

USING NR SERIES MICROPHONES

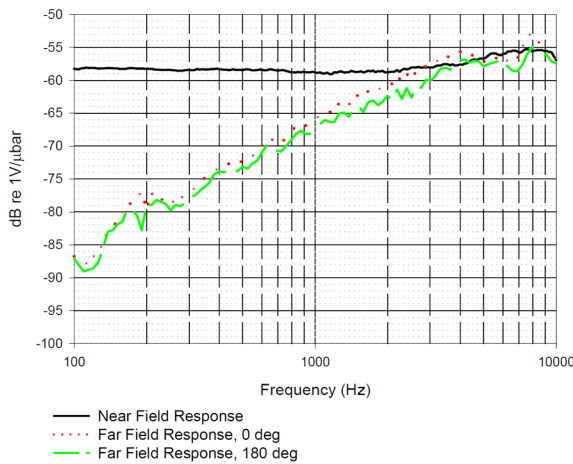


The purpose of this bulletin is to discuss some of the critical areas which require special attention when applying NR Series Microphones

NR Series microphones are designed as close-talking, noise cancelling microphones for use in such applications as boom-mounted headset microphones and hand-held microphones. By “close-talking” it is meant that the unit is positioned close to the lips of the user. For this reason, it is extremely important that the microphone be protected from foreign material entering its sound ports. Failure to provide proper protection can result in poor performance of the microphone.

The frequency response (shown in Figure 1) is determined by the sound pressure difference between the front and rear ports through which access is provided to both sides of the diaphragm. The cancelling feature is based on the smaller pressure difference between the ports when exposed to sound generated at a much greater distance (far/field) than the gradient resulting from a close-talking sound source (near/field).

Figure 1: Example NR response in W Series Boom housing



The W Series boom housing is only slightly larger than the NR element, so spacing between front and back ports is minimized. This is beneficial for noise cancelling. The small housing and well-balanced acoustics yield a crossover frequency of about 3 kHz. A higher crossover indicates better noise cancelling due to the proximity effect.

Near field response is measured with a Mouth Simulator (B&K Type 4227) at spacing of 6 mm from the opening. Far field measured at 1 m from speaker sound source.



A larger housing will increase the spacing from front to rear sound ports. This will result in higher near field sensitivity because the sound pressure differential is greater across the longer path. However, the crossover frequency will be lower for a larger housing. The overall noise cancellation will be somewhat degraded.

Noise is also cancelled due to the directional polar response. Both direct and reverberant noise is cancelled. NR microphone performance is exceptionally well balanced – performance is near identical into front or

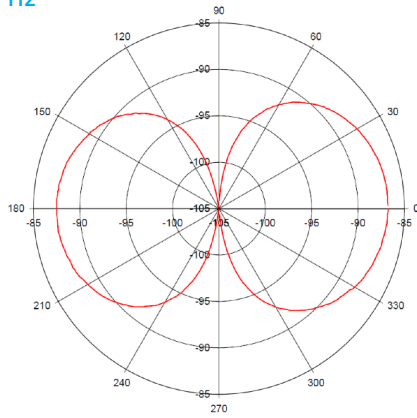
Common NR Series Models	
NR-23158-000	-3-wire hook-up
NR-23159-000	low sensitivity and 2-wire hook-up
NR-23160-000	2-wire hook-up
NR-25994-000	3-wire hook-up and RF bypass circuit
NR-25994-C97	2-wire hook-up and RF bypass circuit
NR-23610-000	high bias voltage for improved dynamic range



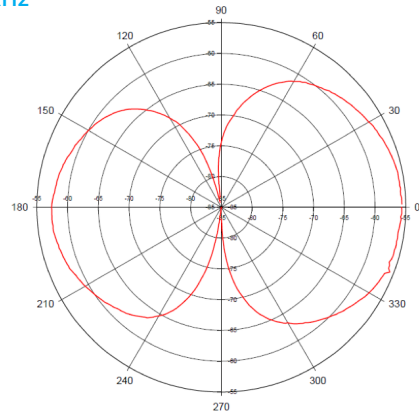
rear port. The polar pattern keeps a figure 8 shape through the audio band. Most ECM type microphones lose their directional performance at high frequencies.

Below are typical polar response curves for W series housing.

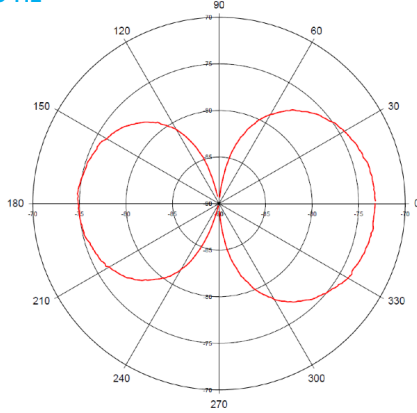
100 Hz



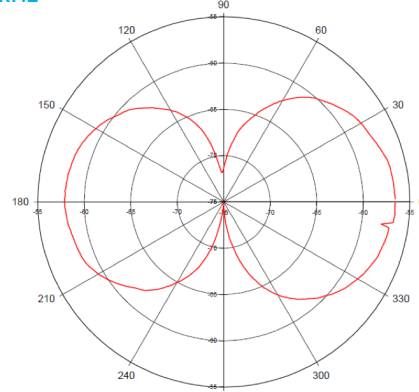
4 kHz



400 Hz



10 kHz



1 kHz

