Loud Speaker for Wave~Lab

In Housing

LB2065-001 Pair of Speakers

Description:

The IEC Loud Speakers for Wave~Lab are broad ranged, robust, compact and are designed for general laboratory use where better than normal frequency response is required. They are suitable for the IEC Wave~Lab and for most laboratory experiments where signals must be converted to sound.

These speakers are supplied in pairs and have 4mm socket terminals for the connection of banana plugs. A set of cables, 1 metre long, is provided for connecting to the Wave~Lab or to other apparatus. Be sure to 'Phase' the speakers properly when connecting them to the source of the signal (see overleaf).

Note: The speaker has a 4 ohm series protection resistor to reduce the chance of a burn out. This resistor will increase the resistance and impedance figure as measured at the terminals.

Specifications:

Resistance of Speaker Coil:
3.5 ohms

Impedance of Speaker:
approx. 4 ohms (at 400 Hz).

Power Handling:
Each speaker can handle approx. 5 Watts RMS power continuously or approx.10 to 15 Watts of power in short bursts.

Resonance:
The speaker housing has a natural resonance at about 200 Hz. To avoid unwanted drumming and vibration, avoid high power operation at or close to this frequency.

Length: 145mm	Width: 190mm	Thickness: 85mm	Weight: 840g

Important Note Take Caution:

The IEC Wave~Lab is a high power instrument for running large speakers and mechanical devices. It can supply enough power to destroy these loud speakers. Remember that a constant and steady tone is much more destructive to a loud speaker coil than the variable frequency and variable loudness tonal patterns of music or voice.

To protect the speakers from burning out or loosening their speaker coils, do not exceed 50% of the Wave~Lab output for periods exceeding a few seconds.

As the frequency is reduced, the current through the speaker coil increases. Be careful not to run the speakers at high powers when the frequency is lower than 50 Hz. Remember that at very low frequencies (from 0 Hz to 10 Hz), the impedance of the speaker is lowest and the current is highest. In addition, at these frequencies, sound cannot be heard, so the speaker can burn out silently.

There is no warranty on burned out or loose speaker coils.

The Meaning of “Phasing”:

A loud speaker consists of a semi-rigid cone bonded to a coil of many turns of fine copper wire. This coil rests in a small air gap of very strong magnetic field which is usually the circular poles of a specially shaped permanent magnet. As a current passes through the copper winding, coil is physically deflected within the magnetic field and the cone is moved. The cone then pushes a pulse of air towards the listener’s ear drum. When this occurs hundreds of times per second, we hear the sound that was originally created by the current passing through the coil.

If DC current is applied to the coil, the cone will be deflected steadily either forwards or backwards depending on the direction of the current flow. When an identical signal is applied to both speakers together, it is important that both cones move forward and backwards at exactly the same time. When this occurs, the speakers are said to be ‘In Phase’ or ‘Phased’. If one speaker is connected in reverse to the other, when one cone is moving forward, the cone of the other speaker would be moving backwards. When this occurs, the combined sound of both speakers is not correct and speakers are said to be ‘Out of Phase’.

When connecting external speakers be sure the speakers are ‘In Phase’. Always check on each speaker that each black socket is connected to the black or the ‘common’ terminal on the instrument and the coloured socket is connected to the active or the ‘power output’ terminal on the instrument.

Also note that sometimes the speakers are deliberately connected out of Phase for certain types of experiments.

The Meaning of ‘Impedance’:

Since the coil of wire connected to the speaker cone is resting in a magnetic field, when the coil moves in the magnetic field there is an inductance effect added to the resistance effect.

When inductive reactance and resistance are combined, the result is called Impedance. The Impedance value of this speaker is approximately 4 ohms when the signal is a sine wave at 400 Hz. Note that the impedance of a circuit is always greater than its DC resistance and generally, the impedance will rise and the current will fall as the frequency rises.

The lowest impedance and therefore the largest current through the speaker coil occurs when the frequency is at its lowest.

Current Limiting:

To help to protect the speaker coil from damage at low frequencies, the speaker is fitted with a 4 ohm series resistor. This means the total resistance measured at the terminals will be approx. 7.5 ohm although the speaker itself is actually 3.5 ohm

Designed and manufactured in Australia