



**FEDERAL SIGNAL**  
Safety and Security Systems

# Model ESB-U

## Compact Speaker Mounting Kit

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### ***Installation Instructions***

## Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at [www.fedsig.com/SSG-Warranty](http://www.fedsig.com/SSG-Warranty). A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to [info@fedsig.com](mailto:info@fedsig.com) or call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or implied, contractual or statutory, including, but not limited to the warranty of merchantability, warranty of fitness for a particular purpose and any warranty against failure of its essential purpose.



## FEDERAL SIGNAL

Safety and Security Systems

2645 Federal Signal Drive  
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Customer Support

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## Contents

Safety Messages for Installers of Siren Speakers.....	4
Before You Begin.....	7
Unpacking the Kit.....	7
Mounting a Speaker .....	7
Mounting a Speaker on a 1998 Chevrolet Tahoe .....	10
Wiring the Speaker.....	12
Testing the Siren System.....	12
Safety Messages for Operators of Sirens and Light/Sound Systems.....	13
Getting Technical Support.....	15
Getting Repair Service.....	15

## Tables

Table 1 Kit contents.....	7
---------------------------	---

## Figures

Figure 1 ES100 speaker vertically mounted with center bracket holes .....	9
Figure 2 MS100 speaker vertically mounted with inner bracket holes .....	9
Figure 3 ES100/MS100 horizontally mounted with outer bracket holes .....	10
Figure 4 Screw securing plastic shield behind bumper .....	10
Figure 5 Speaker mounted through plastic shield behind bumper .....	11

### **Safety Messages for Installers of Siren Speakers**

#### **⚠ WARNING**

People's lives depend on your proper installation and servicing of Federal Signal products. It is important to read and follow all instructions shipped with this product and the original product. Listed below are some other important safety instructions and precautions you should follow:

#### **Before Installation**

##### *Qualifications*

- To properly install an electronic siren, you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment. Always refer to the vehicle's service manuals when installing equipment on a vehicle.

##### *Sound Hazards*

- Your hearing and the hearing of others, in or close to your emergency vehicle, could be damaged by loud sounds. This can occur from short exposures to very loud sounds, or from longer exposures to moderately loud sounds. For hearing conservation guidance, refer to federal, state, or local recommendations. OSHA Standard 1910.95 offers guidance on "Permissible Noise Exposure."
- All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.
- Federal Signal siren amplifiers and speakers are designed to work together as a system. Combining a siren and speaker from different manufacturers may reduce the warning effectiveness of the siren system and may damage the components. Verify or test your combination to ensure that the system works together properly and meets federal, state and local standards or guidelines.

#### **During Installation**

- DO NOT get metal shavings inside the product. Metal shavings in the product can cause the system to fail. If drilling must be done near the unit, place an ESD-approved cover over the unit to prevent metal shavings from entering the unit. Inspect the unit after mounting to ensure that there are no shavings present in or near the unit.

## ***Safety Messages for Installers of Siren Speakers***

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- DO NOT connect this system to the vehicle battery until ALL other electrical connections are made, mounting of all components is complete, and you have verified that no shorts exist. If wiring is shorted to vehicle frame, high current conductors can cause hazardous sparks, resulting in electrical fires or flying molten metal.
- Make sure the siren amplifier and speaker(s) in your installation have compatible wattage ratings.
- In order for the electronic siren to function properly, the ground connection must be made to the NEGATIVE battery terminal.
- Sound output will be severely reduced if any objects are in front of the speaker. If maximum sound output is required for your application, ensure that the front of the speaker is clear of any obstructions.
- Install the speaker(s) as far forward on the vehicle as possible in a location that provides maximum signaling effectiveness and minimizes the sound reaching the vehicle's occupants. Refer to the National Institute of Justice guide 500-00 for further information.
- Mounting the speakers behind the grille will reduce the sound output and warning effectiveness of the siren system. Before mounting speakers behind the grille, make sure the vehicle operators are trained and understand that this type of installation is less effective for warning others.
- Sound propagation and warning effectiveness will be severely reduced if the speaker is not facing forward. Carefully follow the installation instructions and always install the speaker with the projector facing forward.
- DO NOT install the speaker(s) or route the speaker wires where they may interfere with the operation of airbag sensors.
- Installation of two speakers requires that you wire the speakers in phase.
- Never attempt to install aftermarket equipment that connects to the vehicle wiring without reviewing a vehicle wiring diagram, which is available from the vehicle manufacturer. Ensure that your installation will not affect vehicle operation and safety functions or circuits. Always check vehicle for proper operation after installation.
- DO NOT install equipment or route wiring or cord in the deployment path of an airbag.

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- Locate the control head so the vehicle, controls, and microphone can be operated safely.
  - When drilling into a vehicle structure, be sure that both sides of the surface are clear of anything that could be damaged.

### **After Installation**

- After installation, test the siren system and light system to ensure that it is operating properly.
- Test all vehicle functions, including horn operation, vehicle safety functions and vehicle light systems, to ensure proper operation. Ensure that installation has not affected vehicle operation or changed any vehicle safety function or circuit.
- After testing is complete, provide a copy of these instructions to the instructional staff and all operating personnel.
- File these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

### Before You Begin

**IMPORTANT:** The ES100 and MS100 comply with the requirements of SAE J1849 EVS3 and CCR Title 13 Class A when they are used with Federal Signal Corporation electronic sirens.

The ES100 and MS100 are compact speakers intended to be mounted with the supplied mounting system. If the ES100 and MS100 are installed with another mounting system, the safety and effectiveness of the installation must be carefully evaluated.

### Unpacking the Kit

After unpacking the product, inspect it for damage that may have occurred in transit. If it has been damaged or is missing a part, do not attempt to install or operate it. File a claim immediately with the carrier, stating the extent of the damage. Carefully check all envelopes, shipping labels and tags before removing or destroying them. Ensure that all parts in Table 1 have been included. If you are missing any parts, contact Customer Support at 1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday (CT).

**Table 1 Kit contents**

Qty.	Description	Part Number
1	Bracket, Speaker Mounting	8567196
4	Screw, 1/4" x 5/8", Type B	7011165-10
4	Lockwasher, Split, 1/4"	7059A020

### Mounting a Speaker

#### **NOTICE**

***The installation procedure in Step 2 on the next page may not apply to all vehicles. See "Mounting a Speaker on a 1998 Chevrolet Tahoe," on page 5. Otherwise, use the procedure in Step 2 on page 8.***

The bracket is designed for mounting directly on a surface suitable for installing a speaker. In addition, the bracket can be used to install the speaker on an adapter bracket fabricated by the installer.

Each bracket arm has three holes to secure the speaker with two 5/16-18 hex head bolts:

- Use the center pair of holes when mounting the ES100 on a vertical surface. See Figure 1 on page 9.

## Mounting a Speaker

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- Use the inner pair of holes when mounting the MS100 on a vertical surface. See in Figure 2 on page 9.

**NOTE:** When using the center or inner holes for vertical surface mounting, space restrictions may require the removal of the excess bracket material that protrudes from the front of the vehicle (Figure 1 on page 9).

- Use the outer pair of holes when mounting the ES100 or MS100 on a horizontal surface. See Figure 3 on page 10.

**NOTE:** Because of the variety of vehicles and possible mounting arrangements, installation details and mounting bracket fabrication must be determined by the installer.

To mount a speaker to the vehicle:

1. Select a mounting location that provides both adequate support and sufficient clearance for the speaker assembly. In addition, the mounting location should provide maximum signaling effectiveness while minimizing the sound reaching the vehicle's occupants.

If you are installing a second speaker/bracket, also determine its mounting position at this time.

2. Using the bracket as a template, scribe four drill position marks on the selected mounting location.
3. Drill four 3/16-inch mounting holes at the drill position marks.

### **NOTICE**

**DRILLING PRECAUTIONS:** *Before drilling holes, check the area into which you plan to drill to ensure that you do not damage vehicle components while drilling. All drilled holes should be deburred and all sharp edges should be smoothed. All wires going through drilled holes should be protected by a grommet or convolute/split-loom tubing.*

**NOTE:** Some mounting arrangements may require installing the bracket on the mounting surface before securing the speaker to the bracket.

### **⚠ WARNING**

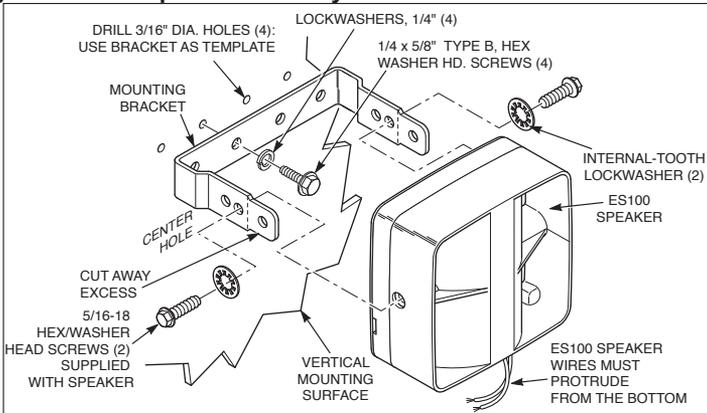
**ES100 MOUNTING PRECAUTIONS:** *To avoid reducing the sound output and damaging the speaker, ensure that the speaker is mounted with the wires protruding from the bottom of the speaker.*

**⚠ WARNING**

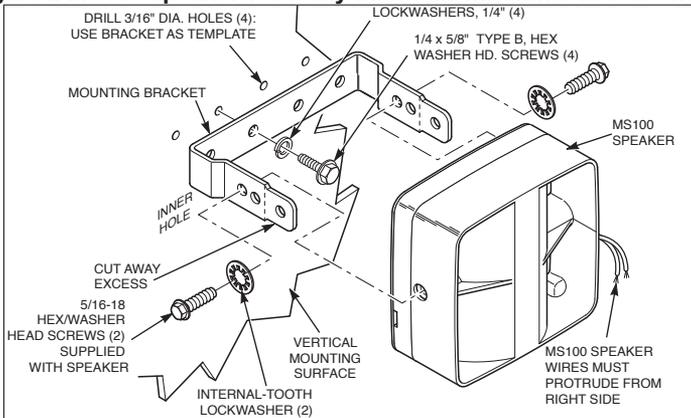
**MS100 MOUNTING PRECAUTIONS:** To avoid reducing the sound output and damaging the speaker, ensure that the speaker is mounted with the wires protruding from the right side of the speaker when it is seen from the right side of the speaker when it is seen from the front.

4. Secure the bracket or assembled unit to the mounting surface with the 1/4-inch by 5/8-inch Type B screws and 1/4-inch split lockwashers. See Figures 1 and 2.
5. Position the front of the speaker perpendicular to a horizontal mounting surface or parallel to a vertical mounting surface, and secure the speaker to the bracket with the two 5/16-18 bolts and internal-tooth lockwashers.

**Figure 1 ES100 speaker vertically mounted with center bracket holes**

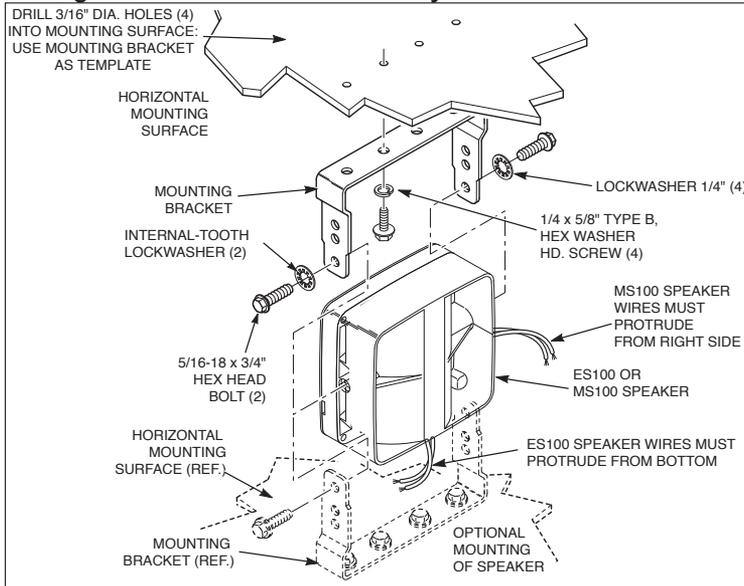


**Figure 2 MS100 speaker vertically mounted with inner bracket holes**



## Mounting a Speaker on a 1998 Chevrolet Tahoe

**Figure 3 ES100/MS100 horizontally mounted with outer bracket holes**

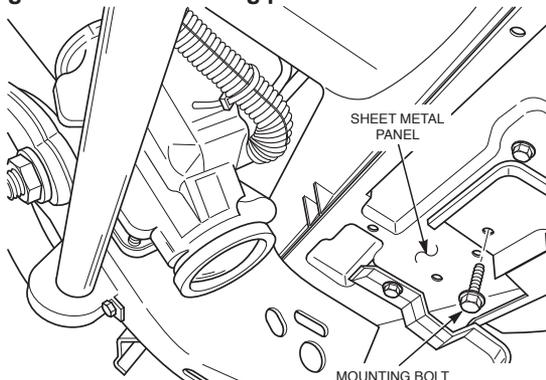


## Mounting a Speaker on a 1998 Chevrolet Tahoe

It is recommended that the speaker be mounted under the vehicle behind the front bumper as described in this section.

1. Locate, remove, and retain the screw that secures the plastic shield behind the bumper and in front of the steering box. See Figure 4.

**Figure 4 Screw securing plastic shield behind bumper**



2. Use the outermost bracket hole to temporarily install the bracket on the mounting surface with the screw removed in Step 1.

## Mounting a Speaker on a 1998 Chevrolet Tahoe

- Use the bracket as a template to scribe three drill-position marks on the mounting surface.

### NOTICE

**DRILLING PRECAUTIONS:** Before drilling holes, check the area into which you plan to drill to ensure that you do not damage vehicle components while drilling. All drilled holes should be deburred, and all sharp edges should be smoothed. All wires going through drilled holes should be protected by a grommet or convolute/split-loom tubing.

- Remove the bracket from the mounting surface. Drill three 3/16-inch holes at the drill position marks.

### WARNING

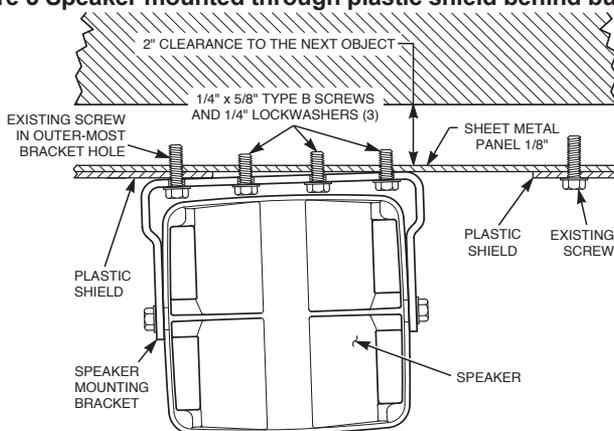
**ES100 MOUNTING PRECAUTIONS:** To avoid reducing the sound output and damaging the speaker, ensure that the speaker is mounted with the wires protruding from the bottom of the speaker.

### WARNING

**MS100 MOUNTING PRECAUTIONS:** To avoid reducing the sound output and damaging the speaker, ensure that the speaker is mounted with the wires protruding from the right side of the speaker when it is seen from the front.

- Secure the bracket to the mounting surface using the screw installed in Step 2, three 1/4-inch by 5/8-inch Type B screws, and 1/4-inch split lockwashers. Position the front of the speaker forward and secure it to the bracket with the 5/16-18 bolts.

Figure 5 Speaker mounted through plastic shield behind bumper



### Wiring the Speaker

- To connect one speaker, connect the two leads from the speaker to the electronic siren's speaker cable.
- To connect two speakers, you must connect the speakers in phase. Connect the two red speaker leads to one lead of the siren's speaker cable. Connect the two black speaker leads to the other lead of the siren speaker cable.

Refer to the instructions provided with the electronic siren for additional details.

### Testing the Siren System



***SOUND HAZARD: All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.***

After the installation, test the siren system to ensure that it is operating properly. Also test all vehicle functions, including horn operation, vehicle safety functions, and vehicle lighting systems to ensure proper operation. Ensure that the installation has not affected the vehicle operation or changed any vehicle safety functions or circuits.

## **Safety Message for Operators of Sirens and Light/Sound Systems**

People's lives depend on your safe operation of Federal products. It is important to read and follow all instructions shipped with the products. Listed below are some other important safety instructions and precautions you should follow.

### *Qualifications*

- To properly use an electronic siren and speaker(s), you must have a good understanding of general vehicle operation, a high proficiency in the use of safety warning equipment, and thorough knowledge of state and federal UNIFORM TRAFFIC CODES.

### *Sound Hazards*

- Your hearing and the hearing of others, in or close to your emergency vehicle, could be damaged by loud sounds. This can occur from short exposures to very loud sounds, or from longer exposures to moderately loud sounds. For hearing conservation guidance, refer to federal, state, or local recommendations. OSHA Standard 1910.95 offers guidance on "Permissible Noise Exposure."
- All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound, roll up your windows and wear hearing protection.
- Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound. Only use the siren for emergency response situations.

### *Sound Limitations*

- Before using the vehicle, check to see if the siren speakers are concealed from view. If the siren speaker is not in clear view on the front of the vehicle, use extra caution when operating the vehicle. A concealed siren speaker installation is less effective at warning others.
- Maximum sound output will be severely reduced if any objects are in front of the speaker. If your installation has obstructions in front of the speaker, drive even more cautiously.
- Frequently inspect the speaker to ensure that it is clear of any obstruction, such as mud or snow, which will reduce maximum sound output.

## ***Safety Message for Operators of Sirens and Light/Sound Systems***

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### *Signaling Limitations*

- Be aware that the use of your visual and audible signaling devices does not give you the right to force your way through traffic. Your emergency lights, siren, and actions are REQUESTING the right-of-way.
- Although your warning system is operating properly, it may not alert everyone. People may not hear, see, or heed your warning signal. You must recognize this fact and continue driving cautiously.
- Situations may occur which obstruct your warning signal when natural or man-made objects are between your vehicle and others. This can also occur when you raise your hood or trunk lid. If these situations occur, be especially careful.

### *Driving Limitations*

- At the start of your shift, you should ensure that the light/sound system is securely attached to the vehicle and operating properly.
- If the unique combination of emergency vehicle equipment installed in your vehicle has resulted in the siren controls being installed in a position that does not allow you to operate them by touch only, OPERATE CONTROLS ONLY WHILE YOUR VEHICLE IS STOPPED.
- If driving conditions require your full attention, avoid operating the siren controls while the vehicle is in motion.

### *Continuing Education*

- File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees.

Failure to follow these safety precautions may result in property damage, serious injury, or death.

## **Getting Technical Support**

For technical support, please contact:

Federal Signal Corporation

Phone: 1-800-443-9132

Fax: 1-800-343-9706

Email: [empserviceinfo@fedsig.com](mailto:empserviceinfo@fedsig.com)

## **Getting Repair Service**

The Federal Signal factory provides technical assistance with

Any units returned to returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization (RMA). Obtain an RMA from a Local Distributor or Manufacturer's Representative. Provided a brief explanation of the service requested or the nature of the malfunction.

Address all communications to the following address.

Federal Signal Corporation

Service Department

2645 Federal Signal Drive

University Park IL 60484-3167



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