

SHURE®

Shure Brothers Incorporated
222 Hartrey Avenue
Evanston IL 60202-3696 U.S.A.

Model SM89 User Guide



MODEL SM89 CONDENSER SHOTGUN MICROPHONE

Model SM89 is a highly directional condenser shotgun microphone with characteristics especially suitable for distant pickup required in location film and television production. The microphone can also be used for theater sound reinforcement, spot news coverage, or wildlife recording; it will discriminate at a distance in favor of desired dialogue or effects and against ambient noise; and it will make the discrimination even in noisy surroundings, indoors, or outdoors.

The on-axis frequency response of the SM89 is very smooth and extended. For clarity and intelligibility of speech, a slight presence rise optimizes the high-frequency response to compensate for high-frequency losses due to distant pickup. Below 60 Hz a low-frequency cutoff is tailored for minimum pickup of wind, mechanical vibration, ambient noise, and rumble without affecting voice frequencies. A switch allows selection of the cutoff frequency at 160 Hz to provide maximum intelligibility of voice and speech under extremely adverse noise and wind conditions.

The off-axis response of the SM89 is outstandingly free of comb-filter effects. This is particularly important when it is not possible to aim the microphone precisely, when it is desirable to pick up dialogue, sound from moving sources, or

when it is necessary to reinforce sound from a single instrument within a group without excessively coloring the sound of nearby instruments that will be picked up at a lower level.

Additionally, because of such off-axis characteristics, the SM89 can be used for pickup at greater angles off-axis than is possible with other shotgun microphones. This feature permits deliberately locating the desired source up to $\pm 30^\circ$ off-axis in order to ensure that an undesired source is entirely off-axis and will not be picked up. Changes in frequency response above 1,000 Hz can then be compensated by simple equalization if necessary.

Pickup (and cancellation) is symmetrical about the microphone axis; it is unchanged when the microphone is rotated about its own axis. In addition to its acoustical and electrical properties, the SM89 is extremely lightweight. This makes it easier for an operator to hold it on a fishpole for extended periods of time, for instance, during lengthy takes. The microphone length is optimized in relation to its directional characteristics and ease of handling. Its aircraft-grade materials withstand rough handling, and its unique internal construction provides excellent wind noise rejection while protecting against damage to the transducer or electronics.

The SM89 is supplied with a foam windscreen for use when the microphone is subject to quick boom motion, or when air conditioning or other indoor wind noises may be a problem. A rugged carrying case is also supplied. An optional accessory is a specially designed shock-mount virtually eliminating mechanical vibration pickup.

The SM89 is field serviceable. The handle separates by unscrewing from the head; the interconnection is gold-plated and extremely reliable.

Features

- *Designed especially for location film and TV production, theater sound reinforcement, and spot news coverage*
- *Highly directional polar pattern optimized for distant pickup*
- *Smooth, wide on-axis response*
- *Greatly suppressed side pickup with minimum comb-filter effects*
- *Two low-cut frequencies, switch selectable*
- *Low impedance, high sensitivity*
- *Extremely low hum, noise, and RF pickup*
- *Uses readily available 11 to 52 Vdc phantom supply*
- *Rugged and reliable, operates over wide range of temperature and humidity*
- *Extremely lightweight, can be suspended on fishpole for long periods of time without operator fatigue*
- *Aircraft-grade materials used throughout*
- *Supplied with foam windscreen and strong luggage-grade carrying case*

SPECIFICATIONS

Type

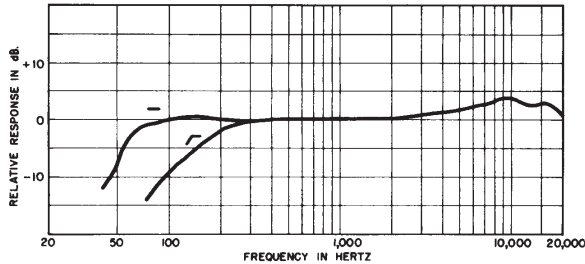
Pressure gradient/line combination

Transducer

Condenser

Frequency Response

60 to 20,000 Hz (see Figure 1*)



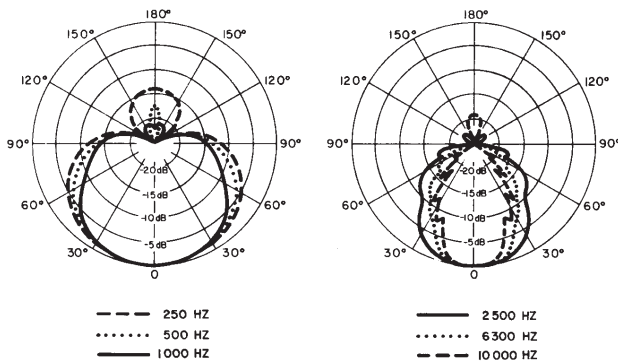
*Curves shown at 1.8m (6 ft)

TYPICAL ON-AXIS FREQUENCY RESPONSE

FIGURE 1

Polar Pattern

Hypercardioid at low frequencies, lobar at frequencies above 1 kHz, symmetrical about axis (see Figure 2*)



*Curves shown at 1.8m (6 ft)

TYPICAL POLAR PATTERNS

FIGURE 2

Output Impedance

Rated at 150 Ω (100 Ω actual)

Recommended minimum load: 800 Ω (May be used with loads low as 150 Ω with reduced clipping level)

Output Level (at 1,000 Hz)

Open Circuit Voltage -53 dB (2.2 mV)
0 dB = 1V/ μ bar

Output Clipping Level (at 1,000 Hz, under 0.5% THD)

800 Ω load: -1 dBV (0.89 V)
150 Ω load: -12 dBV (0.25 V)

Maximum SPL (at 1,000 Hz, under 0.5% THD)

800 Ω load: 127 dB SP
150 Ω load: 119 dB SPL

Hum Pickup

Under 3 dB equivalent SPL in 1 mOe field (60 Hz)

Output Noise

16 dB SPL typical, A-weighted

Signal-to-Noise Ratio

79 dB re 94 dB SPI

Dynamic Range

111 dB

Phasing

Positive pressure on diaphragm produces positive voltage on pin 2 relative to pin 3 of microphone output connector

Power

Phantom voltage: 11 to 52 Vdc; 2 mA current drain

Filter

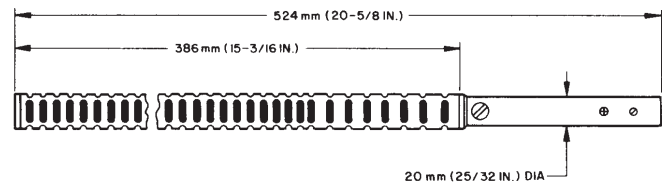
Recessed low-cut filter switch, 15 dB/octave cut below 60 Hz(—)or 160 Hz (—)

Case

Satin-black vinyl painted aluminum alloy handle and grille with stainless steel screen

Dimensions

See Figure 3



OVERALL DIMENSIONS

FIGURE 3

Environmental Conditions

Operating Temperature: -29 to 57° C (-20 to 135° F)

Relative Humidity (Operating): 0 to 95 %

Storage Temperature: -29 to 74° C (-20 to 165° F)

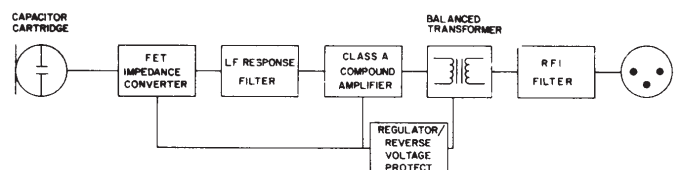
Relative Humidity (Storage): Up to 80% at 74° C (165° F)

Net Weight

195 grams (6.9 oz)

POWERING THE SM89

The SM89 is designed for connection to widely available 11 to 52 Vdc phantom-powered microphone inputs. Suitable inputs are found in such Shure units as Mixer Models M267, M268, FP31, FP32, and FP42, Distribution Amp Model FP16, and Power Supply Model PS1A.

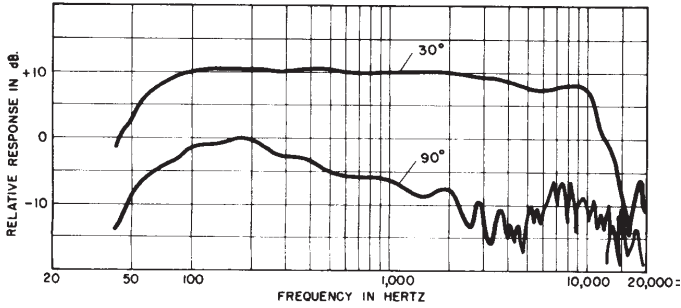


BLOCK DIAGRAM

FIGURE 4

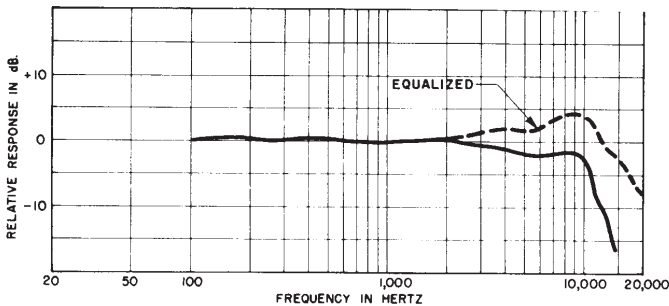
USING THE DIRECTIONAL QUALITIES OF THE SM89

Because of its minimum comb-filter effects, the SM89 has a unique advantage over other shotgun microphones when good sound would otherwise be difficult or impossible to pick up. For instance, in the presence of noise sources in a relatively nonreverberant location, the SM89 can be aimed so that the noise source is entirely off-axis to the microphone even if this puts the desired source up to 30° off-axis. The noise pickup will then be at absolute minimum; and the SM89 will pick up the desired source with slightly diminished high-frequency response (see Figure 5).



COMPARISON OF 30° AND 90° OFF-AXIS RESPONSE OF SM89 (SHOWN AT 1.8M [6 FTL])
FIGURE 5

However, because the 30° off-axis response is smooth, simple equalization can compensate for its decreased high-frequencies if necessary. The curve below (Figure 6) shows the SM89 response at 30° off-axis, with the equalization that can be used to restore the high-frequency response.



TYPICAL SM89 RESPONSE, 30° OFF-AXIS
FIGURE 6

ACCESSORIES

The supplied windscreen is useful under most indoor-conditions where minimal wind noise due to boom motion, air conditioners, or heater fans is present. When structure-borne mechanical vibration must be cancelled, the optional Model A89SM Shock-Mount can be used. And for mounting on a conventional microphone stand, use the Shure A57E Swivel Adapter.



SM89 AND A89SM SHOCK MOUNT
FIGURE 7

IMPORTANT: To avoid degrading the response of the SM89, never cover its grille perforations with anything except acoustically transparent windscreen material.

FURNISHED ACCESSORIES

- Carrying Case 95A1020
- Foam Windscreen RK257WS

OPTIONAL ACCESSORIES

- Shock Mount A89SM
- Swivel Adapter A57E

REPLACEMENT PARTS

- Head Assembly R144
- Handle Assembly 90A3123
- RFI Filter and Plug Element 90A3127

For additional service or parts information, please contact Shure's Service department at 1-800-516-2525. Outside the United States, please contact your authorized Shure Service Center.