

# ***Model ESB-TERRA Compact Speaker Mounting Kit***

---

## ***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.



2645 Federal Signal Drive  
University Park, Illinois 60484

[www.fedsig.com](http://www.fedsig.com)

Customer Support

Police/Fire-EMS: 800-264-3578 • +1 708 534-3400

Work Truck: 800-824-0254 • +1 708 534-3400

Technical Support 800-433-9132 • +1 708 534-3400



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

### **⚠ WARNING**

People's lives depend on your safe installation of our products. It is important to read, understand and follow all instructions shipped with the products. In addition, 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 near 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. You should verify or test your combination to make sure 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 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 be sure there are no shavings present in or near the unit.



## ***Installation Instructions***

---

- 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.
- Be 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, you should 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 while minimizing 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, which connects to the vehicle wiring, without reviewing a vehicle wiring diagram, which is available from the vehicle manufacturer. Insure 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.
- 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.
- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.
- 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.

**NOTE:** For electrical installation instructions, refer to the Installation and Maintenance Instructions packed with the ES100 speaker.



## **Before You Begin**

**IMPORTANT:** The ES100 complies with the requirements of SAE J1849 EVS3 and CCR Title 13 Class A when it is used with Federal Signal Corporation electronic sirens. The ES100 is a compact speaker intended to be mounted with the supplied mounting system. If the ES100 is 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

<b>Qty.</b>	<b>Description</b>	<b>Part Number</b>
4	1/4 in-20 x 0.75 in Bolt	7000A311-12
4	1/4 in-20 x 1.50 in Bolt	7000A311-24
4	1/4 in-20 Stop Nut	7058A010
12	1/4 in Flat Washer	7072A024
8	5/16 in Lock Washer	7074A020
4	Unthreaded Spacer, Nylon, 6/6, 3/4in Outer Diameter, 0.625 in Long	71000299
1	TerraStar Flush-Mount ES100 Mounting Bracket Assembly	856701819
1	ES100 Grille, TerraStar International	856701820

## **Preparing the Mounting Surface**

### **⚠ WARNING**

**AIRBAG DEPLOYMENT** — *Do not install or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.*



**⚠ 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. Failure to observe this warning will reduce the effectiveness of the speaker, causing serious injury or death.*

**NOTICE**

**DRILLING PRECAUTIONS** — *Before drilling holes, check the area you are drilling into to be sure you do not damage vehicle components. All drilled holes should be de-burred and all sharp edges should be smoothed. All wire routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.*

**IMPORTANT:** Plan all cable routing before the installation.

To select and prepare the mounting surface:

1. Use Figure 2 on page 11 as a guide to determine the mounting location of the ES100 speaker in the bumper. Also ensure that there is adequate clearance behind the bumper. If you are installing a second speaker/bracket, determine its mounting position at this time.
2. Cut the hole in the bumper as shown in Figure 2 on page 11.
3. Drill the eight 5/16 in holes as shown.

## Installing the Speaker

To install the speaker

1. Attach the two mounting brackets to the speaker with the two 5/16 in-18 x 3/4 in bolts, 5/16 in lock washers, and 5/16 in flat washers as shown in Figure 1 on page 9. Do not tighten the bolts yet.
2. Insert the speaker/brackets assembly into the bumper cutout from the inside of the bumper. Ensure that the wires will exit from the speaker when the installation is complete.
3. See Figure 1. Adjust the speaker so that it is perpendicular to the ground and pointed straight forward. Tighten the two 5/16 in bolts.



## **Installation Instructions**

---

4. Secure the assembly by hand-tightening it to the bumper with the speaker brackets/grille and the four 1/4 in-20 x 1.50 in hex-head screws, four 5/16 in lockwashers, four 1/4 in flat washers, and four 3/4 in O.D. x 0.625 in long nylon spacers as shown in Figure 3 on page 12.
5. Once the grille and speaker/bracket assembly is fastened to bumper, hand-tighten the 1/4 in-20 x 0.075 inch bolt, (2) 1/4 inch flat washers and 1/4 in-20 stop nut combination to fasten the each corner of the grille to the bumper. See Figure 3 for the combination order of parts).
6. Make sure the grille is properly aligned with the speaker opening. Then secure all bolts to the speaker/bracket assembly and bumper.
7. If you are installing a second speaker, repeat steps 2 through 9 for the second speaker.
8. Finish the speaker wire connections to vehicle.

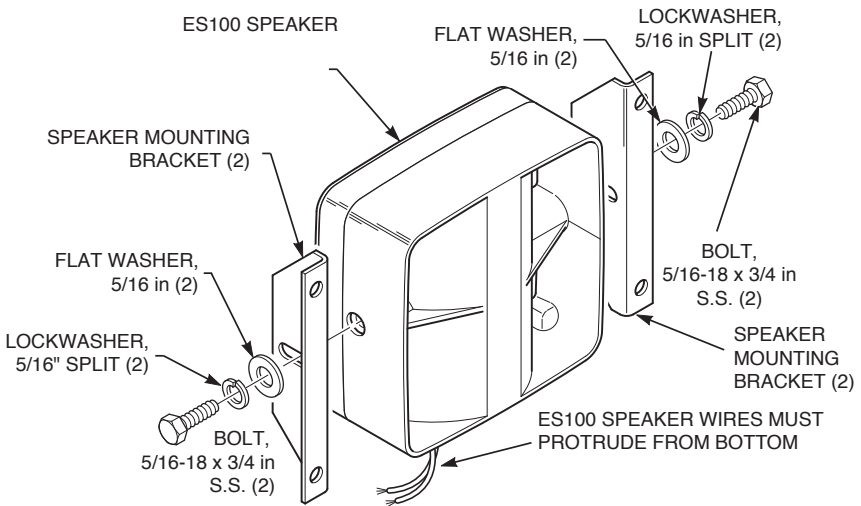
### **⚠ WARNING**

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

9. Test the siren for proper operation.



**Figure 1** Brackets attached to speaker



## Getting Technical Support and Service

The Federal Signal factory provides technical assistance with any problems that cannot be handled locally. Any units returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization (RMA). Obtain a RMA from a local Distributor or Manufacturer's Representative. Please provide a brief explanation of the service requested, or the nature of the malfunction.

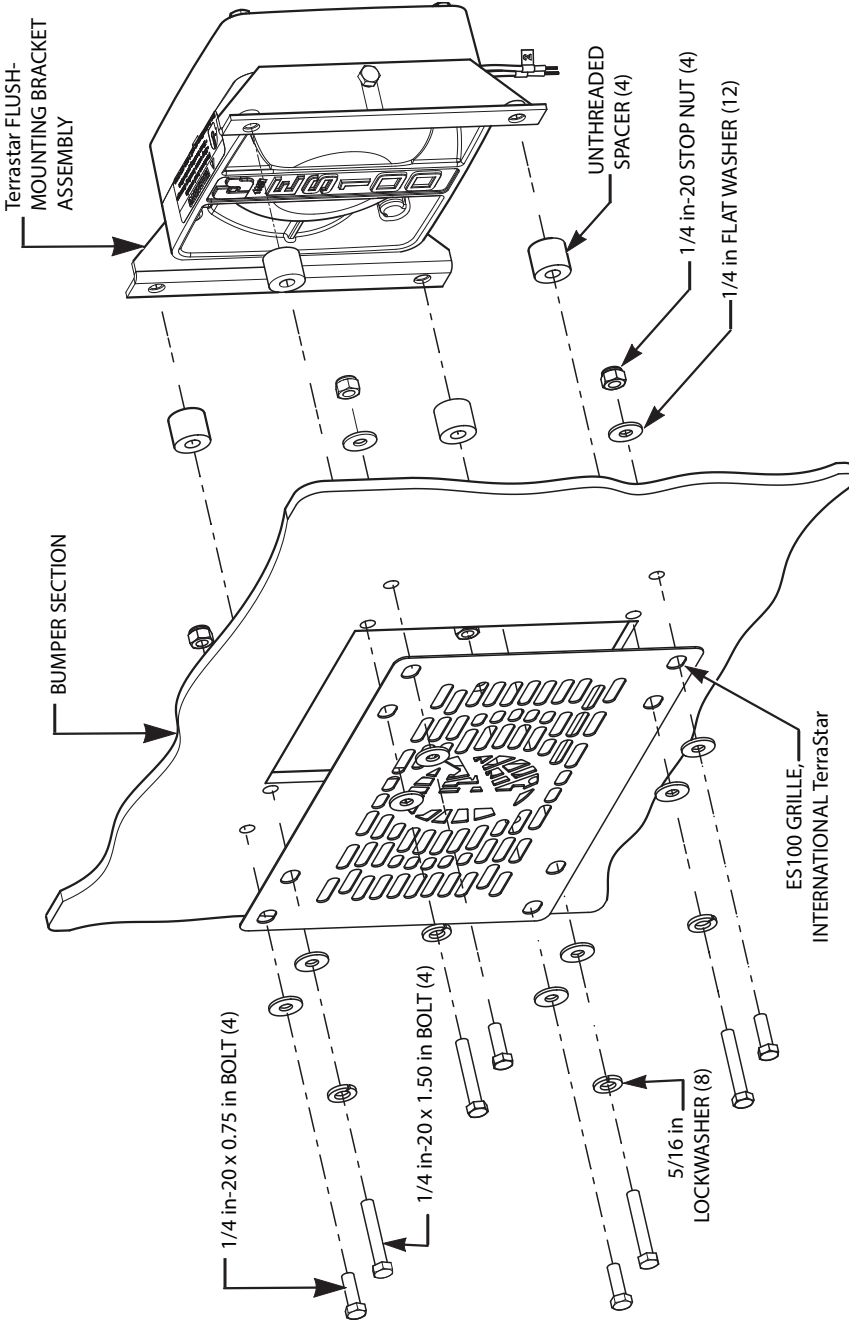
For technical support and service, visit:

<https://www.fedsig.com/technical-support>

<https://www.fedsig.com/service-centers>



Figure 3 Speaker and ES100 grille secured to bumper





### Figure 4 Mounting template

