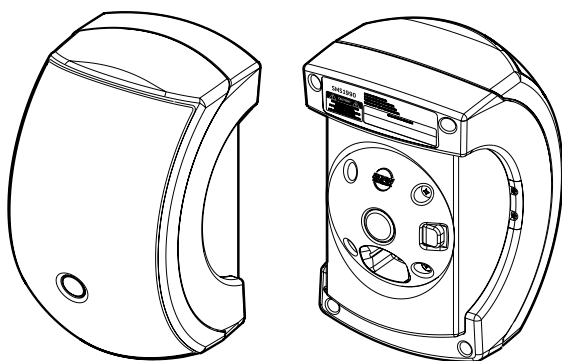




# SMS1990

Compact two-way loudspeaker



INSTRUCTION MANUAL

# 1. SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Only use attachments/accessories specified by the manufacturer.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
11. The entire sound system must be designed in compliance with the current standards and laws regarding electrical systems.
12. When installing and using this apparatus, keep in mind the technical specifications indicated in the dedicated section of the manual.
13. Exposure to high sound levels can cause permanent hearing loss. The sound pressure level which leads to hearing loss varies considerably from one person to another, and depends on the duration of exposure. The U.S. Government's Occupational Safety and Health Administration (OSHA) has established the maximum sound pressure levels that can be withstood without causing damage, which are shown in the table below. According to the OSHA regulations, any exposure over the maximum limits indicated in the table can reduce the hearing capacity of a person. To prevent potentially dangerous exposure to high sound pressure levels, anyone subjected to such levels must use suitable protection. When a EAW Commercial product capable of producing high sound levels is being used, it is therefore necessary to wear ear plugs or protective earphones when the limits shown in the table are exceeded. Consult the specifications provided in the instruction manual to know the maximum sound pressure (SPL) the loudspeaker is capable of producing.



*The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the apparatus.*



**WARNING!** *This equipment has been designed to be installed by qualified professionals only! There are many factors to be considered when installing professional sound reinforcement systems, including mechanical and electrical considerations, as well as acoustic coverage and performance. EAW Commercial strongly recommends that this equipment be installed only by a professional sound installer or contractor.*

Duration per day (hours)	Sound level (dBA)	Typical example
8	90	Duo in a small club
6	92	
4	95	Subway train
3	97	
2	100	Very loud classical music
1.5	102	
1	105	Locomotive at 50 feet
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

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14. Rigging Precautions: When mounting or suspending EAW Commercial loudspeaker enclosures, it is essential that load ratings, rigging techniques, and special safety considerations be appropriate for the installation. Use only the mounting/rigging points on the loudspeaker enclosure intended for this purpose. The user must determine the load requirements, dynamic loading, and any other contributing factors affecting the loudspeaker installation. The user must determine the proper design factor for specific applications and the required load rating of the connection to structure. Comply with all applicable federal, state, and local regulations.

EAW Commercial strongly recommends the following rigging system practices:

- Documentation: Thoroughly document the mounting/rigging design with detailed drawings and parts lists.
- Analysis: Have a licensed structural engineer or other qualified professional review and approve the mounting/rigging design before its implementation.
- Installation: Use personnel experienced and qualified for mounting/rigging loudspeakers in accordance with and in compliance with all federal, state and local regulations.



**DANGER:** Loudspeakers should be mounted or suspended only by persons with knowledge of the proper hardware and rigging techniques. Failure to follow these precautions may result in damage to the equipment, personal injury, or death.

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## 2. INTRODUCTION

Congratulations on the purchase of your new EAW Commercial loudspeaker. You now own one of the finest professional audio products available – the result of exceptional engineering and meticulous craftsmanship. Please read these instructions to get the maximum performance from your new loudspeaker.

Each EAW Commercial loudspeaker is intended for professional use. The construction, components, and hardware have been designed to provide robust, reliable performance for its intended application. Please ensure that you fully understand its proper installation and operation before use.

This manual describes the SMS1990 loudspeaker and the optional clip-fit mounting system. The SMS1990 is an economical solution for exceptional fidelity in speech reinforcement and background music applications. It is especially suited for small to mid-sized spaces with excessive reverberation or problematic sound reflections. The drivers and system voicing are designed to maximize vocal range clarity and speech intelligibility, without compromising the broadband frequency response required for pleasing music reproduction.

The included bracket allows setting the enclosure's vertical angle for wall-mounting.

Two optional mounting brackets are available that allow the loudspeaker to be mounted to the wall and electrically connected at the same time. These "clip-fit" brackets allow the SMS1990 to be easily clipped in place and adjusted within a wide range of angles. One bracket (CF-1TX) includes an internal transformer for constant voltage applications, and the other (CF-1LZ) is for constant impedance applications.

### Features:

- 90 degree horizontal x 90 degree vertical nominal beamwidth
- Passive crossover for economical, single-amplifier operation
- Includes adjustable mounting bracket
- Optional clip-fit bracket for constant-voltage systems
- Optional clip-fit bracket for constant-impedance systems
- Five-year warranty

### Applications include:

- Houses of Worship
- Transportation Terminals
- Museums
- Theme Parks
- Schools
- Meeting Rooms

# 3. INSTALLATION

## Unpacking and Inspection

Visually inspect the outside of the shipping carton and check for any damage. After unpacking, if you find concealed damage to the loudspeaker, save the packing materials for the carrier's inspection, notify the carrier immediately, and file a shipping damage claim. Although EAW Commercial will help in any way possible, it is always the responsibility of the receiving party to file any shipping damage claim. The carrier will help prepare and file this claim.

## Mounting Precautions

The mounting bracket provided can be used for wall mounting the loudspeaker.



**WARNING:** Installation should only be done by an experienced technician.

Improper installation may result in damage to the equipment, injury or death. Make sure that the loudspeaker is installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures:

- Check to make sure that the support surface (e.g., wall, etc.) has the necessary mechanical characteristics to support the weight of the loudspeaker without the danger of it falling.
- Always use support elements suitable for the material of the wall that will support the loudspeaker (e.g., screw anchors for bricks, screw anchors for cement, etc.). Due to various construction methods and materials used today, the hardware for securing the bracket to the mounting surface is not supplied. Consult a building professional for the proper mounting hardware before mounting the bracket.
- Before mounting the loudspeaker, carefully check all the components to be used to make sure there is no damage, deformation, corrosion and/or missing or damaged parts that could reduce the safety of the installation.
- Consult a professional rigger or structural engineer prior to mounting loudspeakers from a structure not intended for that use. Always know the working load limit of the structure supporting the loudspeaker. Always make sure that the rigging hardware minimum rating is at least five times the actual load.
- Avoid installing the loudspeaker in places exposed to harsh weather conditions.

## Wall bracket mounting instructions

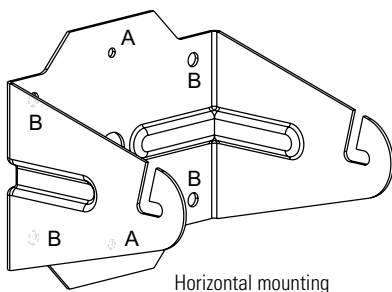
Follow these instructions to mount the SMS1990 loudspeaker using the supplied wall mount bracket.



**Warning:** Installation should only be done by an experienced technician. Improper installation may result in damage to the equipment, injury or death.

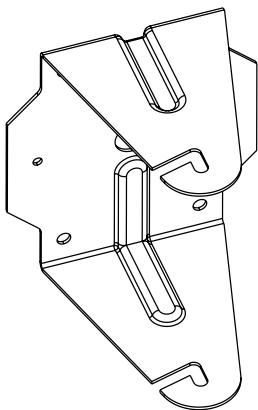
### 1. Mounting the wall bracket to the wall:

- a. Mount the bracket so the slots in the ends are upwards as shown. This will support the SMS1990 even if the clamp nuts become loose.

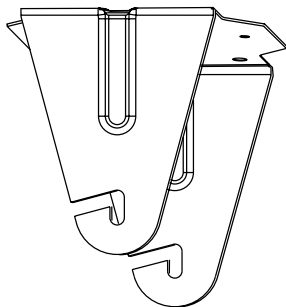


When mounted on a wall, the bracket should be centered over a J-box that is appropriately rated and installed for the weight of the speaker and bracket. The provided 6-32 screws should be inserted through the holes labeled "A" as shown. The holes labeled "B" should be used to attach the bracket to a wall stud with user-supplied hardware.

- b. The wall bracket can also be mounted sideways on a vertical wall, or mounted on a ceiling. Again, make sure that you consult a rigging professional to examine the wall or ceiling and determine the proper hardware for mounting the bracket.

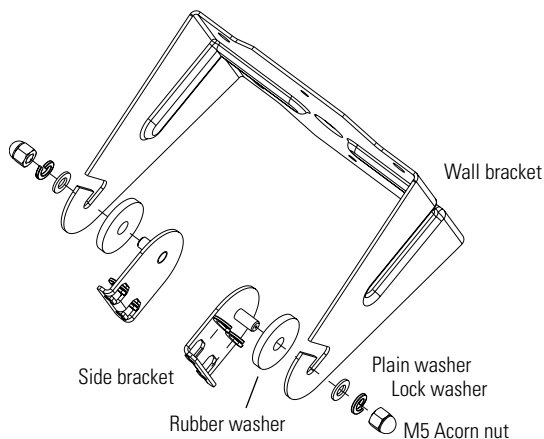


Sideways mounting

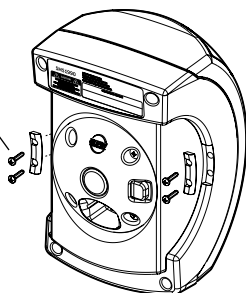


Ceiling mounting

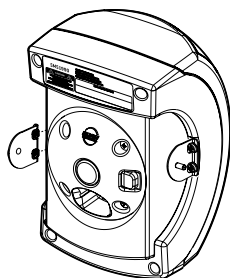
2. Mounting the SMS1990 loudspeaker to the wall bracket:



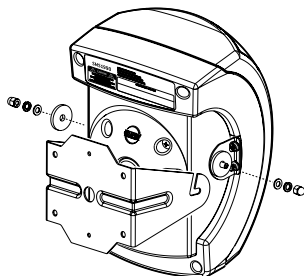
- a. On each side of the SMS1990, undo two screws as shown. Remove the small trim pieces and keep them safe.



- b. Use the same screws, and the lock washers provided in the accessories box, to attach a side bracket to each side of the SMS1990.



- c. Fit a large rubber washer on each side bracket and fit this assembly onto the wall bracket. Add the plain washer, lock washer, and acorn nut and hand-tighten.
- d. Adjust the loudspeaker to the desired angle, and secure the acorn nuts. These are M5 size.



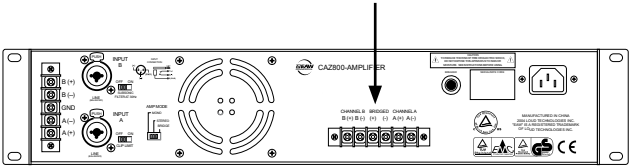
# Electrical Installation



**Note:** Observe all local and national codes when installing the SMS1990.

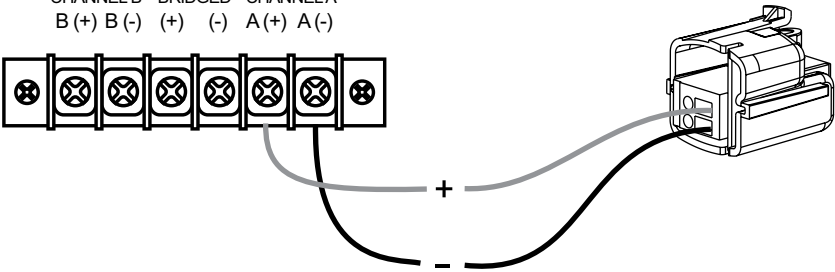
All connections must be made with the power amplifier turned off.

The following example of a low-impedance connection uses a EAW Commercial CAZ800 amplifier. This amplifier uses a screw-terminal output.



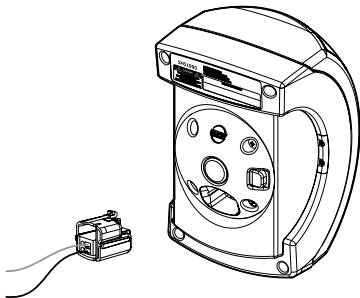
1. Connect the A + terminal on the amplifier to the (+) screw terminal of the input connector as shown.
2. Connect the A – terminal on the amplifier to the (–) screw terminal of the input connector.

CHANNEL B BRIDGED CHANNEL A  
B (+) B (–) (+) (–) A (+) A (–)



The SMS1990 loudspeakers have a nominal impedance of 8 ohms. If you connect other loudspeakers in parallel, make sure that the overall impedance does not drop below the minimum required by your power amplifier.

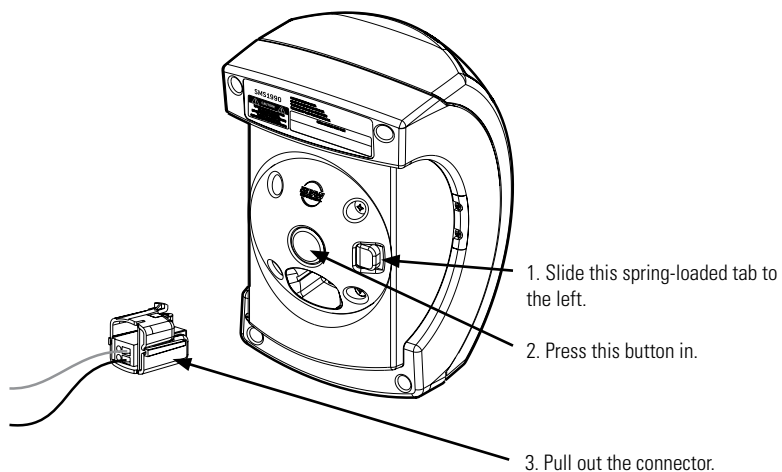
3. Plug the input connector into the back of the SMS1990, until it clicks securely in place.





4. Disconnecting the input connector:

- a. Slide the red plastic tab towards the center of the loudspeaker, and hold while you press the red center button inwards. The input connector can then be removed.



## 4. OPTIONAL CLIP-FIT WALL BRACKETS

Follow these instructions to mount the SMS1990 loudspeaker using the optional clip-fit wall mount brackets CF-1TX and CF-1LZ.

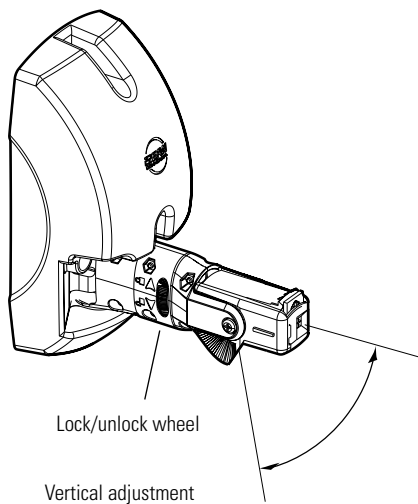
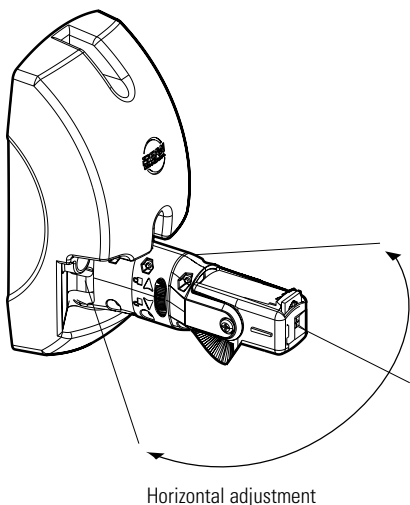


**Warning:** Installation should only be done by an experienced technician. Improper installation may result in damage to the equipment, injury or death.

### Overview

These optional brackets allow the loudspeaker to be mounted to the wall and electrically connected at the same time. They also allow you to wire all the brackets in your system, and add the loudspeakers at a later time.

Once the bracket has been wired and mounted to the wall, the SMS1990 can be quickly pressed onto the input connector and held securely in place. It can be easily adjusted in vertical and horizontal angle, and locked in place with a locking wheel.



Two brackets are available:

- The CF-1TX includes an internal transformer for constant voltage applications. The transformer has multiple taps, with a selector switch that allows you to set the desired power tap wattage for your system.
- The CF-1LZ is used for constant impedance applications, with no internal power transformer.

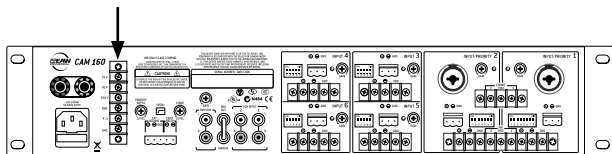
The mounting details are identical for each clip-fit bracket.

## CF-1TX Electrical Installation

Before the clip-fit bracket is mounted to the wall, the electrical connections to your system should be made.

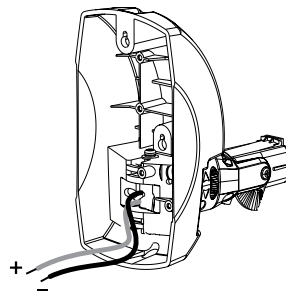
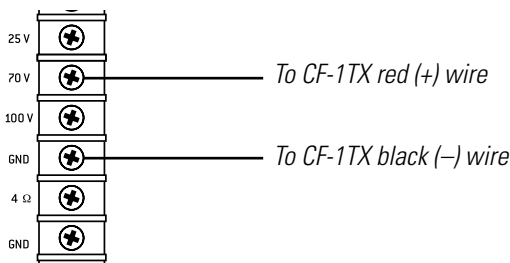
**Note:** Observe all local and national codes when installing the CF-1TX. All connections must be made with the power amplifier turned off.

The following examples of 70 V and 100 V connections show an EAW Commercial CAM160, a typical mixer/amplifier. Its speaker-level output is a screw terminal strip, with outputs for 25 V, 70 V, 100 V, ground, and 4 ohm.



### 70 V connection example

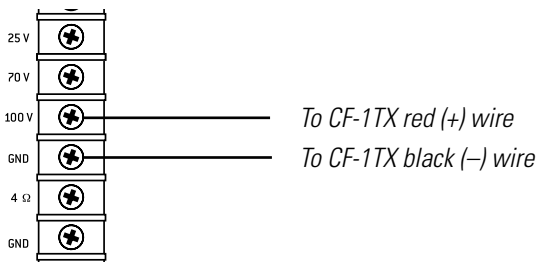
1. Connect the amplifier's 70 V terminal to the red (+) input wire on the CF-1TX.
2. Connect the amplifier's GND terminal to the black (–) input wire on the CF-1TX.



3. Select the power tap as shown on the next page.

### 100 V connection example

1. Connect the amplifier's 100 V terminal to the red (+) input wire on the CF-1TX.
2. Connect the amplifier's GND terminal to the black (–) input wire on the CF-1TX.
3. Select the power tap as shown on the next page.

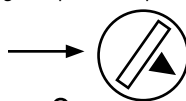


## Selecting the power tap (CF-1TX only):



Make sure the power amplifier is turned off when adjusting the power taps or making connections.

1. Select the desired power tap by turning the switch with a flat-ended screwdriver.

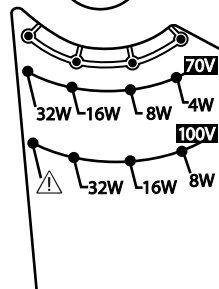


If you are using a 70 V system, the wattage ratings are: 4, 8, 16, and 32 W.

If you are using a 100 V system, the available wattage ratings are: 8, 16, and 32 W.



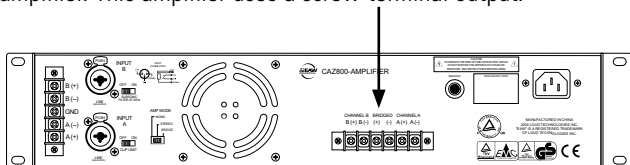
Make sure that you do not overload the amplifier. This may cause overheating to the amplifier, and possible damage to your loudspeakers. To avoid overloading, make sure that the selected taps on the loudspeakers add up to no more than 80% of the rated power of the amplifier being used.



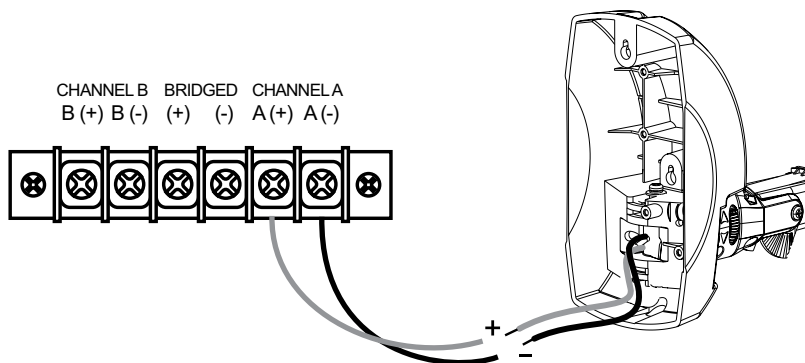
## CF-1LZ Electrical Installation

**Note:** Observe all local and national codes when installing the CF-1LZ clip-fit bracket. All connections to the loudspeaker must be made with the power amplifier turned off.

The following example of a low-impedance connection uses a EAW Commercial CAZ800 amplifier. This amplifier uses a screw-terminal output.



1. Connect the A + terminal on the amplifier to the red (+) input wire on the CF-1LZ.
2. Connect the A – terminal on the amplifier to the black (–) input wire on the CF-1LZ.



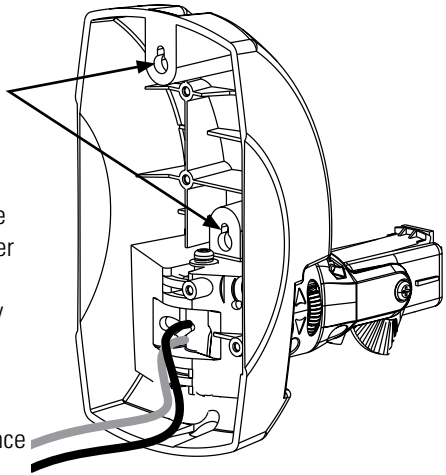
**Warning:** The SMS1990 loudspeakers have a nominal impedance of 8 ohm. If you connect other loudspeakers in parallel, make sure that the overall impedance does not drop below the minimum required by your power amplifier.

# Mechanical Installation

## Mounting the clip-fit brackets to the wall:

- a. Mount the wall bracket to the desired surface, in this vertical orientation only. Note that the bracket has two mounting holes with vertical spacing that allows them to be used with a standard wall J-box.

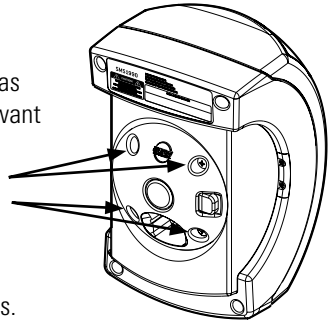
Two screws are supplied for securing the wall bracket to a J-box. Install the shorter 6-32 screw in the top hole of the J-box, and the longer screw in the bottom. Only screw them in by a few threads initially, then place the clip-fit bracket over the screws through the key-hole slots in the bracket as shown. Tighten the screws once the bracket is securely in place.



## Rotating the loudspeaker's input section (if required):

The SMS1990 loudspeaker can be mounted vertically (as shown) onto the clip-fit bracket, or horizontally. If you want to change the orientation, follow these steps:

- a. Remove the four screws holding the circular input section in place.
- b. Pull out the input section by approximately half an inch, and rotate it through no more than 90 degrees.
- c. Secure the input section into its new position with the four screws.

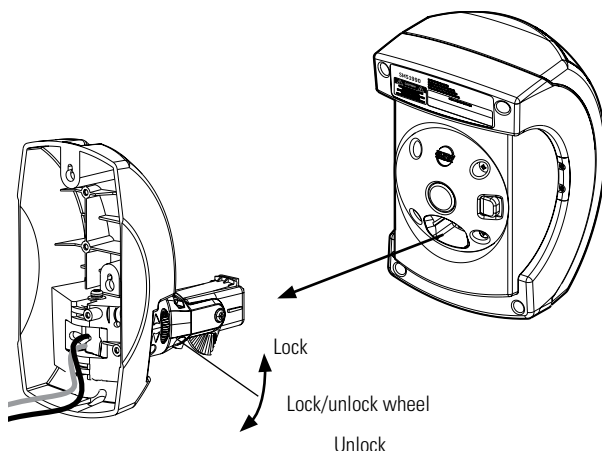


## Mounting the loudspeaker onto a bracket:

- a. Once the clip-fit bracket has been wired and secured to the wall, press the loudspeaker onto the input connector, until it clicks into place.



Make sure it is fitted on correctly. It is possible to fit it on upside-down, but it will not click in place, or be securely held on the bracket, or make an electrical connection.



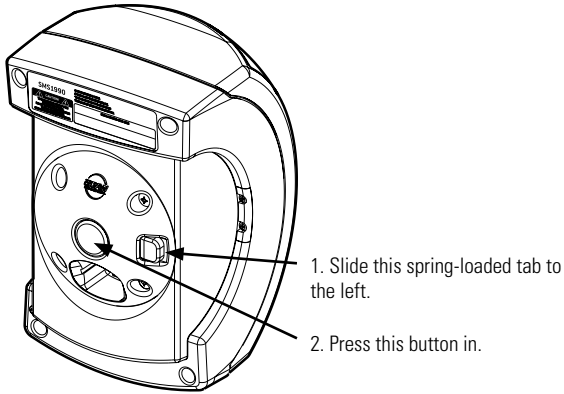
## Adjusting the loudspeaker angle:

The adjustment and locking mechanism has been designed to be easy to use.

- a. Rotate the locking wheel until the loudspeaker can be rotated horizontally and vertically. Find the desired loudspeaker position, and then rotate the locking wheel until it locks this position. Slots are provided in the locking wheel to allow further tightening with a flathead screwdriver if required.
- b. Perform a listening test to verify that the coverage is acceptable.

## Unmounting the loudspeaker from the bracket:

- a. Slide the red plastic tab towards the center of the loudspeaker, and hold while you press the red center button inwards. Pull the SMS1990 off the bracket.





## 5. SPECIFICATIONS

<b>Model</b>	<b>SMS1990</b>
<b>Woofer</b>	3 in x 2 cone
<b>Woofer Loading</b>	Vented
<b>Tweeter</b>	1 in x 1 dome
<b>Tweeter Loading</b>	Waveguide
<b>Operating Range (-10 dB)</b>	99 Hz - 20 kHz
<b>Horizontal Beamwidth - Nominal</b>	90 degrees
<b>Vertical Beamwidth - Nominal</b>	90 degrees
<b>Axial Sensitivity (whole space SPL)</b>	86 dB, 99 Hz - 20 kHz
<b>Input Impedance - Nominal</b>	8 ohm
<b>Input Impedance - Minimum</b>	6.7 ohm @ 390 Hz
<b>Recommended High Pass Filter</b>	≥ 90 Hz, 24 dB/octave Butterworth
<b>Power Handling</b>	75 W, 25 V @ 8 ohm
<b>Power taps 70 V (with CF-1TX optional mounting bracket/transformer)</b>	32 W, 16 W, 8 W, 4 W
<b>Power taps 100 V (with CF-1TX optional mounting bracket/transformer)</b>	32 W, 16 W, 8 W
<b>Maximum SPL, Average</b>	105 dB
<b>Maximum SPL, Peak</b>	111 dB
<b>Height</b>	9.24 in/234.6 mm
<b>Width</b>	5.50 in/139.6 mm
<b>Depth</b>	6.35 in/161.3 mm
<b>Dimension Tolerance</b>	± 0.1 in/2.5 mm
<b>Weight</b>	6.7 lb./3.0 kg

### Disclaimer

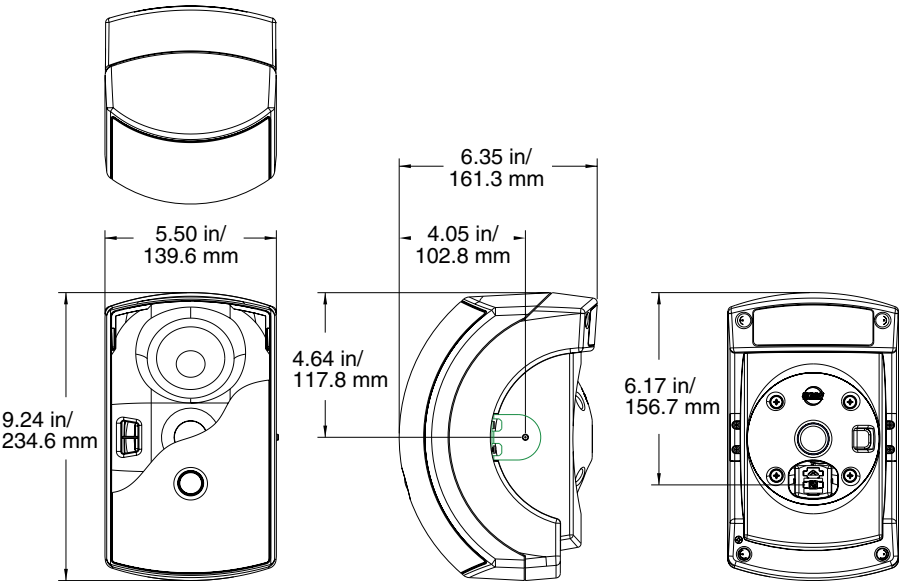
EAW Commercial continually engages in research related to product improvement, new materials, and production methods. Design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current EAW Commercial product may differ in some respect from its published description, but will always equal or exceed the original design specifications unless otherwise stated.

“EAW Commercial” is a trademark of LOUD Technologies Inc.

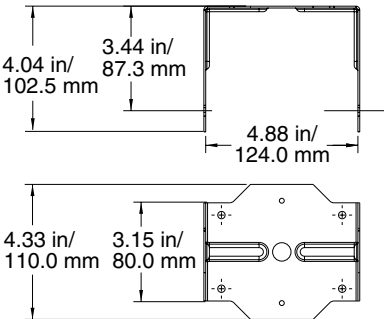
All other brand names mentioned are trademarks or registered trademarks of their respective holders, and are hereby acknowledged.



SMS1990 Dimensions



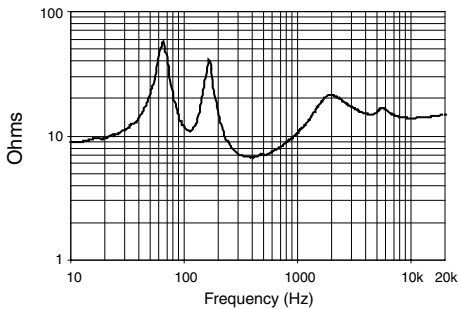
With side brackets fitted



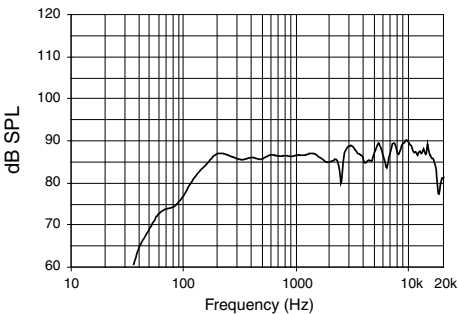
Mounting bracket

# Performance Graphs

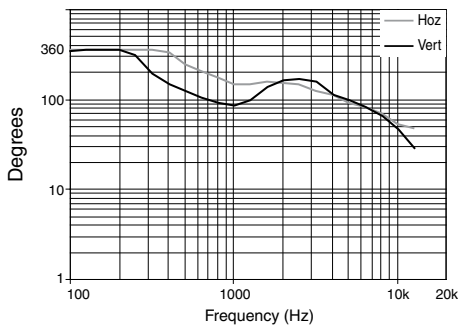
## SMS1990 Impedance vs Frequency



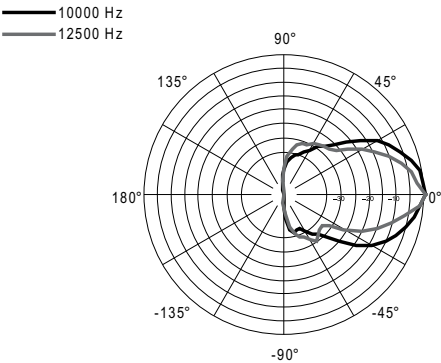
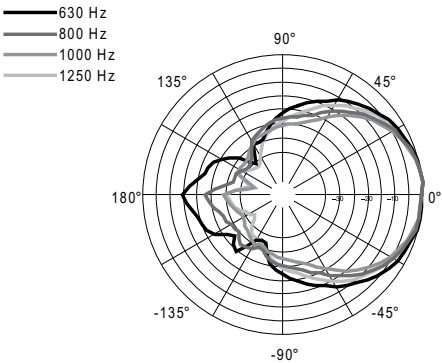
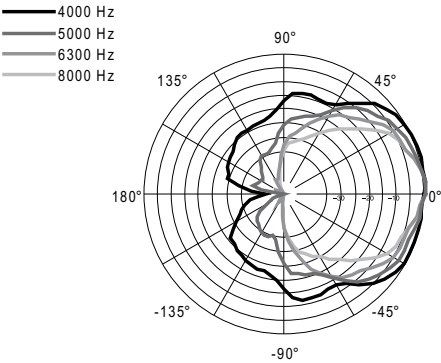
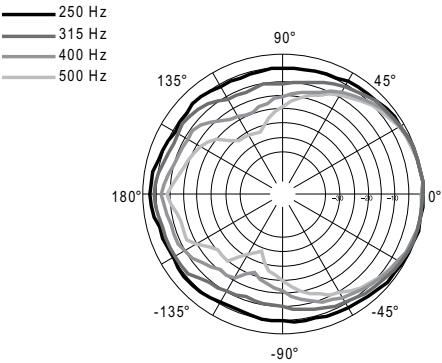
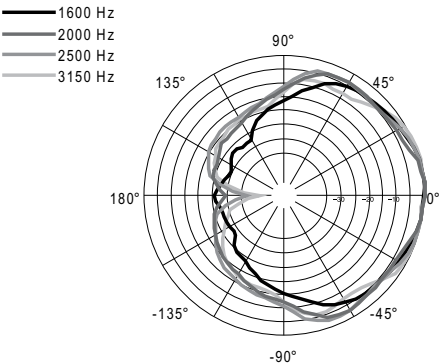
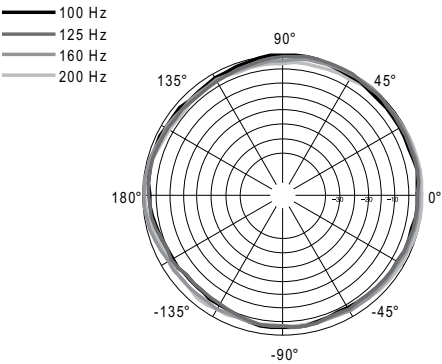
## SMS1990 Axial Response vs Frequency



## SMS1990 Beamwidth vs Frequency

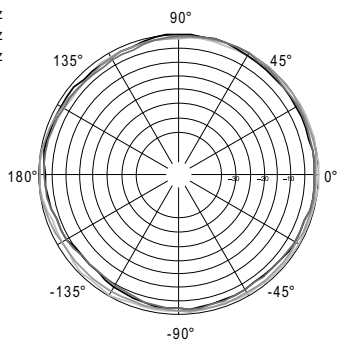


Vertical Polar Diagrams

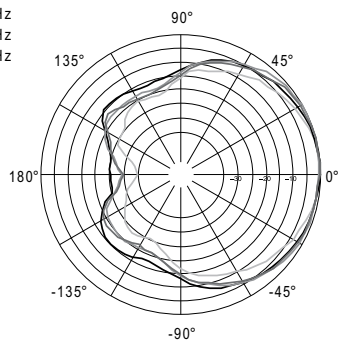


# Horizontal Polar Diagrams

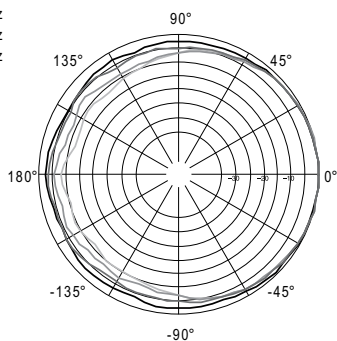
— 100 Hz  
— 125 Hz  
— 160 Hz  
— 200 Hz



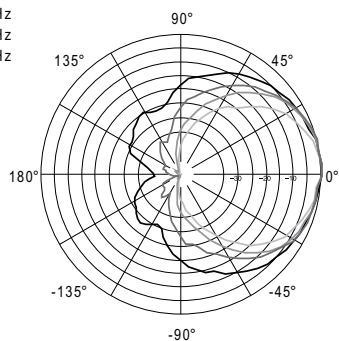
— 1600 Hz  
— 2000 Hz  
— 2500 Hz  
— 3150 Hz



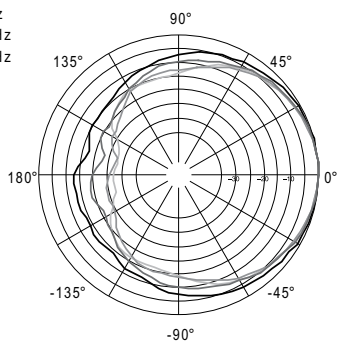
— 250 Hz  
— 315 Hz  
— 400 Hz  
— 500 Hz



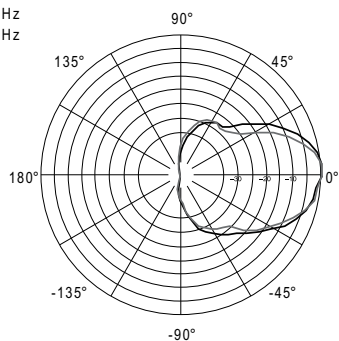
— 4000 Hz  
— 5000 Hz  
— 6300 Hz  
— 8000 Hz



— 630 Hz  
— 800 Hz  
— 1000 Hz  
— 1250 Hz



— 10000 Hz  
— 12500 Hz  
— 16000 Hz



## 6. SERVICE INFORMATION

In the event that your SMS1990 should require servicing, please follow these instructions:

1. Call EAW Commercial Tech Support at 1-888-337-7404, 7 am to 5 p.m. PST (Monday-Friday), to verify the problem and obtain a Return Authorization (RA) Number. Be sure to have the serial number of the unit when you call. You must have a Return Authorization Number in order to obtain warranty service at an authorized service center. You can also e-mail EAW Commercial Tech Support at: [support@eawcommercial.com](mailto:support@eawcommercial.com)
2. Pack the unit in its original packaging. **THIS IS VERY IMPORTANT.** LOUD Technologies is not responsible for any damage that occurs during shipping due to non-conventional packaging. Original packaging helps to minimize the possibility of shipping damage.
3. Include a legible note stating your name, return address (no P.O. boxes), daytime phone number, Return Authorization Number, and a detailed description of the problem, including how we can duplicate it.
4. Write the Return Authorization Number in **BIG BOLD PRINT** on the top of the box.
5. Tech Support will tell you where to ship the unit when you call for an RA Number. We suggest insurance for all forms of cartage.

## 7. EAW COMMERCIAL WARRANTY

**Warranty:** LOUD Technologies Inc. requires its authorized EAW Commercial distributors to abide by the following warranty terms for all EAW Commercial brand products (all dates are from the date of delivery from an Authorized EAW Commercial Distributor to the end user/installation site): Loudspeakers – 5 years; Active Electronics – 5 years; Accessories – 2 years.

**What Is Covered:** Defects in workmanship and materials and against malfunctions. EAW Commercial distributors must remedy all such defects and malfunctions without charge for parts or labor if the warranty applies. Final determination of warranty coverage lies solely with each authorized EAW Commercial distributor.

**What Is Not Covered:** This warranty does not extend to damage or malfunctions resulting from, but not limited to, shipment, improper installation, misuse, neglect, abuse, normal wear, accident, or to any product on which the serial number has been modified or removed. Exterior defects in or damage to the exterior appearance are specifically excluded from this warranty. EAW Commercial distributors shall not be liable for incidental or consequential damages resulting from the use of EAW Commercial products. Repairs and/or modifications by other than an Authorized EAW Commercial Distributor automatically voids this warranty.



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