

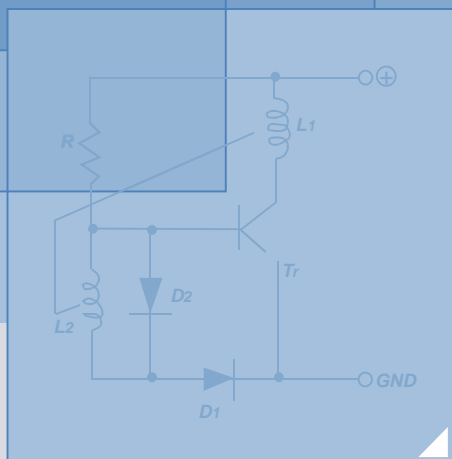
# 5



Products Limited



## TECHNICAL INFORMATION

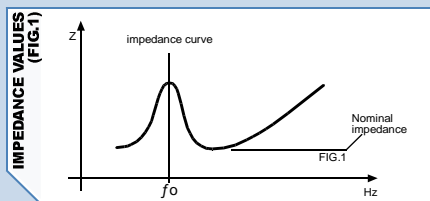


## DB Products Speakers

DB Products speakers are designed and manufactured based on a long-year experience and constant effort to search for sound quality in various audio systems. The materials and physical structure of components such as diaphragm, and electrical characteristics of magnetic circuit are chosen for the best acoustic performance. These components are fabricated and assembled using our superior micro machining technique. The purpose of this section is to supply you with practical selection guide of micro speakers by explaining what characteristics micro speakers have and how they work in your system.

## Impedance

All speakers have a certain amount of impedance which is a frequency-sensitive function. They have typical impedance values in the range shown in Fig.1. Nominal impedance is a speaker impedance at a particular frequency, usually the one above the lowest resonant frequency ( $f_0$ ) at which the speaker has the lowest impedance, DB Products will simply specify the nominal impedance at 1 kHz if the speaker impedance curve is relatively flat over an extended range above  $f_0$ .



## Input Power

The input to a speaker is defined as follows:

$$P = \frac{E^2}{Z}$$

P : input power (W), Z : nominal impedance ( $\Omega$ ),  
E : voltage across the voice coil (V)

## Output sound pressure level

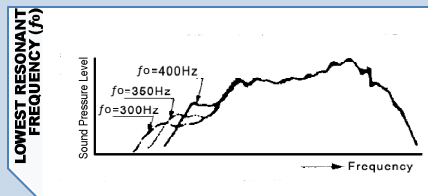
Output sound pressure level is defined with an input of the rated power at 4 different frequencies applied to the speaker terminals. The output is defined as SPL which is dB relative to  $2 \times 10^{-5}$  Pa at the average value. At DB Products, the sound pressure is measured at a fixed distance from the front of the speaker in a specially designed test chamber which well represents working environment. It is not simple from to compare our speakers' sound output level with those of speakers from other makers which use different measurement configurations.

## Frequency

A practical frequency response for a speaker is the frequency range within which the speaker output will not drop by more than 10 dB from the rated output sound pressure level. A speaker will not only have a specified frequency response, but within its range the speaker may prefer certain sound frequencies to others. Variations in frequency response of the micro speaker greatly depends on materials, structure, design, etc., of the small variations on frequency response curve diagrams of our catalogs and technical data sheets.

## Lowest resonant frequency ( $f_0$ )

The lowest frequency below which the speakers is unable to convert an input voltage into audible sound pressure level. At DB Products,  $f_0$  is measured together with the output sound pressure level.



## Maximum allowable input power

The maximum input (rms) power containing various frequency spectrums, applied repeatedly for 1 minute every 2 minutes, on which the speaker can operate regardless of distortion without being damaged.

## Handling and operating precautions

A micro speaker is an assembly of small precision components which are not strong enough to resist against unusual shock and stress, e.g. a shock to which it is exposed when dropped on a solid floor. As you know, a speaker which performs well under laboratory examination will not sound well in practical application. Your ears are test instruments when choosing size and materials for the baffle and enclosure.

## Soldering

The wires from the voice coil are soldered to copper pads attached to the body of the driver. These pads have extensions for soldering connections. Use as little heat for the shortest time consistent with a reliable joint.

## Speaker Mounting

- 1) Mount the speaker so that its gasket comes in close contact with the cabinet baffle board. Air leak here will impair good bass reproduction.
- 2) Forced fastening of a speaker to the board will cause unpleasant vibration noise. The speaker voice coil sits in a narrow gap; hence forced mounting and thus causing the frame to be deformed or uneven fastening will bring about vibration noise.

## Polarity

Fixation and making of polarity ( $\oplus$ ,  $\ominus$ ) to a predetermined side of terminal lugs is available on request.

## DB Products Receiver

This notes are intended to provide an understanding of the methods used in defining this specification of dynamic receivers described in this publication and their application.

## Impedance

The magnitude of the complex impedance at 1 kHz is stated in ohms. A range of impedances are available. Where an impedance of 150 ohms is specified 30 ohm and 300 ohm versions are generally available.

## Input Power

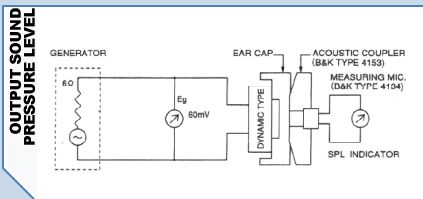
When calculating input power it is assumed the impedance is resistive therefore,

$$P = \frac{E^2}{Z}$$

where P = input power ( W )  
 Z = the impedance at 1 kHz (  $\Omega$  )  
 E = the input voltage ( V )

## Output Sound Pressure Level

The sound pressure level output is defined with a rated input voltage at 1kHz applied to the terminals of the receiver which in turn is coupled to a **G III** earcap sealed to an artificial ear according to IEC318 or other standard. The output is defined as SPL which is dB relative to  $2 \times 10^{-4}$  Pa (1Pa=94 dB SPL 1N/m<sup>2</sup>)



Sound pressure level is analogous to voltage and therefore output SPL is proportional to applied input voltage.

Comparison with other companies receivers is only valid if the specifying conditions are the same, i.e. applied input voltage, impedance, earcap and artificial ear.

The change in output SPL expressed in dB(±) due to the application of a different input voltage all other factors being equals is calculated by

$$\log \frac{E_2}{E_1} = \text{dB change (in SPL)}$$

Where E2 is the new voltage and E1 is 60mV. Due to the variety of telephone handsets available the **G III** earcap may not always be suitable, in this case an alternative earcap is specified.

## Hearing Aid Compatibility

From August 16th 1991 US FCC regulations required that all telephones in public places shall be hearing aid compatible. HAC receivers incorporate an additional coil, which produces a magnetic field and couples to the hearing aid pick-up coil.

The AC magnetic field generated conforms to ELAR S-0504.

## Leakage ring

Traditionally, the performance of telephone receivers was measured in a closed loop using the artificial ear specified in the IEC 318. This approach did not pose any serious problem in the past because there were only a few types of telephone handsets available on the market. In recent years, however, a variety of new types of telephones such as cordless, portable and cellular telephones, have entered the market one after another, and they come equipped with various types of handsets. In the face of these new circumstances, more and more manufactures are trying to adopt the so-called "open" measurement method, in addition to the conventional closed loop method. This is because they believe that more emphasis should be put on auditory DB Products has also decided to adopt the most popular open measurement methods. It is widely employed in many countries control process of their production. The results of the open measurement methods depends to a large extent upon the condition of the "open" state. We would like ask you to keep in mind that the results of the leakage ring method should only be used as a rough guide in evaluating the performance of telephone receivers.

## Installation in Handset

Consideration at the handset design stage should be given to the hole configuration in the earcap and the cavity between the receiver and earcap, since this has a significant influence on overall performance. A good seal between the receiver and earcap will avoid loss of low frequency response.

Avoid excessive mechanical load on the back of the receivers and avoid covering the sound ports.

The wires from the voice coil are soldered to copper pads attached to the body of the driver. These pads have extensions for soldering connections. Use as little heat for the shortest time consistent with a reliable joint.

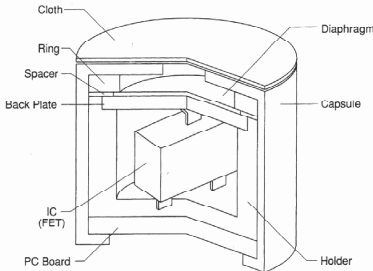
## Use as a Transmitter

Although specified as receivers Dynamic Receivers will function as transmitters. Please contact DB Products for performance details.

## Electret Condenser Microphone (ECM)

A condenser microphone consists of a very light diaphragm and back plate to which is applied a polarizing voltage. The principle of operation is that sound waves impinging on the diaphragm cause the capacitance between it and the back plate to change in sympathy, this in turn induces an s.c. voltage on the back plate.

**STRUCTURAL SCHEMA OF CONDENSER MICROPHONE**



Because the capacitance is relatively small the electrical impedance is high and unmanageable so to overcome this condenser microphone incorporate an FET to transform the impedance to a lower level suitable for feeding an amplifier via screened lead.

The electret condenser microphone operates in a similar manner except that it has a permanent charge voltage implanted in an electret material to provide the polarizing voltage. This can be effected in three ways, the most common being when the diaphragm is the electret material, in this case one side is metallised. This is known as the foil or diaphragm type. The electret material does not make the best diaphragm is made of other material and the electret material applied to the back plate. This is known as the back type. A more recent variation is the so called front type.

Here the electret material is applied to the inside of the front cover of the microphone and the metallised diaphragm connected to the input of the FET. This works by the variations in capacitance between the front cover and diaphragm caused by the sound waves impinging on the diaphragm.

In itself an electret microphone does not need a polarising voltage or current, however it requires a small feed current of between 50µA and 1 mA to power the FET, the actual value depending on the type.

A condenser microphone of the omnidirectional type has an output dependent upon diaphragm displacement, therefore its output voltage is proportional to sound pressure regardless of frequency throughout its operating range.

Like condenser microphones ECMs can be made to have directional or pressure gradient characteristics by allowing back feed to the diaphragm with suitable acoustic treatment.

A major advantage of the electret condenser microphone is its immunity to vibration, resulting from the very low mass of the diaphragm. This is particularly useful in the field of telecommunications and hand held or body worn gear and where it is installed in equipment incorporating moving parts such as motors in dictation machines and cassette recorders.

## Directional Characteristics

This represents the characteristics of the microphone to pick up sound from a particular direction.

## Omnidirectional

This property of the microphones implies an even and equal sensitivity for all sounds irrespective of their directions. Such microphones are suitable for picking up the exact acoustic ambience around the place of the use.

## Unidirectional

Such microphones have maximum sensitivity for sound coming from the front. Since sound from other directions is not picked up, a clean response is obtained.

## Bidirectional

These microphones have high sensitivity for the sound both from the front and the rear but do not catch the sound coming from the sides at all.

## Soldering

Use as little heat for the shortest time consistent with a reliable joint.