



Expanded Dynamic Range Microphones

The majority of Knowles Electronics microphones have evolved in concert with hearing aid technology over many years. Many of the attributes of the microphones (small size, high signal/noise, etc.) also help enable commercial applications. Some common attributes, may not be compatible with certain applications. For instance, it is typically desirable for hearing aids to function on a 0.9V supply. For compatibility, many Knowles microphones are designed with a nominal signal bias voltage of 0.45V to maximize signal dynamic range in a hearing aid.

The 0.45V signal bias also sets the maximum dynamic range for the microphone at about 0.9Vpp signal voltage, which corresponds to a maximum sound pressure for linear signal output.

To expand the sound pressure allowed for linear operation, a number of microphones are available with a modification that sets the signal bias to $\frac{1}{2}$ of the supply voltage to allow full utilization. For the current set of available microphones, the maximum supply voltage allowable is 10VDC, so the available signal is approximately 10Vpp.

Some external circuitry is required for the center-bias capability.

Current microphone model available with center-bias capability

EK Series	EK-26899-P03 EK-26899-P58 EK-30436-P03 EK-31304-P03
EM Series	EM-31144-P58
WP Series	WP-30113-P03
FG45 Series	FG45-32259-P03 FG45-32335-P03

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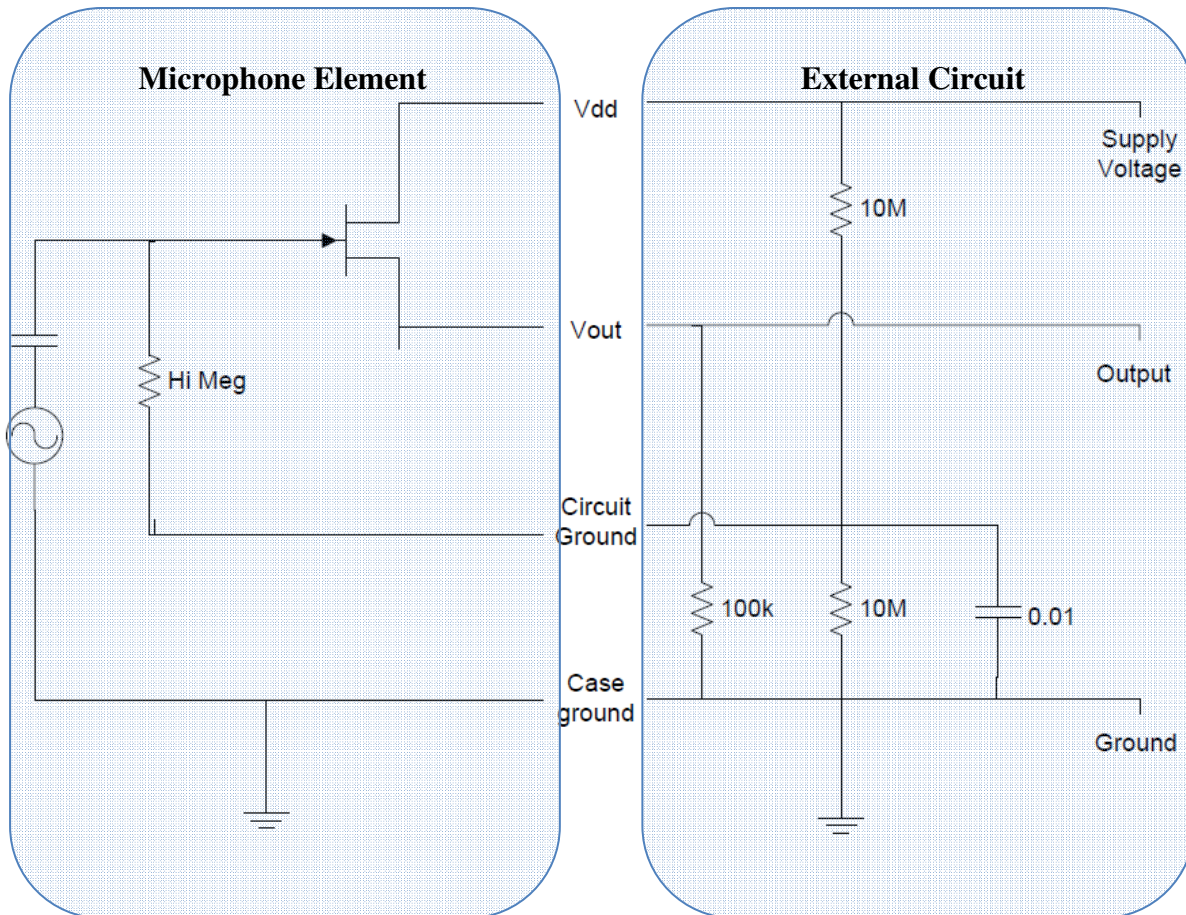
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Below is the schematic including the internal microphone circuit.



Model Variations

In addition to the normal solder terminals, the center-bias microphone models include a wire welded to the case. These four connections microphone attach to the external circuit. Some microphone models have short wires attached to the solder terminals to facilitate PCB mounting.

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The center-bias microphones also are available in standard and reduced sensitivity versions. The reduced sensitivity models offer the highest maximum dynamic range.

One model has a sloped frequency response. For microphones that point into the ear canal for voice pickup, the sloped response provides high-pass filtering to help the voice sound more natural.

The chart below lists the various configurations and typical SPL limit for linear output (defined as 10% THD output level with 9V supply).

Model	Wires	Sensitivity	Response	Linearity
EK-26899-P03	Lead wires for PCB	Reduced	Flat	154dB SPL
EK-26899-P58	Solder terminals	Reduced	Flat	154dB SPL
EK-30436-P03	Lead wires for PCB	Standard	Flat	137dB SPL
EK-31304-P03	Lead wires for PCB	Standard	Lows roll off	137dB SPL
EM-31144-P58	Solder terminal	Standard	Sloped	149dB SPL
WP-30113-P03	Lead wires for PCB	Reduced	Flat	154dB SPL
FG45-32259-P03	Solder terminal	Standard	Flat	140dB SPL
FG45-32335-P03	Solder terminal	Reduced	Flat	150dB SPL

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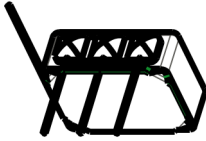
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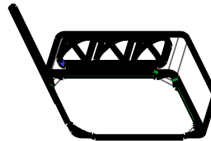
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Mechanical Configurations



EK-P03 or WP-P03
with lead wires for PCB



EK-P58 or WP-P58
with ground wire only



EM-P58 with ground
wire only



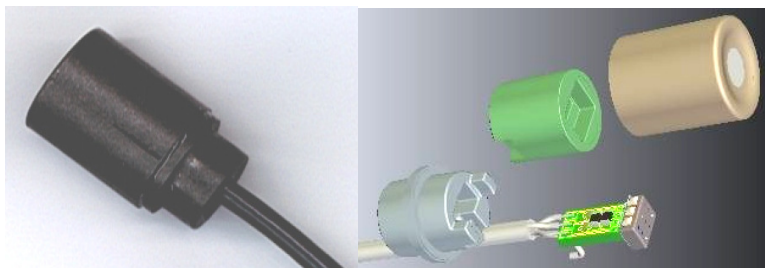
FG45-P03
with ground wire only

Assemblies for Expanded Dynamic Range Microphones

Two types of assemblies are currently available: The H series (VXX-H), and the F series (VXX-F).

H SERIES

H Series assemblies are cylindrical package microphones that offer wide frequency response; some versions operate to high sound pressure levels.



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Package models available with center-bias microphones:

Model	Element	Housing Dimensions	Cable Length
VEK-H-30108-000	EK-26899-P03	12.7mm OD x 20.9mm length	210mm
VEK-H-30320-000	EK-30436-P03	12.7mm OD x 20.9mm length	210mm
VWP-H-30109-000	WP-30113-P03	12.7mm OD x 20.9mm length	210mm

Construction

EK or WP microphone element is located in a conductive plastic housing. Sound enters through a water resistant sintered metal disc. The assembly contains a bias-centering circuit for supply voltages up to 10V. A shielded cable connects to the package, with the shield connected to the conductive housing.

The H Series assembly provides linear reproduction of sounds to 137dB SPL or 154dB SPL typical and to frequencies over 10kHz.

Applications

- General Outdoor Use
- Gunshot detection
- Outdoor security installations
- High SPL detection

F SERIES

F Series assemblies are panel-mount waterproof microphone packages. High SPL (with external circuit) versions are available.

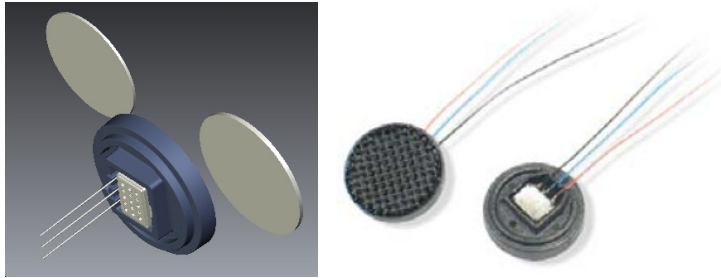
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F Series models available with center bias microphone (compatible with but not including required external circuit):

Model	Element	Housing Dimensions	Exit Wire Length
VEK-F-30431-000	EK-26899-P58	16mm OD x 5mm thickness	200mm
VEK-F-30470-000	EK-26899-P58	16mm OD x 5mm thickness	200mm
VWP-F-30609-000	WP-30113-000	16mm OD x 5mm thickness	20mm

Construction

Plastic molded housing holds EK or WP microphone elements. Waterproof membrane attaches to front of package. Submersion ratings of 1m, 10m, and 20m are possible. Rugged metal mesh protects the waterproof membrane. Flying leads are provided for electrical contact.

Applications

- Outdoor microphone installations
- Body-worn microphone
- High SPL Sensor
- Gunshot detection

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