

# 405 Series

## 4-inch Full-Range High Performance Ceiling Loudspeakers



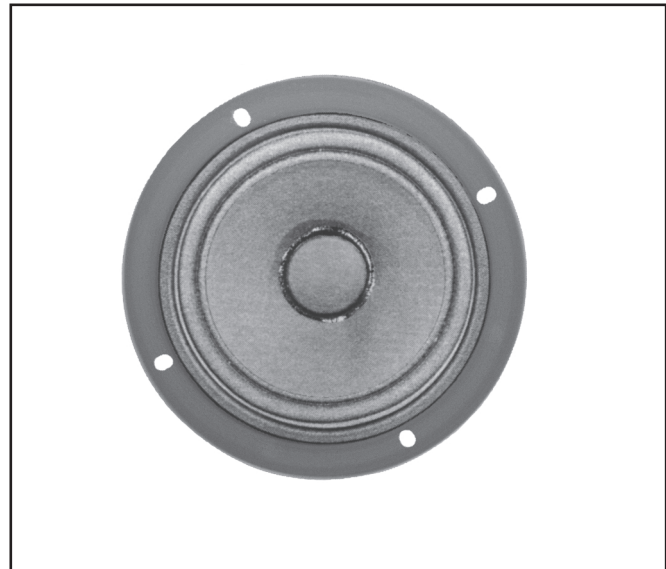
COMMERCIAL

### General Product Description

The EV (Electro-Voice®) Model 405-8H and 405-4T loudspeakers are compact 4" speakers that provide the utmost in performance obtainable from speakers of this size. Clear, intelligible speech and good music reproduction are ensured because of the extended 60 - 15,000 Hz range.

The loudspeaker has an 8-ohm voice coil. The model 405-4T has a factory mounted matching transformer allowing the loudspeaker to be run from 70.7 V or 100 V transmission lines, drawing 0.5, 1, 2, or 4 watts.

These quality loudspeakers are designed for continuous, trouble-free service. The die cast aluminum frame houses a magnetic structure fabricated of heavy gauge steel. The small size of the speakers allows either front or rear mounting in walls, partitions, ceilings, and into volumes as low as 0.1 cubic feet.



### Specifications:

**Power Rating:** ..... 16 watts continuous pink noise (above 50 Hz)  
**Frequency Response:** ..... 60 - 15,000 Hz  
**Pressure Sensitivity:** ..... 90 dB SPL  
 measured at one meter on axis with 1 watt input of pink noise, band-limited from 500 - 3000 Hz (Ref.: 20 µPa)  
**Maximum SPL:** ..... 102 dB for 16W @ 1M  
**Impedance:** ..... 8 ohms  
**70.7/100 Volt Taps:** ..... 0.5, 1, 2, 4 watts (405-4T only)  
**Insertion Loss:** ..... 1.0 dB max. (405-4T only)  
**Transformer Frequency Response:** ..... ±1 dB, 100 - 10,000 Hz  
 ..... (405-4T only)  
**Nominal Free-Air Cone Resonance:** ..... 120 Hz  
**Nominal Distribution Pattern:** ..... 90°  
**\*Distribution Pattern With Polar to Planer Correction:**  
 107' at 2 kHz 69' at 4 kHz  
**Voice Coil Diameter:** ..... 25.4 mm (1.0 in.)  
**Magnet Structure:**  
**Magnet Type:** ..... Ferrite  
**Magnet Weight:** ..... 9.4 ounces  
**Flux Density:** ..... 1.05 tesla  
**Construction:**  
**Frame (Basket):** ..... Structurally reinforced die-cast aluminum  
**Cone:** ..... Molded fiber  
**Cone Suspension:** ..... High-compliance foam surround

**Voice Coil:** ..... Copper  
**Voice Coil Support Material:** ..... Kapton®\*\*  
**Cone Excursion:** ..... 0.125" max. peak to peak  
**Terminals:**  
**Speaker :** ..... 5.2 mm (0.205 in.) spade lug type  
**Transformer:** ..... Pigtaills  
**Mounting Data:**  
**Baffle Opening:**  
 96.8 mm (3.812 in.) diameter (rear mounted)  
 104.8 mm (4.125 in.) diameter (front mounted)  
**Mounting Bolt Centers:**  
 4 equally spaced slots 90° apart on 120.7 mm (4.75 in.) diameter circle  
**Dimensions:**  
**Diameter:** ..... 134.9 mm (5.312 in.)  
**405-8H:** ..... 54.0 mm (2.125 in.) depth  
**405-4T:** ..... 103.2 mm (4.063 in.) depth  
**Weight:**  
**405-8H:** ..... 2 lbs 1 oz. (0.94 kg)  
**405-4T:** ..... 2 lbs 9 oz. (1.2 kg)  
**Color:** ..... Black

\*\* Kapton® is a registered trademark of DuPont.

## Architects' and Engineers' Specifications

### MODEL 405-8H

The loudspeaker shall meet the following performance and structural criteria. Power rating, 16 watts. Frequency response, uniform from 60 - 15,000 Hz. Pressure sensitivity, 90 dB-SPL when measured at one meter on axis with 1 watt input of band-limited pink noise from 500 to 3000 Hz (Ref.: 20  $\mu$ Pa). Impedance, 8 ohms. Nominal free-air cone resonance, 90 Hz. The voice coil shall have a diameter of 1" and shall operate in a magnetic field of 1.05 tesla derived from a Ferrite (V) magnet weighing at least 9.4 ounces. The loudspeaker shall be able to perform efficiently in a volume as low as 0.1 cubic feet. The loudspeaker frame shall be of die cast aluminum construction. The speaker terminals shall be of the spade lug type. Dimensions, 5.312" diameter x 2.125" deep. (See page 2)

The loudspeaker shall be the EV (Electro-Voice®) Model 405-8H.

### MODEL 405-4T

The loudspeaker shall meet the following performance and structural criteria. Power rating, 4 watts. Frequency response, uniform from 60 to 15,000 Hz. Pressure sensitivity, 90 dB-SPL when measured at one meter on axis with 1 watt input of bandlimited pink noise from 500 to 300 kHz (Ref.: 20 uPa). Impedance, 8 ohms. Nominal free-air cone resonance, 90 Hz. The voice coil shall have a diameter of 1" and shall operate in a magnetic field of 1.05 tesla derived from a ferrite (V) magnet weighing at least 9.4 ounces. The loudspeaker shall be able to perform efficiently in a volume as low as 0.1 cubic feet. The loudspeaker frame shall be of die cast aluminum construction. The speaker terminals shall be of the spade lug type. Dimensions, 5.312" diameter x 4.063" deep. Weight, 2 pounds, 9 ounces.

A 70/25-volt line transformer shall be incorporated for use in distributed systems, and shall have a frequency response of +1 dB from 100 to 10,000 Hz, with maximum insertion loss of 1.0 dB and primary wattage taps of 4, 2, 1 and 0.5 watts.

The loudspeaker shall be the EV (Electro-Voice®) Model 405-4T.

## Recommended Connections

The 405-8H is a nominal 8-ohm impedance loudspeaker with a 16-watt input capability. The 405-4T utilizes an 4-watt, 70.7-, 100-volt universal line-matching transformer with power taps ranging from 1 to 4 watts.

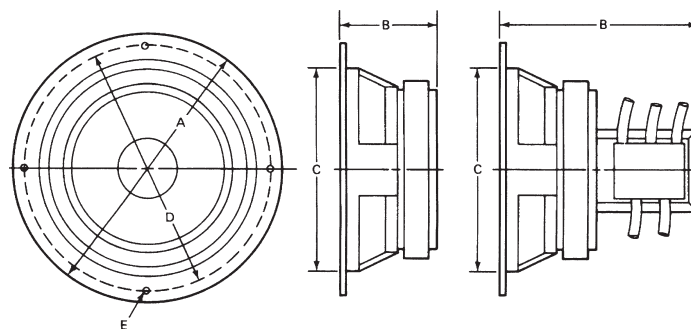
## Recommended Enclosures and Baffles

The 405-8H, 405-4T are designed to fit on standard 4-inch ceiling speaker baffles. Additionally, these loudspeakers will accommodate the use of any standard back enclosure with a diameter of 5.5 inches or greater and a depth of at least 4.5 inches. Larger back volumes will increase the low-frequency

output. The frequency response of a 405 in a typical 0.5-cubic-foot back enclosure is shown in Figure 1.

## Mounting

The 405 may be front or rear mounted against either surface of its mounting flange and requires a 110-mm (4.35-in.) diameter cutout and a 120-mm (4.72-in.) bolt circle, as shown below. Normal fasteners up to 5 mm (0.20 in.) will fit through the four holes in the frame. The 405 is designed for mounting on standard ceiling speaker baffles.

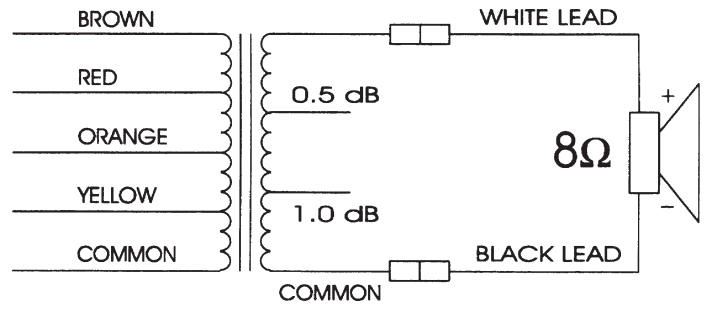


	Mounting Dimensions	405-8H	405-4T
A	Loudspeaker Diameter	134.9 mm (5.312 in.)	134.9 mm (5.312 in.)
B	Loudspeaker Depth	54.0 mm (2.125 in.)	103.2 mm (4.063 in.)
C	Baffle Opening Diameter (Front Mounted)	104.8 mm (4.125 in.)	104.8 mm (4.125 in.)
D	Baffle Opening Diameter (Rear Mounted)	96.8 mm (3.812 in.)	96.8 mm (3.812 in.)
E	Bolt Circle Diameter	120.7 mm (4.75 in.)	120.7 mm (4.75 in.)
F	Bolt Hole Slots	5.2 mm (0.20 in.) x 6.4 mm (0.25 in.)	5.2 mm (0.20 in.) x 6.4 mm (0.25 in.)

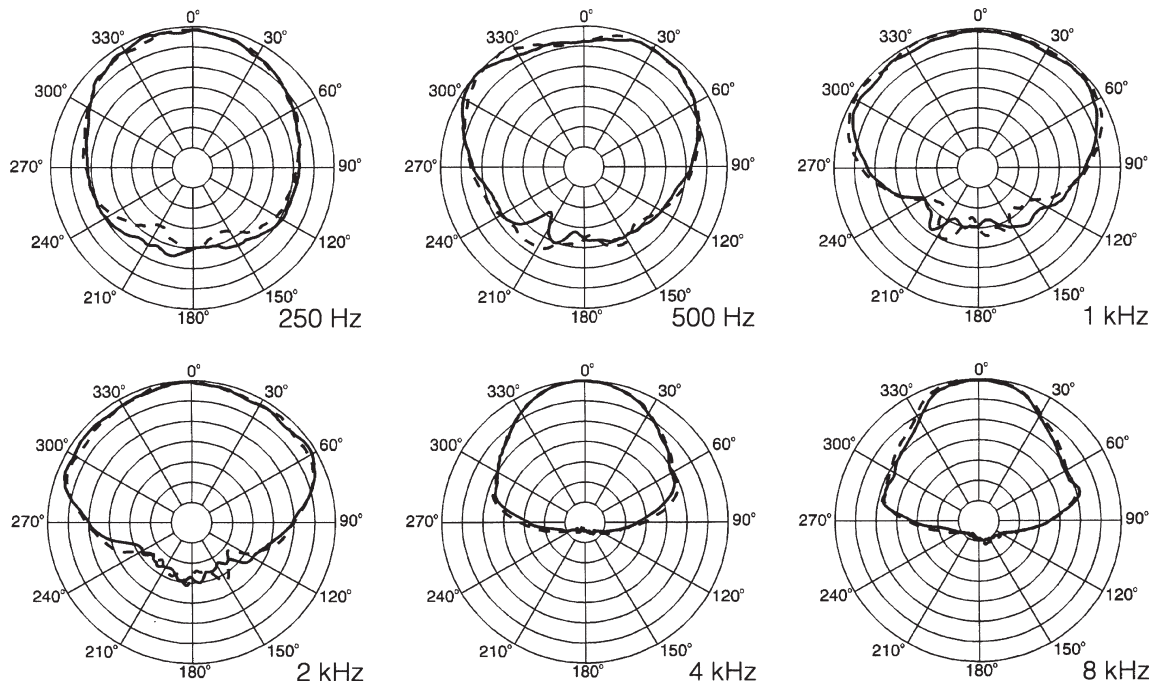
## Dimensions

**405-4T**

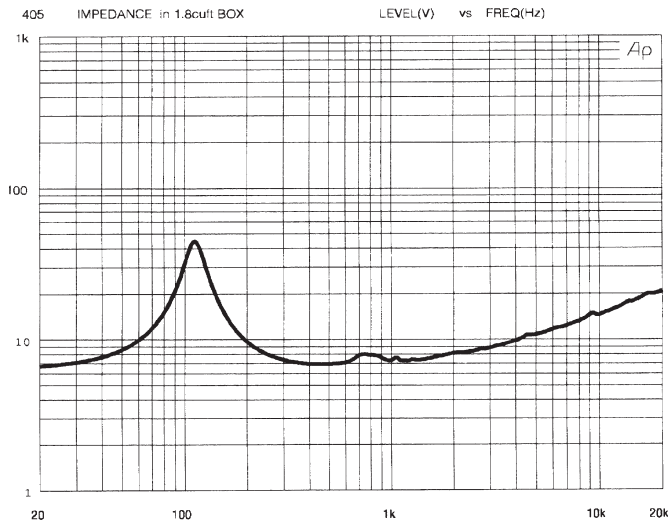
	<b>70V</b>	<b>100V</b>
<b>4.0W</b>	Brown	Red
<b>2.0W</b>	Red	Orange
<b>1.0W</b>	Orange	Yellow
<b>0.5W</b>	Yellow	N/A
<b>Common</b>	Black	Black
<b>8 Ohms</b>	White	White
<b>Common</b>	Black	Black



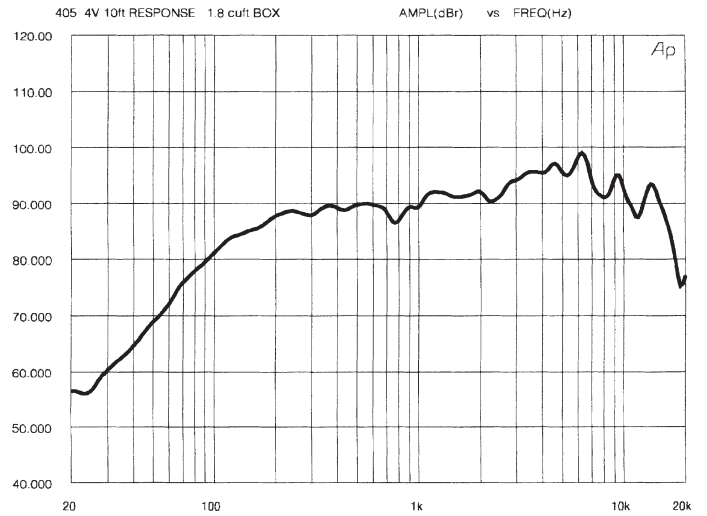
**Wiring Diagram**



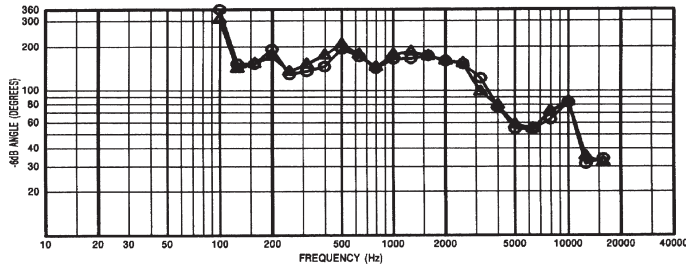
**Figure 1, One-Third-Octave Polar Response Charts**  
 Measurements were made in a 1.5 ft<sup>3</sup> closed enclosure.



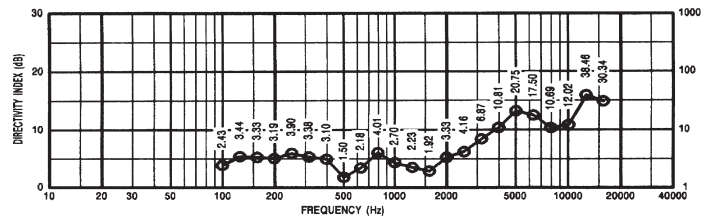
**Impedance Response**



**Frequency Response**



**Beamwidth vs Frequency**



**Directivity and Q**

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