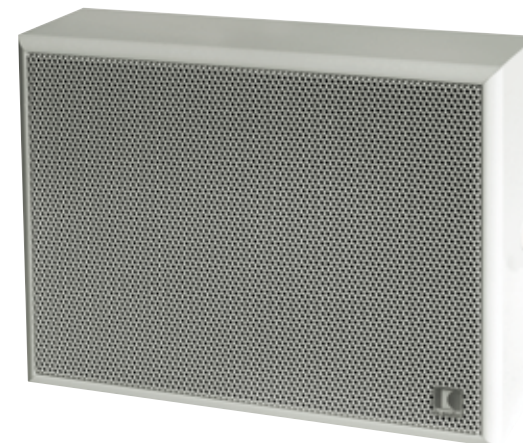
- **DL06-165T / BS5839:** Ceiling Loudspeaker (supplied with back box F165)



- **DAP20-130T / BS5839:** Sound Projector



- **WA06-165T / BS5839:** Wall Speaker



### Specifications:

Model:	DL06-165T / BS5839:	DA-P20-130T / BS5839:	WA06-165T / BS5839:
100v Power Tappings	1.5, 3, 6W	2.5, 5, 10, 20W	1.5, 3, 6W
Frequency Response	100Hz ~ 16kHz	150Hz ~ 20kHz	200Hz ~ 17.4kHz
SPL @1w/1m	97.9dB	99.5dB	95.6dB
Ceramic Terminal	Yes	N/A	Yes
Thermal Fuse	Yes	Yes	Yes
Heat Resistant Cable	Yes	Yes	Yes
Colour	White RAL9010	White RAL9010	White RAL9010
Material	Metal	ABS	Metal
Dimensions	230(Ø) x 70(H) mm	140(Ø) x 195(D) mm	192(H) x 257(W) x 80(D) mm
Weight	1.3kg	1.34kg	2.45kg

## ○ TVC-25 / LVC-25 / LVC-100 / LVC-300: 100v Line Attenuators

A complete range of 100v Line Volume Controls.

Models TVC-25 & LVC-25 are fitted to single gang PVC wall plates, LVC-100 is fitted to a 2 gang PVC plate. LVC-300 can be supplied in a surface mount box or fitted to a flush panel fitting.

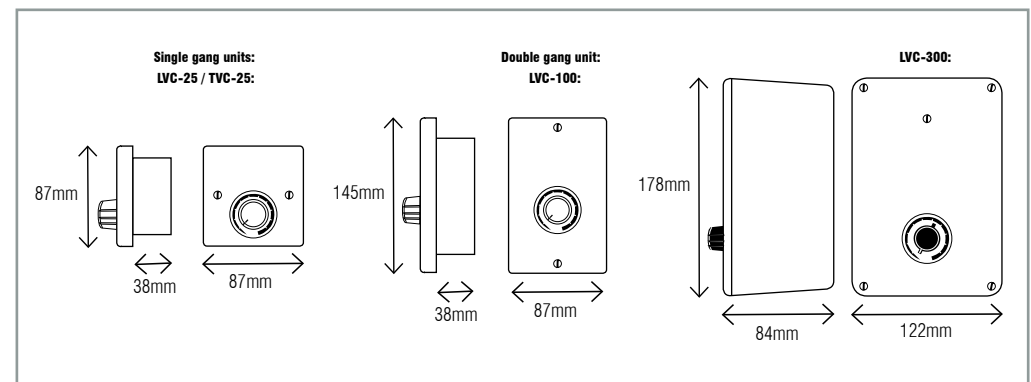
All models include multi-step, continuous rotating knobs, push-fit screw terminals with LVC Models also including a volume restoration facility.



### Specifications:

Model:		TVC-25 / LVC-25 / LVC-100 / LVC-300:
100v Rating	TVC-25: LVC-25: LVC-100: LVC-300:	25W 25W 100W 300W
Volume Restoration (LVC models only)		Full Power, ¾ Power, ½ Power, ¼ Power via Internal Jumper Additional switched 24VDC required
Dimensions	TVC-25: LVC-25: LVC-100: LVC-300:	87(H) x 87(W) x 38(D)* mm 87(H) x 87(W) x 38(D)* mm 145(H) x 87(W) x 38(D)* mm 178(H) x 122(W) x 84(D)* mm

\* minimum depth required for backbox



# Installation Advice & Information

## Professional 100v Line Loudspeakers

IC-Audio, Atlas Sound and Majorcom provide ranges of professional installation loudspeakers for indoor and outdoor PA applications.

Designed to achieve optimum voice/BGM clarity in a wide range of commercial applications, our speakers continue to be specified into many of the UK's leading PA installations.

## The basic principles of effective ceiling loudspeaker installation

The first priority of any sound reproduction system is providing listeners with a level of clear, intelligible sound higher than any possible background noise (at least 6dB in the case of paging systems), together with a wide frequency response and uniform sound pressure level over the area to be covered. To meet these criteria, the hypothetically ideal solution would be to place a single sound source at an equal distance from all required listening positions. As this is all but impossible to achieve in most environments, some compromises usually have to be made. The purpose of these notes is to provide some basic advice as to how this might be accomplished.

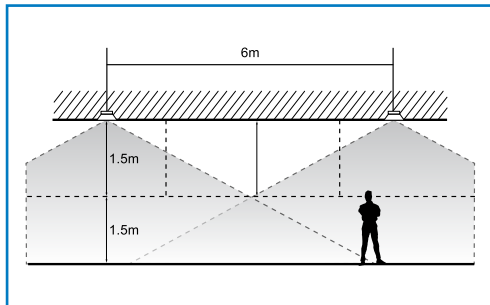


Figure 1

## Ceiling-mounted loudspeakers

In environments offering a suitable ceiling construction and height, the best results can often be obtained by utilising loudspeakers mounted in the ceiling structure. Once the most suitable loudspeaker type has been chosen and its dispersion at the required mounting height ascertained, the number of units needed to obtain constant and uniform coverage and sound pressure level (SPL) can be established.

**Remember, when calculating the SPL it is the level at the listeners' ears to be considered, not the level at the loudspeaker or floor level.**

The required speaker quantity is calculated by dividing the floor area to be covered by the area covered by a single loudspeaker. Note; to obtain even coverage, a suitable overlap between adjacent loudspeakers is required.

[Figure 1 clearly illustrates this concept]

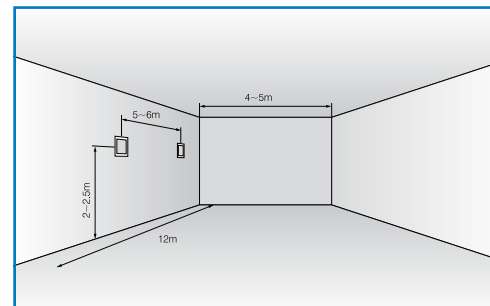


Figure 2

## Wall-mounted loudspeakers

If the architectural features of the room are not compatible with ceiling-mounted loudspeakers or if a wall-mounted solution is preferred, it is essential to observe a few basic rules to obtain the most effective sound distribution. In order to maintain the most efficient listening point inside the direct signal area, both in-wall and surface mounted loudspeakers with power from 6W to 20W should be installed at a height between 2 and 2.5m.

The maximum distance between adjacent loudspeakers must be no more than 5 ~ 6 metres along the length of the room, where the room is no wider than 4 ~ 5 metres.

For wider rooms (eg. 8 ~ 10 metres), it is recommended to install loudspeakers in an alternate pattern along both opposite walls, to provide adequate coverage and maintain sound pressure at the best possible constant level throughout the area for coverage.

[see Figures 2 and 3]

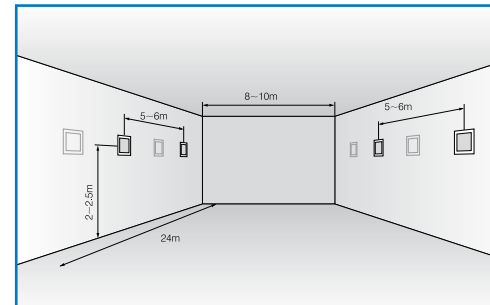


Figure 3

## High ambient noise level environments

For effective sound distribution in locations with high levels of ambient noise, horn loudspeakers are often specified as they produce higher sound pressure levels and, therefore, increased audibility in such conditions. However, it should be noted that horn loudspeakers driven by pressure units are not usually suitable for use on systems where music is required, as the frequency response is optimised for voice reproduction.

Where higher quality sound and/or music reproduction is a requirement, 'Sound Projectors' can often be used as an alternative, though, as they generally produce a lower SPL, a larger number is likely to be required to cover the same area.

In all cases these speakers should be installed at a maximum distance of 15m from one another. They should all be mounted in the same direction with care taken to ensure they are all wired in phase.

[see Figure 4]

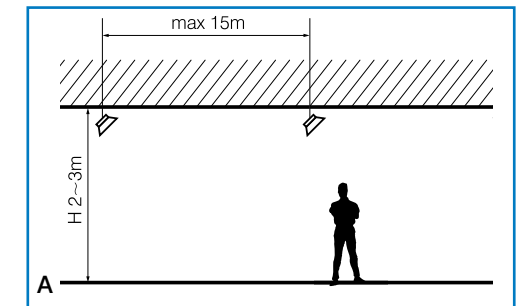


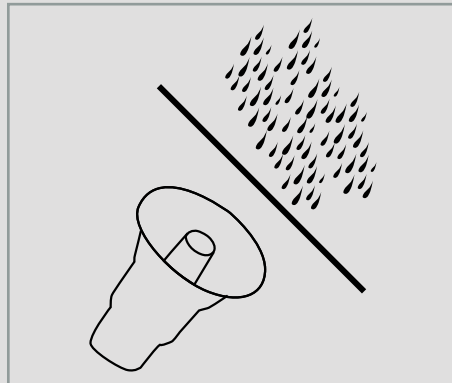
Figure 4

### Degrees of protection (I.P. rating)

The characteristics of a product in terms of its resistance to the penetration of solid objects and liquids is indicated by the letters IP (International Protection) followed by two numbers in accordance with EN standards 60529-CEI 70-1.

#### IP degree of protection

- The first number identifies the level of protection against the ingress of solid objects. Number from 0 to 6.
- The second number identifies the level of protection against penetration of liquids. Number from 0 to 8.



#### First IP number:

- 0 Not protected
- 1 Protected against the ingress of solid objects larger than 50mm
- 2 Protected against the ingress of solid objects larger than 12mm
- 3 Protected against the ingress of solid objects larger than 2.5mm
- 4 Protected against the ingress of solid objects larger than 1mm
- 5 Protected against dust penetration
- 6 Totally dust-proof

#### Second IP number:

- 0 Not protected
- 1 Protected against vertically dripping water
- 2 Protected against water dripping at an angle (up to 15° from the vertical)
- 3 Protected against rain
- 4 Protected against water spray
- 5 Protected against water jets
- 6 Protected against waves
- 7 Protected against the effects of temporary immersion
- 8 Protected against the effects of permanent immersion

Speakers, Decibels, SPL			
Lose 6dB each time distance is doubled from speaker	Add 3dB when power is doubled		
<b>Distance from speaker:</b>	<b>1m</b>	<b>2m</b>	<b>3m</b>
SPL(dB)@1W	95	89	83
SPL(dB)@2W	98	92	86
SPL(dB)@4W	101	95	89
SPL(dB)@8W	104	98	92

### Audio Input Connectors

Connector:	Signal:	Return:	Screen:
XLR3	Pin 2 (hot)	Pin 3 (cold)	Pin 1
3 Pole ¼" 6.3mm Jack	Tip (hot)	Ring (cold)	Sleeve
2 Pole ¼" 6.3mm Jack	Tip	Sleeve	Sleeve
RCA Phono Plug	Pin	Sleeve	Sleeve

3 Pole Jack (stereo):



2 Pole Jack (mono):



Quantity of Ceiling Speakers per Sq/metre for background music		
Ceiling Height = 2.5m	Speaker Spacing = 5m	Coverage = 25sqm
<b>Floor Area:</b>	<b>Quantity of Speakers:</b>	<b>Wattage Tapps in Area</b>
100 sqm	4 x Speakers	Quiet 55dB Tapp @1W
250 sqm	10 x Speakers	Normal 60dB Tapp @2W
1000 sqm	40 x Speakers	Noisy 65dB Tapp @3W

### 100v Line Loudspeaker Systems

Load Impedance Ohms:	Power Dissipation Watts:	Load Impedance Ohms:	Power Dissipation Watts:
10	1000	143	70
20	500	167	60
25	400	200	50
33.3	300	250	40
40	250	333	30
50	200	500	20
83	120	1k0	10
100	100	1k11	9
111	90	1k25	8
125	80	1k43	7

Load Impedance Ohms:	Power Dissipation Watts:
1k67	6
2k0	5
2k5	4
3k33	3
5k0	2
10k0	1
20k0	0.50
40k0	0.25
80k0	0.125



### Low Impedance and 100v Line Systems

A Low Impedance system is normally only used where a small number of loudspeakers are required, to be placed only a short distance from the amplifier.

The constant voltage system (ie. 100v line in the UK) offers a host of advantages on systems of all sizes particularly where long speaker cable runs are required. This connection system requires each loudspeaker to be equipped with its own line transformer which converts the low impedance of the loudspeaker to the much higher impedance of the line itself. The current flow on a line at 100v is considerably lower than that at low impedance. Consequently the voltage drop along the line is much lower which, in turn, means a smaller gauge of cable can be used.

### Some basic rules which must always be observed:

#### Input Signals

- All microphone inputs must be wired as balanced circuits using good quality twin twisted pair microphone cable with an overall screen; input connectors must have 3 pins and the amplifier inputs configured as balanced. The same principal should also be applied to line inputs where the cable is long enough to pick up interference.
- Note, the signal return wire and the screen of the cable must be separate from the source to the input of the amplifier. If they are connected together at any point, or the cable used has only a single screened core, it is impossible for a circuit wired in this manner to operate as a balanced line.
- A line connected incorrectly is wide open to interference pickup and hum which is all but impossible to cure by any method short of re-wiring.

#### Loudspeaker Networks

- As the current flow in low impedance speaker circuits is much higher, it follows that larger cables will be required; the absolute minimum size required is 1mm twin with 1.5mm or even 2.5mm being a better choice for even quite short runs.
- With 100v Line Systems it is sometimes possible to use 0.75mm twin on small systems, though 1mm or 1.5mm is a better choice.
- If attenuators (volume controls) are to be used, this can alter the cable requirements – please seek advice before commencing the installation.
- Under no circumstances use screened cable on loudspeaker networks as serious damage to power amplifiers can be caused.

### Amplifier Selection

The function of an amplifier is to raise the level of sound sources such as microphones, radio tuners, CD players, etc. to a level capable of driving the loudspeaker network. Most amplifiers have several inputs to allow various sources to be mixed and prioritised to suit the requirements of specific installations.

When selecting a suitable amplifier power, it is essential to allow some headroom for both future expansion and load variations – a figure of 20% is desirable with typical 100v systems (see Figure 6).

With installations operating at low impedance, the total load series and/or parallel presented to the amplifier **must** be greater than the minimum impedance the amplifier is rated to drive (see Figure 5). The power output of the amplifier at the selected impedance should be equal to or less than the power the load can withstand. **Beware - it is possible to destroy loudspeakers if the amplifier feeding them is overdriven to the point of clipping.**

Where the constant voltage (100v line) system is utilised, the total load is calculated by adding the wattage setting of each loudspeaker on the system together. The resulting figure is the total wattage load that will be applied to the amplifier; it follows, therefore, that the output of the amplifier used must be greater than this figure (see Figure 6).

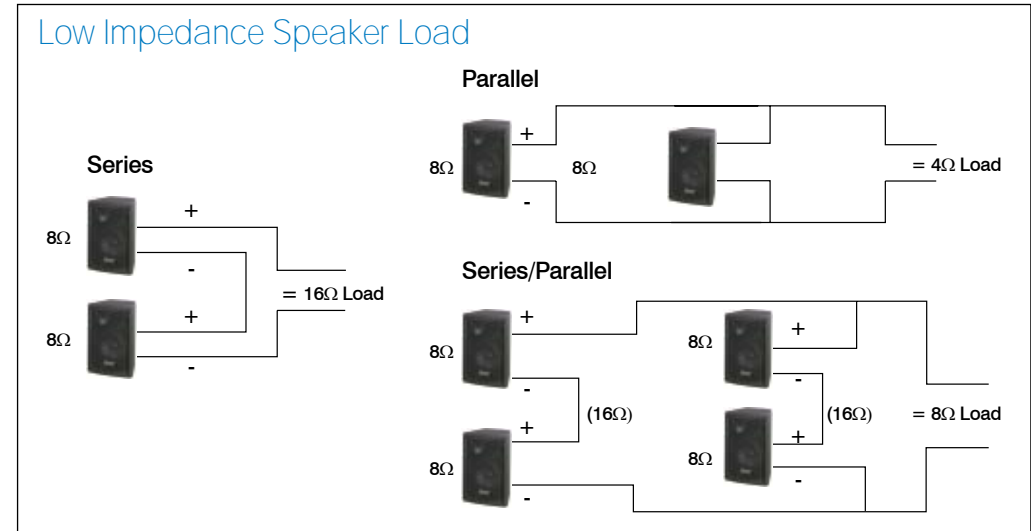


Figure 5

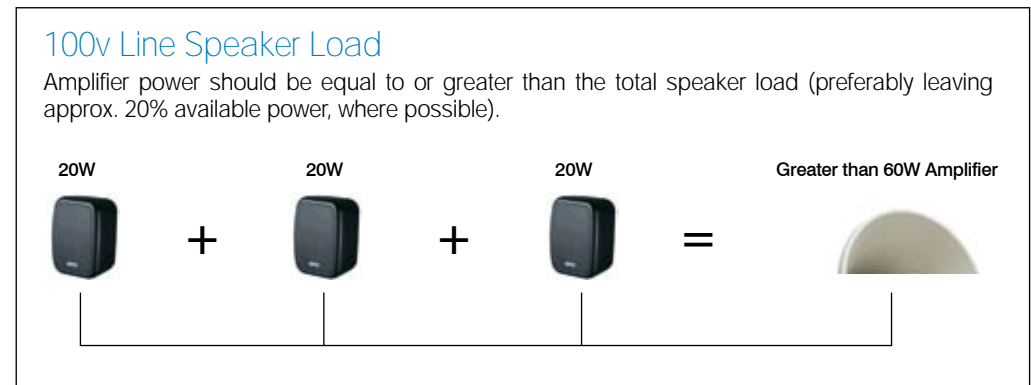


Figure 6

# Dedicated Rack Design & Build Facility

For many years, CIE-Group customers have also benefited from comprehensive Audio Rack System Design & Build Service, to provide 'ready to install' PA, VA and AV Racks in some of the UK's largest and most successful installations.

Using our extensive portfolio of professional audio products, our highly skilled, UK-based Engineering Team have a reputation for consistently producing some of the UK's highest quality, ready-to-install PA rack systems to customers' specifications.

There is no set limit to the size of system we can produce; anything from a small single zone speech-only system, to a multi-zone system combining speech and music. Monitoring and battery back-up can also be accommodated by our in-house Engineering Facilities.

To ensure that we build your system to your specific requirements, we have produced a technical questionnaire which, once completed by yourselves or with our assistance, outlines requirements such as number of zones, music sources, number of microphones, etc.

Each system is supplied assembled, wired and fully tested before leaving our workshops. As part of the Build Package, each System is supplied with a comprehensive operations manual incorporating user instructions for each individual piece of equipment, a schematic drawing of the System, a visual of the Rack layout and easy to use connection details. Finally, each System is given a unique identification number specific to your installation which allows our Engineering Team to easily identify any system we have assembled, to efficiently assist with any after sales service requirements.



**Call the CIE-Group sales desk or your area representative on 0115 9770075 for advice, free UK site surveys and a highly competitive quotation.**

