



## GENERAL

The Shure SM96 is a unidirectional electret condenser microphone tailored to the vocal miking needs of professional vocalists and soundmen in both live performances and sound recording. The SM96 is also a superb choice for lecturers and speechmakers. Its smooth, flat frequency response is modified by a slight presence rise and an electronically generated low-frequency rolloff, making it quite effective for rhythm pickups. The SM96's ball-type steel mesh and acoustic foam grille minimize popping from explosive breath sounds and "rushing" from wind and strong air currents.

The SM96 can be powered by virtually any phantom (simplex) power source, or by an internal 1.5-volt AA battery. The battery, which serves as a backup power source in the event of phantom power failure, can provide up to 5000 hours of continuous microphone operation.

The SM96 is supplied with a swivel adapter for use on a microphone stand, boom or gooseneck, and a zippered vinyl storage bag. Model SM96-LC is supplied without cable. Optional accessories include a foam windscreen (A85WS), SHOCK-STOPPER™ isolation mount (A53HM), two-channel phantom power supply (PSI), and 7.6m (25 ft) TRIPLE-FLEX® microphone cable (C25E).

## Model SM96 Features

- Wide-range frequency response tailored for professional vocal applications
- Built-in wind and pop filter minimizes undesirable wind and breath sounds
- Controlled low-frequency rolloff to reduce low-frequency handling noise and compensate for proximity effect
- Transducer element shock-mounted for reduced stand and handling noise
- Low distortion output and wide dynamic range characteristics for variety of load impedances
- Cardioid polar pattern, uniform with frequency and symmetrical about axis, to provide maximum rejection and minimum coloration of off-axis sounds
- Very low RF and magnetic hum susceptibility
- Wide-range phantom powering includes DIN 45 596 voltages of 13 and 48 Vdc
- Rugged construction for outstanding reliability
- Field-usable over wide range of temperature and humidity conditions
- Increased versatility through operation with easily obtainable battery-serves as backup in case of phantom power failure

## MODEL SM96

### UNIDIRECTIONAL CONDENSER MICROPHONE



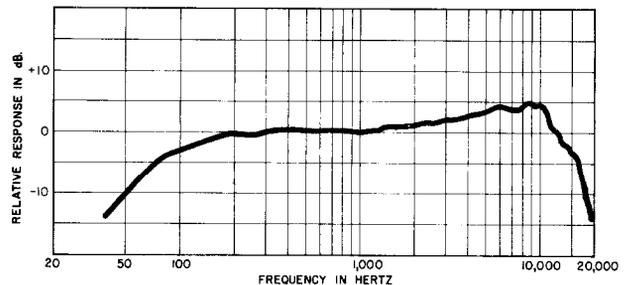
## SPECIFICATIONS

### Type

Cardioid condenser (electret bias)

### Frequency Response

70 to 16,000 Hz (see Figure 1)



TYPICAL FREQUENCY RESPONSE  
FIGURE 1

### Polar Pattern

Cardioid (unidirectional) response-uniform with frequency, symmetrical about axis (see Figure 2)

### Output Impedance

Rated at 150 ohms (200 ohms actual)

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

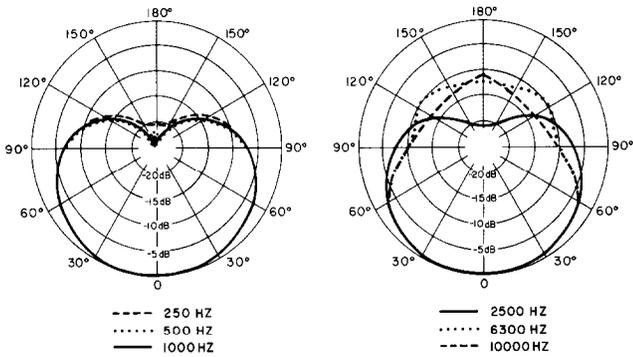
### Output Level (at 1,000 Hz)

Open Circuit Voltage . . . . -74 dB (0.2 mV) (phantom)  
-75 dB (0.18 mV) (battery)  
(0 dB = 1 volt per microbar)

### Clipping Level (1,000 Hz)

800-ohm Load : -4 dBV (0.63V) (phantom, 1% THD);  
-23 dBV (71 mV) (battery, 3% THD)  
150-ohm Load : -15 dBV (0.18V) (phantom, 1% THD);  
-31 dBV (28 mV) (battery, 3% THD)

UNIDIRECTIONAL CONDENSER MICROPHONE  
MODEL SM96



TYPICAL POLAR PATTERNS  
FIGURE 2

**Maximum SPL**

800-Ohm Load: 146 dB (phantom), 128 dB (battery)  
150-Ohm Load: 140 dB (phantom), 125 dB (battery)

**Hum Pickup**

+ 2 dB equivalent SPL in a 1 millioersted field (60 Hz)

**Output Noise** (equivalent sound pressure levels; measured with true rms voltmeter)

27 dB typical, A-weighted  
30 dB typical, weighted per DIN 45 405

**Dynamic Range**

119 dB (phantom); 101 dB (battery) (maximum SPL to A-weighted noise level)

**Signal-to-Noise Ratio**

67 dB (IEC 179)\* at 94 dB SPL

**Overvoltage Protection**

Max. External Voltage Applied to Pins 2 and 3 with Respect to Pin 1 . . . . . +52 Vdc  
Reverse polarity protected to 75 Vdc

**Phasing**

Positive pressure on diaphragm produces positive voltage on pin 2 relative to pin 3

**Cartridge Capacitance**

24 pF

**Power**

Phantom (Simplex) Operation  
Supply Voltage . . . . . 11 to 52 Vdc, (+) pins 2 and 3  
Current Drain . . . . . 1.0 mA to 1.2 mA  
Battery Operation  
Type . . . . . 1.5V alkaline, AA size (NEDA 15A)  
Life . . . . . Up to 5000 hours with fresh battery

**Environmental Conditions**

Relative Humidity 0-50% . . . . . -29° to 74°C  
(-20° to 165°F)  
Relative Humidity 0-95% . . . . . -29° to 57°C  
(-20° to 135°F)

**Connector**

Three-pin professional audio\*\*

**Case**

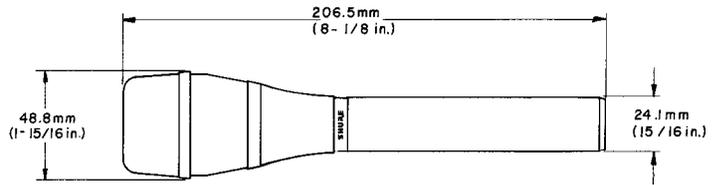
Steel and aluminum construction with gray finish and gray steel grille

**Dimensions**

See Figure 3

**Weight**

Net . . . . . 262 grams (9.2 oz) less battery  
Packaged . . . . . SM96-LC: 969 grams (2 lb 4 oz)



OVERALL DIMENSIONS  
FIGURE 3  
OPERATION

The SM96 is designed for phantom (simplex) powering by a Shure PS1 Power Supply, or by virtually any microphone power supply providing 12 to 48 Vdc phantom voltage, or by any microphone mixer (such as the Shure M267 and M268) with a phantom supply. In addition, the SM96 can be powered by a single 1.5-volt AA alkaline battery (Duracell MN1500 or equivalent). The battery also serves as a backup in case of phantom power failure. A new alkaline battery will provide up to 5,000 hours of continuous microphone operation. Note that microphone performance will be significantly affected by battery operation. Note too that there is no battery drain during phantom powered operation.

**PS1 POWER SUPPLY**

Connect the microphone cable to the SM96 and the power supply MICROPHONE connector. The power supply uses the balanced audio cable pair to carry the supply current to the microphone, and the cable shield as a ground return.

Connect the power supply OUTPUT connector to a low-impedance microphone input of a mixer, audio console or tape recorder. A second SM96 may be connected to the remaining power supply channel in a similar manner.

**BATTERY OPERATION**

Disconnect the microphone cable, and unscrew the SM96 handle, turning counterclockwise (from top) until the handle is free of the microphone body. Slide the handle away from the grille, exposing the battery compartment. Insert a new battery (or replace the old battery), observing the polarity marking in the compartment.

Slide the handle toward the grille, and tighten the handle by turning it clockwise (from top).

**WIND NOISE**

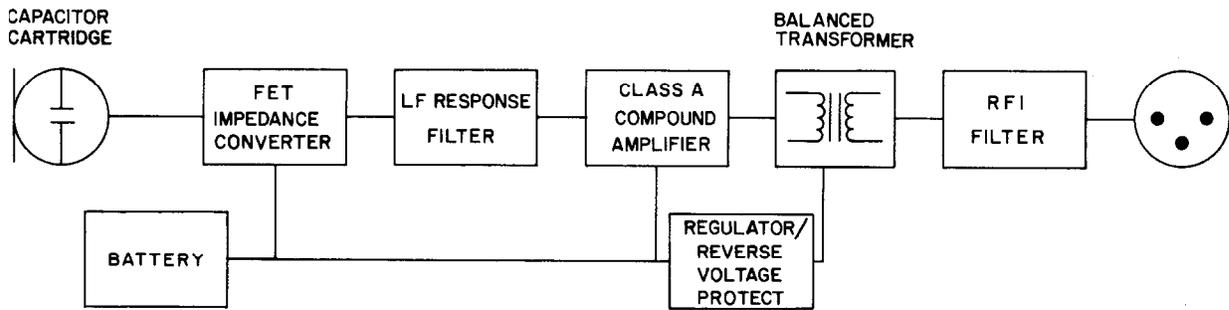
The SM96 has an integral three-stage wind and pop filter which provides excellent protection against most wind and breath noise. Under adverse conditions, such as a windy day outdoors, or close proximity to a "problem" vocalist, the optional foam windscreen can be used.

**CIRCUIT DESCRIPTION**

A block diagram of the SM96 is shown in Figure 8. The capacitor cartridge is followed by an impedance converter stage. The impedance converter output drives

\*S/N ratio is difference between microphone output at 94 dB SPL and microphone self-noise A-weighted.

\*\*Designed to mate with Cannon XL series, Switchcraft A3 (Q.G.) series or equivalent connectors.



BLOCK DIAGRAM  
FIGURE 4

an active low-frequency rolloff (high-pass) filter. The filter output from the Class A, emitter-follower amplifier is transformer-coupled, providing a balanced output to the RFI protection filter at the microphone connector. An active, constant-current, power supply circuit regulates the phantom voltage, allowing the SM96 to operate over a wide voltage range. In addition, the SM96 can be powered by an internal 1.5-volt battery. A reverse voltage protection diode guards against miswired cables and equipment. The circuit contains eight semiconductors to provide low noise, low distortion, wide frequency response, and ultra-reliable operation over a wide range of operating conditions

### SERVICING

#### TROUBLESHOOTING

Due to the high packing density and circuit complexity of the SM96, only basic servicing is recommended. The following steps should be taken if problems arise.

1. Check the power supply output voltage to the microphone. For the Shure PS1, this should be  $21.5 \pm 1.5$  Vdc open circuit.
2. Check the voltage on connector pins 2 and 3 (at back of connector; cable connector disassembled from shell, but connected to microphone). The voltage at pins 2 and 3 with reference to pin 1 should be between 10 and 48 Vdc.
3. If the microphone does not work on phantom power, battery operation may still be possible. Similarly, if battery operation is impaired (with a fresh battery installed), the SM96 may still operate with phantom power. In either case, servicing by an Authorized Shure Service Center to restore full operation is recommended.

### ARCHITECTS SPECIFICATIONS

The microphone shall be a condenser microphone with a frequency response of 70 to 16,000 Hz. It shall have a cardioid directional characteristic, with cancellation at the sides of 6 dB and a minimum cancellation at the rear of 15 dB at 1 kHz. The microphone shall have a rated output impedance of 150 ohms for connection to microphone inputs of 150 ohms or higher. The open circuit voltage shall be -74 dB (0.2 mV) (0 dB equals 1 volt per microbar).

The overall dimensions shall be 206.5 mm (8-1/8 in.) in length by 48.8 mm (1-15/16 in.) in diameter. The handle diameter shall be 24.1 mm (15/16 in.). The weight shall be 262 grams (9.2 oz).

The microphone shall be capable of being powered by a phantom (simplex) power supply with an output of 11 to 52 Vdc, or by a mixer, audio console or tape recorder capable of supplying 11 to 52 Vdc, or by an internal 1.5-volt battery.

The microphone shall be a Shure Model SM96.

### FURNISHED ACCESSORY

Swivel Adapter . . . . . A25C

### OPTIONAL ACCESSORIES

Phantom (Simplex) Power Supply . . . . . PS1  
Switch-Selectable Attenuator . . . . . A15AS  
Isolation Mount . . . . . A53HM  
Windscreen . . . . . A85WS  
Cable (7.6m - 25 ft) . . . . . C25E

### REPLACEMENT PARTS

Screen and Grille . . . . . RK243G  
Cartridge and Shock Mount . . . . . R137  
Amplifier . . . . . 90A3901  
RFI Filter and Plug Element . . . . . RK202P

### GUARANTEE

This Shure product is guaranteed in normal use to be free from electrical and mechanical defects for a period of one year from date of purchase. Please retain proof of purchase date. This guarantee includes all parts and labor. This guarantee is in lieu of any and all other guarantees or warranties, express or implied, and there shall be no recovery for any consequential or incidental damages.

### SHIPPING INSTRUCTIONS

Carefully repack the unit, have it insured, and return it prepaid to:

Shure Brothers Incorporated  
Attention: Service Department  
222 Hartrey Avenue  
Evanston, Illinois 60204

If outside the United States, return the unit to your dealer or Authorized Shure Service Center for repair. The unit will be returned to you prepaid.