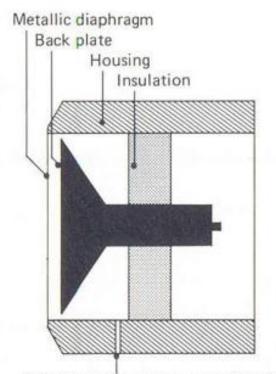
If the planar electrode is connected to ground (earth) and the diaphragm of the condenser mic held at potential  $V_{bias}$  by a very high resistance  $R_{bias}$ , then a time-varying AC voltage signal  $V_R(t) = I(t) \cdot R_{bias}$  appears across this resistor due to the time-varying AC current  $I(t) = dQ(t)/dt = V_{bias} \cdot dC(t)/dt = -(\varepsilon_o A_{dia} V_{bias}/d_{gap}^2(t)) \cdot (dd_{gap}(t)/dt)$  flowing through this resistor and the planar capacitor to ground. The capacitor  $C_{block}$  blocks the DC voltage  $V_{bias}$ present on the metalized diaphragm, but allows the AC voltage signal  $V_R(t)$  to pass through it – which is then amplified by some kind of voltage amplifier – *e.g.* a vacuum triode voltage amplifier {back in the hey-day of vacuum tubes} or a high-input impedance FET (Field-Effect Transistor) amplifier or *e.g.* a low-noise high-input impedance FET-input op-amp (operational amplifier).

Condenser microphones intrinsically have {very} high output impedance, and require a bias voltage {*aka* "phantom power"} for them to operate, as well as a high input impedance preamplifier of some kind. If designed properly, the condenser mic + mic preamp system together will have very good, flat frequency and phase response and also have low intrinsic noise.

Again, condenser microphone elements with omni-directional response are completely sealed (except for a small ambient pressure equalization port) as shown in the figure below:



## CONDENSER

Hole for static pressure equalisation

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