

MOUNTING APPLICATION NOTES

These application notes on mounting Knowles transducers are intended to give some practical hints and suggestions to the user, but may not cover his particular application. Where this is the case, it is recommended that the factory is contacted for any further advice which may be required. See also Technical Bulletin TB8 on "Handling" and "Application Environment" for acoustic transducers.

1. Antishock Mounting

Transducers are most susceptible to damage from shock in the direction shown in Figure 1. This is more noticeable with magnetic than with ceramic or electret devices. Some antishock protection is therefore advised i.e. a minimum of 2mm of soft rubber or similar resilient energy absorbent material. Foam plastics or foam rubbers tend to be unsuitable as they collapse under shock conditions and provide little or no protection. When making electrical connection to the terminals of a unit mounted with shock protection it is essential that flexible wire is used. A rigid wire may cause damage to the solder pad or the circuit to which it is attached. Ideally, the transducer should be mounted in some form of rubber boot which would provide protection in all directions. Where a transducer is soldered directly to a printed circuit board, some shock protection should be provided for the circuit board and care must be taken that, under shock conditions, the transducer is not able to hit any housing or components on adjacent circuit boards. If nearby components are shock mounted or flexible in some way, it must not be possible for them to strike the transducer.

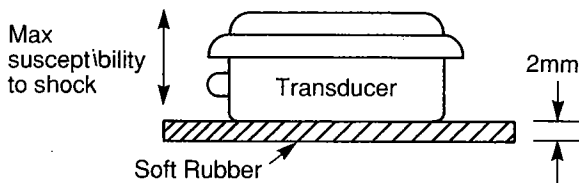


Figure 1

2. Soldering

The Knowles Technical Bulletin TB4 on soldering, should be followed. Flow soldering is not recommended as this can involve solvent cleaning agents which may be harmful to the transducer and too much heat may be applied to the terminals. Flow soldering may only be carried out if the transducer is adequately protected from solvents or fumes, and where precautions are taken against overheating of terminals and transducer. Flexible leads should always be used when connecting to the terminal pad. If the transducer is fitted with pins, e.g. for printed circuit mounting, then care must be taken that the pins do not become overheated, and that force is not used to push them through the printed circuit board holes when heat is applied. The pins may get pushed back into the transducer causing damage.

3. Acoustic

Acoustic conditions for transducers used in hearing aids and similar devices are dealt with in other application notes. The following notes apply mainly to bleeper and bleeper/speaker devices used in paging and similar applications.

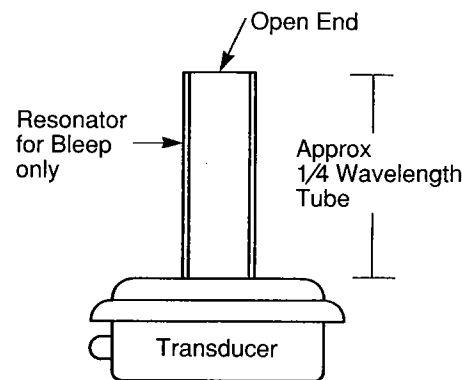


Figure 2

It is important that the outlet port of the transducer has an airtight seal to the outlet of the pager housing as any sound leaking back into the housing will result in an overall reduction of sound output level. This sealing can often be incorporated in the rubber shock mounting. When bleep only is required,

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advantage can be taken, if space will allow, of a resonator. This can take the form of a simple tube of approximately quarter wavelength* or can be of a more complicated shape to fit the space available. Some experimentation would be needed for the latter, see fig. 2. A cavity between the outlet port of the transducer and the sound port of the pager housing can often enhance the speech capability, see fig. 3. It must be remembered, however, that this will give large peaks in the frequency response which may boost one voice and not another, and can also give different effects for different languages.

Putting components in front of or near the transducer outlet port should be avoided. Obstruction of the port will reduce the sound output level. The area of the sound outlet in the pager housing should be as large as

possible. If protective gauze is used, it should be of low acoustic resistance and should not be placed over the transducer outlet port, but across the larger area of the pager sound outlet. It should be noted that fine gauze will reduce the output level, it being a question of how much reduction in sound level can be tolerated against minimum allowable dust protection.

* A tube, quarter wavelength long, will have a slightly longer "effective" length than when measured with a rule due to the "end effect" of the tube.

SEE ALSO:

TRI "Protection Against Shock and Vibration" by M. D. Burkhard.

TR4 "Vibration Isolation of the BL Microphone" by R. J. Maxwell and M. D. Burkhard.

"Vibration Isolation Design" by M. D. Burkhard.

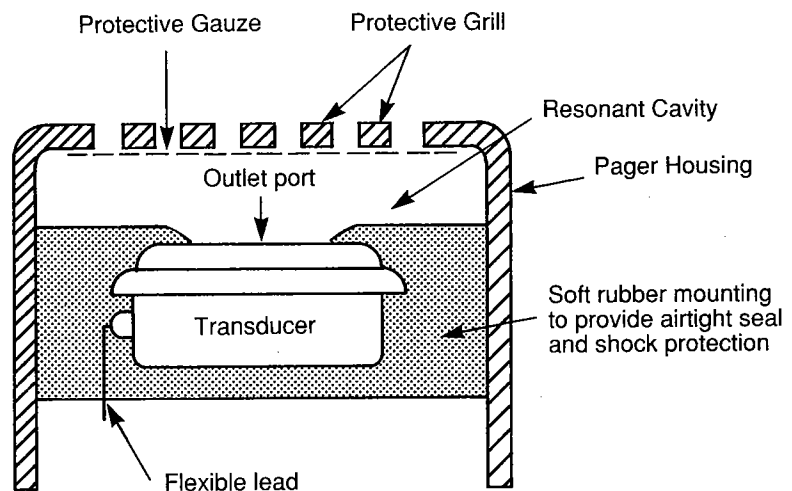


Figure 3