



Connevens Dynamic Mute

*The ideal
companion for
your Connevens
CRM-220*



INSTRUCTIONS AND INFORMATION
for the Connevens Dynamic Mute

Connevens Dynamic Mute

The Connevens dynamic mute is a device which is capable of causing 10 to 18dB muting of the internal microphone of a hearing aid when an audio signal from an external signal source, such as an FM radio aid is presented at the input. The audio signal from the external source is also passed to the direct input connection of the hearing aid.

In a relatively quiet environment it may be difficult to tell whether the unit is 'working' or not. A significant improvement in signal to noise ratio is obtained where the radio aid transmitter picks up less noise than the user's hearing aid (the teacher is usually at the 'quieter' end of the classroom). These latter statements are of course true for any manufacturers' dynamic muting circuit.

The unit uses the peak level of the audio signal from the external source to mute the hearing aid microphone. External signals above a variable threshold level provide more muting as the level increases. Thus it can be seen that if the audio signal from the external source is noisy, or the gains of either the radio aid or the dynamic mute are set too high, then the hearing aid could be muted for much of the time. It is therefore important to set the levels correctly or there will be a tendency to believe that the dynamic mute is not capable of working effectively. Having said this, it should only be necessary to set the mute gain once for a particular hearing aid or possibly, general type of hearing aid. Each mute gain is set in our factory using a Phonak SUPER-FRONT PP-C-2. For most Phonak hearing aids, the factory setting may well be adequate.

CONNEVANS LIMITED

54 Albert Road North, Reigate, Surrey RH2 9YR
Switchboard 01 737 247571 Text 01 737 243134 Fax 01 737 223475
Internet: www.connevens.com Email: mail@connevens.com

Operation

- 1) Plug one end of the non-polarised lead into the two holes at the bottom of the mute and the other end into the radio aid output socket.
- 2) Plug the 2.5mm jack plug of the "V" lead into the socket in the back of the mute and the Europlug end(s) into the hearing aid shoe(s).
- 3) Open the battery door at the bottom of the mute and preferably fit an LR44 or equivalent alkaline or silver oxide battery. The mute will work fine if you use a 675 zinc-air battery but it will not last much longer than in your hearing aid so it must be checked or changed regularly.
- 4) Switch centre position is DYNAMIC MUTE ON; OFF to either side.
- 5) With the unit OFF or battery removed the mute acts the same as a standard resistive direct input lead.
- 6) The two outputs are independent; there is no cross coupling between hearing aids when used binaurally. A single output may be used. If the "V" lead has been supplied but only one output is needed, the spare cable may be cut off, but the core and screen must be prevented from shorting to each other. Alternatively, the spare cable may just be tucked out of the way.
- 7) The gain control is accessed by using a trimming tool or screwdriver through the hole in the case near the fixing screw.

We always recommend that you try out the mute in realistic acoustic conditions before you attempt to adjust the gain control. If you can hear a signal from the radio aid but the mute does not seem to work check the following things before finding a screwdriver:

- a) mute switch in centre position
- b) battery OK
- c) enough noise near the hearing aid so that you could expect to be able to hear the difference

Testing and adjustment

Since the dynamic mute has to work with many different hearing aids of varying sensitivity, a gain adjustment pre-set has been provided. It should only be necessary to adjust this pre-set once, for any particular hearing aid, when the radio aid has been balanced and the user is satisfied with the radio aid output level. It is important to make this adjustment under conditions of realistic background noise level, as expected at the hearing aid position. It is even more important to make the adjustment with a realistic level of background noise at the radio aid transmitter. The higher the output setting of the radio aid and the higher the dynamic mute gain is set, the more muting will be achieved, but if the background noise coming through the radio aid is high, then the hearing aid microphone will be partially muted.

If it is possible we recommend setting up the dynamic mute gain in the following 'subjective' manner because it is the most realistic method:

- 1) Make sure that the dynamic mute is switched off
- 2) 'Balance' the radio aid to the hearing aid in the usual way (or use a previously 'balanced' system) using the dynamic mute in place of the usual attenuating direct input lead
- 3) Take the hearing aid and radio aid system into a typically noisy area (don't overdo it otherwise you may not get as much muting as you'd hoped for)
- 4) Ask an assistant to wear the transmitter as normal (the mouth to microphone distance and speech level must be normal) at the usual location in the room (e.g. at the front of a class). You should listen to the hearing aid at its usual location (e.g. at a desk)
- 5) Switch the dynamic mute to its ON position (centre)
- 6) Before you fiddle with any controls try the unit out first: ask the assistant to speak normally into the radio aid, you should be able to hear the level of background noise through the hearing aid microphone reduce as the assistant speaks, and rise again when they stop speaking. You will, of course, still be able to hear whatever background noise is picked up by the radio aid transmitter. Note that it is important that the person listening to the hearing aid should only be listening through the hearing aid and not directly through the air. You must take whatever steps are necessary to exclude or at least attenuate any sound from directly reaching the tester's ears. If you do not do this it can be difficult to tell when the hearing aid microphone is muted.

- 7) If the unit does not seem to work very well, adjust the potentiometer clockwise with a trimming tool until you can just hear the level of background noise from the hearing aid start to reduce, then turn the potentiometer back a few degrees
- 8) If you now get the assistant to speak normally into the radio aid again, you should be able to hear the level of background noise through the hearing aid microphone reduce as the assistant speaks, and rise again when they stop speaking. As before you will still be able to hear whatever background noise is picked up by the radio aid transmitter.
- 9) You can compare the signal to noise improvement with or without the dynamic mute by switching the unit on and off. It is perfectly OK to use the mute with the unit switched off or without a battery; it will just perform as a normal resistive component on the input lead.
- 10) The dynamic mute takes less than 100 μ A from a standard LR44 or equivalent battery. Alkaline, silver oxide or mercury batteries will last for ages (maybe years) but zinc-air batteries self-discharge rapidly and so may only last a week or so. Battery life will be maximised if the mute is turned off when not in use!

It is recognised that it is often inconvenient to set up equipment such as this under realistic conditions of use and that the setting up procedure needs to be done 'scientifically' on a test box. We say 'scientifically' here because although the signals on a test box are reproducible, constant and calibrated, real speech is not and it is actually difficult to predict accurately what will be the most appropriate gain setting. We suggest two methods and the most appropriate will depend on your preferences and the type of test equipment you have available. In both cases it is necessary to employ two separate sound sources which have different frequency characteristics so that you can distinguish the muting effect on one of these signals.

Method 1: Radio Aid microphone in any test box

Signal discrimination by tester's ears

- 1) Make sure that the dynamic mute is switched off
- 2) 'Balance' the radio aid to the hearing aid in the usual way at 75dB SPL (or use a previously 'balanced' system) using the dynamic mute in place of the usual resistive direct input lead
- 3) Leave the radio aid microphone in the test box and reduce the signal level to 65dB SPL
- 4) Place the hearing aid microphone close to another signal source e.g. a second test box, a sound level meter (SLM) calibrator, small radio/cassette etc. and listen to the hearing aid. It is important that you listen to this second signal source only through the hearing aid and not directly through the air. You must take whatever steps are necessary to exclude or at least attenuate any of this sound from directly reaching your ears. If you do not do this it can be difficult to tell when the hearing aid microphone is muted. We will call this second signal the 'noise'.
- 5) Switch the dynamic mute to its ON position (centre). The level of 'noise' should temporarily reduce and then recover. The level of the test signal should not change significantly.
- 6) When the 'noise' level has stabilised (a few seconds), adjust the gain control until you can just hear the 'noise' through the hearing aid reduce then turn back the control a few degrees. Since the tone signal from the hearing aid will also be heard, it is important to choose a 'noise' source which you can easily identify against the tone from the test box. It is not a good idea to use wideband noise as the signal from the test box because the peak level will be different to that for a tone and it will tend to mask whatever you choose for the second 'noise' signal. Obviously, you cannot use the same frequency tone for both signals.
- 7) Check that the mute is working correctly by increasing the signal to the radio aid transmitter to around 75dB SPL. The test signal will increase by 10dB and the noise through the hearing aid microphone should reduce from its previous level by 6 to 10dB. If you now reduce the radio aid transmitter signal again or turn it off, the noise through the hearing aid microphone should recover again within a couple of seconds. If you increase the radio aid transmitter signal level to 80/85dB SPL, the noise through the hearing aid microphone should reduce by 12 to 18dB. Since you are relying on your ears to detect the muting effect it will probably help if you turn the test signal to the radio aid transmitter on and off a few times so that you get used to hearing the difference. It may also be beneficial if you change the frequency of the test signal so that it is quite different to the 'noise' signal. Changing the test frequency to 250Hz or 5kHz

won't make any difference to the dynamic mute operation but it may allow ears to distinguish the two signals better.

In the above method the tester uses their ear(s) as the discriminating device between the test signal and the background 'noise'.

Method 2: Hearing Aid in test box

Signal discrimination by test box

You can only use this method if your test box is capable of distinguishing between separate signals i.e. it performs narrow band level measurements rather than wideband level measurements. Test boxes which can measure hearing aid frequency response using 'wideband noise' will usually be satisfactory for this method. However, you should note that test boxes are not usually designed to analyse additional signals whatever is internally generated by the test box, so the displayed level and frequency results may not be totally realistic, particularly for the additional external signal.

- 1) Make sure that the dynamic mute is switched off
- 2) 'Balance' the radio aid to the hearing aid in the usual way at 75dB SPL (or use a previously 'balanced' system) using the dynamic mute in place of the usual resistive direct input lead
- 3) Replace the hearing aid in the test box and close the lid then select wideband noise
- 4) Place the radio aid transmitter microphone close to another signal source e.g. a second test box, a sound level meter (SLM) calibrator, tone generator etc. and listen to the hearing aid. It is important that you listen to this signal source only through the hearing aid and not directly through the air. You must take whatever steps are necessary to exclude or at least attenuate any of this sound from directly reaching your ears. If you do not do this it can be difficult to tell when the hearing aid microphone is muted. You could place the radio aid transmitter and signal source on the other side of the room or even in another room in order to attenuate the direct sound to your ears.
- 5) The average level of the signal into the radio aid transmitter microphone should be set at a level of about 65dB SPL. If you are using a second test box this is otherwise you can set the level by using a sound level meter near the radio aid microphone. You cannot rely on the measurement of the radio aid transmitter signal on the test box display to set this level because the test box will probably not respond linearly to this additional signal. The test box may also generate apparent distortion products which are not really there. However, you should be able to see the effect of the mute sufficiently well.

Connevans Dynamic Mute

- 6) Turn on the wideband noise to the hearing aid at a reasonable level, say 60 to 70dB SPL. The test box display should show the noise with the test signal visible above the noise (plus any apparent distortion products introduced by the test box). Ignore the level of the test signal which may be erroneous, just note that it is at the correct frequency.
- 7) Switch the dynamic mute to its ON position (centre). The level of noise on the screen should temporarily reduce and then recover. The level of the test signal should not change significantly.
- 8) When the noise level has stabilised (a few seconds) adjust the gain control until the noise level just starts to reduce. You may need to do this slowly if the display update rate of the test box is low.
- 9) Check that the mute is working correctly by increasing the signal to the radio aid transmitter to around 75dB SPL. The test box display should continue to show the test signal with the noise through the hearing aid microphone reducing from its previous level by 6 to 10dB. If you now reduce the radio aid transmitter signal again or turn it off, the noise through the hearing aid microphone should recover again within a couple of seconds. The apparent attack and recovery times indicated on the test box display may be slowed down by the test box measurement rate. If you increase the radio aid transmitter signal level to 80/85dB SPL, the noise through the hearing aid microphone should reduce by 12 to 18dB.

In this method the tester uses the test box to discriminate between the test signal and the background 'noise' picked up by the hearing aid microphone. You should always satisfy yourself that the setting up and the operation of the mute is satisfactory by finally having a listen to the output of the hearing aid.

CUSTOMER SUPPORT: If after following these instructions, you are still having difficulties – please feel free to phone David Evans, who will be happy to help you.



Connevans Limited

**EQUIPMENT FOR THE DEAF AND HEARING IMPAIRED
IN EDUCATION, EMPLOYMENT, THE HOME & LEISURE**

54 Albert Road North, Reigate, Surrey RH2 9YR, United Kingdom
Switchboard: 01 737 247571 Text: 01 737 243134 Fax: 01 737 223475
Internet: www.connevans.com Email: mail@connevans.com