

## CH230/ CH230W

### Condenser Cardioid Hanging Microphones

- Available in black or white
- Braided cable shield maintains horizontal aiming, even when temperature and humidity vary
- Preamp mounts in standard electrical boxes
- Steel preamp shield gives high resistance to electrical noise and rf interference
- Hum-bucking output transformer cuts hum by more than 20 dB
- Screw-type output terminals are reliable over the long term

---

#### Description and Application

---

The CH230 and CH230W hanging microphones, utilize back-electret condenser technology to provide an extended, flat frequency response with a controlled cardioid polar pattern for high-quality sound reinforcement. The CH230 and CH230W were specifically designed to mic choirs, instrumental and vocal groups, and live theater. The size and color (black/white) of the transducer and cable allow the microphone to blend in with the surroundings.

The CH230's low self noise and high output signal level combine to produce an excellent signal-to-noise ratio. **Exceptionally high sensitivity**, a uniform cardioid polar response, and smooth frequency response make the CH230 ideally suited for **distant sound pick-up**. The cardioid polar response is precisely controlled and is highly effective in suppressing feedback without coloration of sound. Additionally, unwanted low-frequency noise such as the rumble from air-moving equipment can be reduced with the use of a switchable high-pass filter. The filter's corner frequency (75 Hz) is low enough to have essentially no effect on voice

quality.

The CH230 and CH230W are easily aimed at the performance with the supplied steel wire hanger and holding nut. The wire hanger attached to the microphone element and cable can be bent to aim the microphone in the vertical plane. The horizontal positioning of the microphone is accomplished by rotating the element and locking the position with the nut (detailed description later). This allows the microphone to be accurately positioned over a choir, stage or orchestra.

The CH230 and CH230W are furnished with 30 feet of black (CH230) or white (CH230W) miniature braided shielded cable. The design of the cable ensures the microphone's horizontal position will be held stable without the need of fish-line tethering.

The CH230's electronics module and mounting hardware allow quick assembly and mounting to a standard electrical switch box or four-inch electrical box. Figure 3 illustrates the assembly for either box style. Connecting a mixer to the electronics module is through the output terminal block. Power is obtained from any phantom source supplying 12 to 52 volts.

---

#### Assembly

---

##### Parts List:

- 1 microphone with hanger and 30 ft of cable
- 1 round plaster ring
- 1 rectangular switch cover
- 1 printed circuit board
- 1 shield box
- 1 strain relief
- 2 1 $\frac{1}{4}$ -in. #4-40 Phillips-head screws
- 4  $\frac{3}{16}$ -in. #4-40 Phillips-head screws
- 2  $\frac{1}{2}$ -in. #8-32 Phillips-head screws
- 2 #4 split-ring washers
- 2 #4-40 hex-head nuts
- 4 threaded spacers
- 6 #4 fiber washers

##### Tools Required:

- Medium-head (#2) Phillips screwdriver
- Small-blade screwdriver
- $\frac{1}{4}$ -in. open-end wrench

##### Assembly Instructions (see Figure 3):

1. Identify the type of electrical box, switch or octagon, and select the proper cover plate to start the assembly.
2. Position the plate with the printed side

# CH230/CH230W Condenser Cardioid Hanging Microphone

up with “INPUT-OUTPUT” aligned as shown in Figure 3. Start the assembly by inserting the two 1<sup>1</sup>/<sub>4</sub>-in. screws into the upper left-hand and lower right-hand holes, drop on the internal toothed lockwashers, thread on the spacer and tighten against the plate with a wrench. Repeat the procedure for the two 3<sup>3</sup>/<sub>16</sub>-in. screws. Place the fiber washer on each spacer.

3. Position the printed circuit board with the larger terminal block and the transformer over the printed “OUTPUT” label. Align the screw holes in the upper right and lower left corners of the printed circuit board with the two 1<sup>1</sup>/<sub>4</sub>-in. screws and push down until the board rests against the four fiber washers. Take the remaining two 3<sup>3</sup>/<sub>16</sub>-in. screws and two fiber washers and fasten the board to the plate.

4. Determine the length of cable required before attaching the microphone cable to the printed circuit board. If the cable must be trimmed, measure the length and add three inches. Trim the cable by removing about 1 in. of the outside jacket, then separate the shield from the red and white wires.

Strip 1<sup>1</sup>/<sub>4</sub> in. of insulation from the red and white wires. Push the bare wire ends of microphone cable through the center hole in the plate and the circuit board, then insert the wires into the “INPUT” terminal block. Follow the label instructions printed on the plate. With the small-blade screwdriver, tighten the screws in the terminal block.

5. Use the strain relief to fasten the microphone cable to the plate by capturing the cable about 1<sup>1</sup>/<sub>2</sub> in. from the front of the plate, then orient the flats of the strain relief with the flats of the center hole and squeeze and push the strain relief into the center hole. The strain relief will lock into place.

6. To attach the mixer cable to the circuit board, trim 1<sup>1</sup>/<sub>4</sub> in. of insulation from the cable wires and insert the wires into the “OUTPUT” terminal block. Follow the label instructions and insert the cable shield into “SHLD GND,” and the remaining wires into terminals 2 and 3. **Warning:** the CH230 and CH230W have terminal 2 positive with a positive pressure on the diaphragm, so be aware of possible phasing problems if the

wires for terminals 2 and 3 are reversed. Tighten the terminal block screws with a small-blade screwdriver.

7. Set the roll-off switch to the position desired. The rolloff filter is a two-pole, 12-dB-per-octave high pass with a corner frequency of 75 Hz.

8. Position the shield box with the slotted end over the mixer cable and the screw holes over the two 1<sup>1</sup>/<sub>4</sub>-in. screws. Push down the shield box over the circuit board until the shield is sitting on the plate. Inspect the mixer cable connection for any shorts of terminals 2 or 3 to the shield box. With the wrench, fasten the shield box to the plate with the two split-ring washers and the two hex nuts.

9. Gently push the assembly into the wallbox and fasten the assembly in place with the two remaining 1<sup>1</sup>/<sub>2</sub>-in. #8-32 screws.

10. To orient the microphone in the proper direction, loosen the holding nut on the back of the microphone and slightly twist the microphone on the wire holder (clockwise rotation moves the microphone to the left; counterclockwise rotation moves the microphone to the right). Tighten the holding nut. **Note:** for fixed installations, allow the microphone cable to hang for at least 24 hours so the cable can completely relax and establish a set. Bend the hanger wire to position the microphone in the vertical plane.

## Application Notes

When hanging one or more microphones to provide coverage for a choir, instrumental, or theater group, the best microphone position for optimum sound quality and feedback control depends on many factors—sound system characteristics, construction of the auditorium or theater, and the size and nature of the performing group. Two general rules to observe for the best sound coverage are (1) microphone position and (2) the “3-to-1 rule.”

The first rule is to suspend the microphone approximately two to three feet in front of the first row of performers and two to three feet higher than the heads of the last row of performers. The microphones are usually aimed to point at the last row of performers (Figure 5).

The second rule, the “3-to-1 rule,” should be applied when more than one microphone is required, and their outputs are combined (as with a mixer). Following the 3-to-1 rule avoids the deep voids and dips in frequency response that occur when two or more microphones “see” the same signal from slightly different distances. The 3-to-1 rule is as follows: when multiple microphones are used, place them at least three times as far apart as any one of them is from the nearest sound source. Figure 6 shows a proper application of the 3-to-1 rule.

The CH230 and CH230W may also be used to provide coverage for live theater applications (Figure 7). Most of the action occurs at center stage, so the microphone should be positioned above and pointed to the center of the stage.

## Architects' and Engineering Specifications

The microphone shall be a back-electret condenser type with a frequency response of 30 Hz to 20 kHz. The microphone shall have a cardioid polar pattern with a rear response which is typically 20 dB below the front response at 1.0 kHz. The microphone shall have an output power level of -21.7 dB, where 0 dB = 1 milliwatt per pascal, and output shall not be appreciably affected by the following temperature and humidity extremes: -29° to 74° C (-20° to 165° F) when relative humidity is 0-50%; -29° to 57° C (-20° to 135° F) when relative humidity is 0-95%. The microphone shall have a nominal, balanced output impedance of 150 ohms when connected to its electronics module. The microphone shall have a low-gloss black finish (CH230) or a low-gloss white finish (CH230W). The cable color shall match the transducer. A switchable, two-pole high-pass filter ( $f_0 = 75$  Hz) shall be provided.

The transducer shall have a wire hanger for directing the microphone. Dimensions: the transducer shall be 10.5 mm (0.42 in.) wide and 41.9 mm (1.65 in.) long; the cable shall be 9.1 m (30 ft) long and 2.6 mm (0.106 in.) in diameter. The electronics module shall fit into either a switch box or four-inch electrical box, with a rectangular switch-box plate and circular plaster-ring cover provided.

# CH230/CH230W Condenser Cardioid Hanging Microphone

Terminations to the electronics module shall be terminal blocks.

The Electro-Voice model CH230 (CH230W) is specified.

## Limited Warranty

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring

at any time after repairs have been made to the product by anyone other than Electro-Voice Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice Service at 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. **Electro-Voice Wired Microphones**

are guaranteed against malfunction from any cause for two (2) years from the date of original purchase. In addition, the Limited Warranty for the acoustic system contained in these microphones shall apply for the life of the product, defined as a period of ten (10) years from the date that the manufacture of the specific microphone has been discontinued. Any and all active electronics incorporated in these microphones are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. The Limited Warranty does not extend to cables, cable connectors, or switches. Additional details are included in the Uniform Limited Warranty statement.

**For warranty repair** or service information, contact the service repair department at: 616/695-6831 or 800/685-2606.

**For technical assistance,** contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard Time.

Specifications subject to change without notice.

CH230/CH230W Condenser Cardioid Hanging Microphone

FIGURE 1—Frequency Response

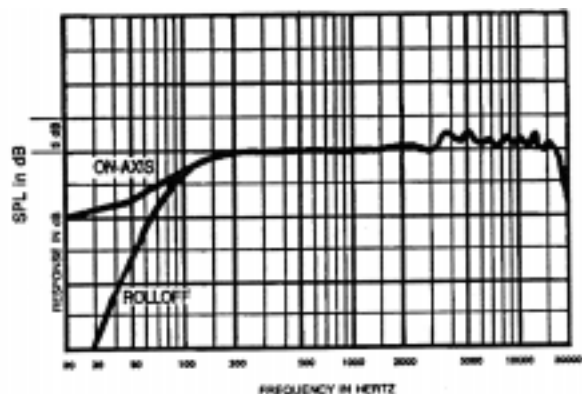
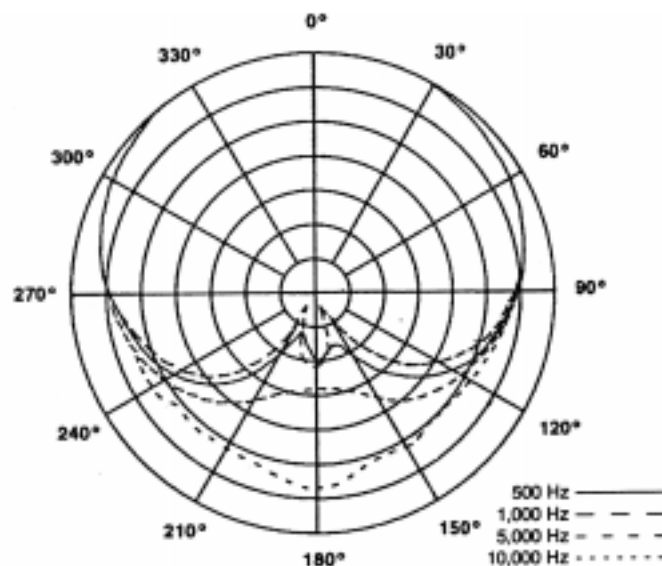


FIGURE 2—Polar Response



# CH230/CH230W Condenser Cardioid Hanging Microphone

FIGURE 3—Assembly Drawing

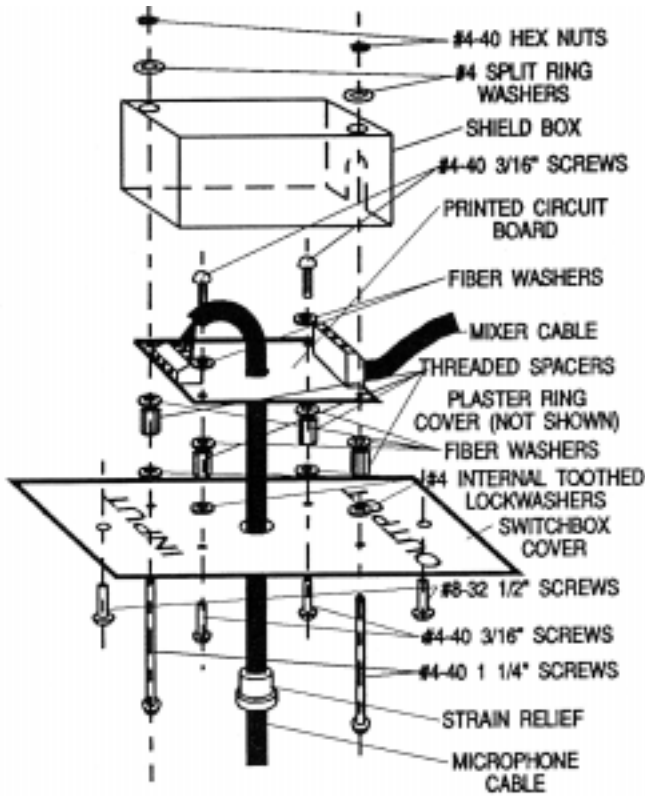


FIGURE 4—Electronics Board and Wiring

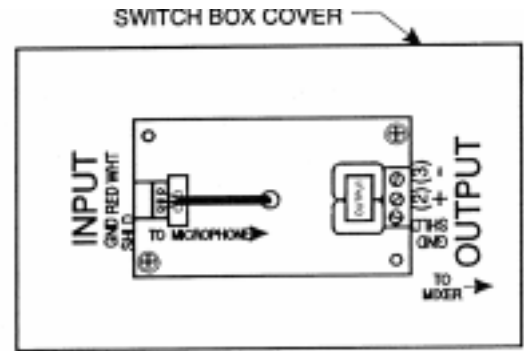


FIGURE 5—Hanging Microphone Placement

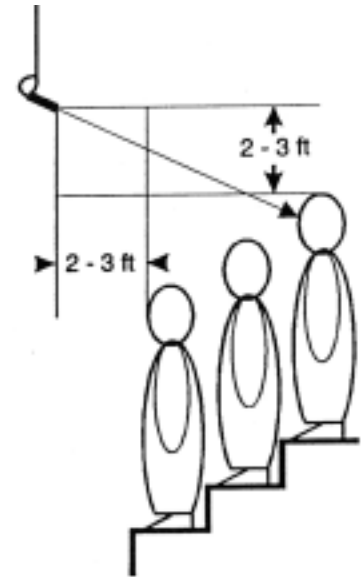


FIGURE 6—3-to-1 Rule

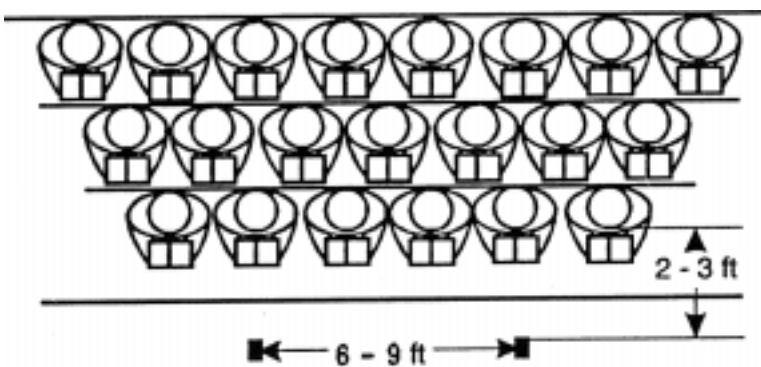
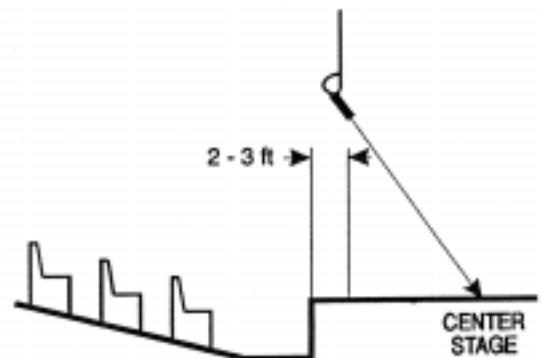


FIGURE 7—Live Theater Placement



# CH230/CH230W Condenser Cardioid Hanging Microphone

## Specifications

### Generation Element:

Condenser, back electret

### Frequency Response (see Figure 1):

30 Hz to 20,000 Hz

### Polar Pattern (see Figure 2):

Cardioid

### Sensitivity,

### Open Circuit Voltage, 1 kHz:

30 mV/pascal

### Power Level, 1 kHz (0 dB = 1 mW/pascal):

-21.7 dB

### Clipping Level (1% THD):

127 dB SPL

### Equivalent Noise:

22 dB SPL A weighted

### Dynamic Range:

105 dB

### Output Impedance, 1 kHz:

150 ohms

### Power Requirements:

12 to 52 V dc phantom supply

### Current Consumption:

2.1 mA

### Switchable High-Pass Filter,

### Corner Frequency:

75 Hz

### Slope:

12 dB per octave

### Polarity:

A positive pressure on the diaphragm produces a positive voltage on output pin 2

### Color,

**CH230:** Nonreflecting black

**CH230W:** White

### Environmental Conditions,

### Relative Humidity 0–50%:

-29° to 74° C (-20° to 165° F)

### Relative Humidity 0–95%:

-29° to 57° C (-25° to 135° F)

### Dimensions,

### Transducer:

10.5 mm (0.4 in.) diameter,

41.9 mm (1.65 in.) long

### Microphone Cable:

9.1 m (30 ft) long

### Electronics Module:

67.3 mm (2.65 in.) long,

40.6 mm (1.6 in.) wide,

30.5 mm (1.2 in.) high

### Net Weight:

332 grams (11.7 oz)

### Shipping Weight:

555 grams (19.6 oz)

# CH230/CH230W Condenser Cardioid Hanging Microphone

CH230/CH230W Condenser Cardioid Hanging Microphone

---

**Electro-Voice®**

600 Cecil Street, Buchanan, MI 49107

616/695-6831, 616/695-1304 Fax

©EVI Audio 1999 • Litho in U.S.A.

MICROPHONES—Condenser Cardioid

Part Number 532021 — 9941