FEDERAL SIGNAL
Public Safety Systems

Models MS4000 and MS4000U Mini-Sirens

Installation and Operating Instructions

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Safety Message to 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 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 the sound of the siren or horn and wear hearing protection. Do not sound the siren or horn 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.

- To avoid a battery explosion, always disconnect the negative battery cable first and reconnect it last. Avoid causing a spark when connecting near or to the battery. The gases produced by a battery can caused a battery explosion that could result in vehicle damage and serious injury.

- 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 the 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.
- 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.
- If a vehicle seat is temporary removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.
- 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.
- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.

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 or reinstalling the product.

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

Overview of the MS4000 Siren Series

The Federal Signal MS4000 Series mini-siren is advanced, efficient, and economical. It offers reliable performance with effective traffic clearing capability. Reliability is increased and operating temperature is decreased with the use of advanced rail circuitry and low-loss FET design arrangement.

Efficiency and versatility are built-in features of the MS4000. This mini-siren comes with its own bracket and can be mounted virtually anywhere because of its compact size and lightweight construction.

MS4000 mini-sirens provide 100-watt output and meet Class A requirements when paired with any Federal Signal speaker. This mini-siren can operate from any 12 V negative-ground vehicle electrical system. It is protected against failure modes, including reversed polarity, by a fuse that can be replaced without tools. The MS4000 can be powered via the vehicle's power distribution center or directly from the vehicle's battery.

Wail, Yelp, Priority, Manual, and Air Horn are all standard on the MS4000. Two rocker switches control all the siren functions. One switch controls AIR HORN/MANUAL, and the other controls WAIL/YELP. The AIR HORN/MANUAL switch rests in the neutral (center) position and activates a function when momentarily placed into the up or down position. The WAIL/YELP switch is a three-position switch with the center position being neutral.

A new, built-in intersection clearing feature adds effective traffic management capability at potentially hazardous crossings. When the MS4000 is activated and in the WAIL position, depressing the momentary rocker switch to the MANUAL position produces an eight-second Yelp tone. When the MS4000 is activated and in the YELP position, depressing the momentary rocker switch to the MANUAL position produces an eight-second PRIORITY tone.

The MS4000U is designed especially for the undercover officer and volunteer firefighters. Siren functions are activated in the same manner as the standard MS4000, but from switches mounted onto a small, remote switch panel.

Siren Features

- Small and compact – mounts virtually anywhere.
- Easy to operate – new, built-in intersection clearing feature.
- High reliability – advanced circuitry and FET design.
- 100 W output – meets Class A with just one Federal Signal speaker.
- Output short-circuit protected – replaceable fuse protection.
- Tones included – Wail, Yelp, Priority, Manual (peak and hold), and Air Horn.
- In states where the Priority tone is not allowed, the JMP1 shunt can be added to eliminate the tone (see the safety messages on page 11 and "Eliminating the Priority Tone" on page 12)

Siren Specifications

Input Voltage:	9 Vdc to 15 Vdc
Input Current, Operating:	10 A maximum
Polarity:	Negative grounded systems only
Standby Current:	60 mA nominal
Operating Temperature Range:	-30 ºC to +65 ºC
Frequency Range:	725 Hz to 1,575 Hz
Cycle Range:	WAIL: 12 cycles per minute YELP: 240 cycles per minute MANUAL: 1,425 Hz peak
Output Voltage:	64 V (nominal) peak-to-peak
Output Power:	100 W
Output Current:	3 A
Dimensions (HWD):	1.3 in (3.4925 cm) x 6.3 in (15.575 cm) x 5.7 in (14.478 cm)
Shipping Weight:	3 lb (1.4 kg)

Unpacking the Siren

After unpacking the siren, examine it for damage that may have occurred in transit. If the speaker has been damaged, 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 discarding them. Disposal of all shipping materials must be carried out in accordance with national and local codes and standards. If any parts are missing, please call Federal Signal Customer Support at +1-800-264-3578 or 1-708-534-3400.

Mounting the Siren Under the Dashboard

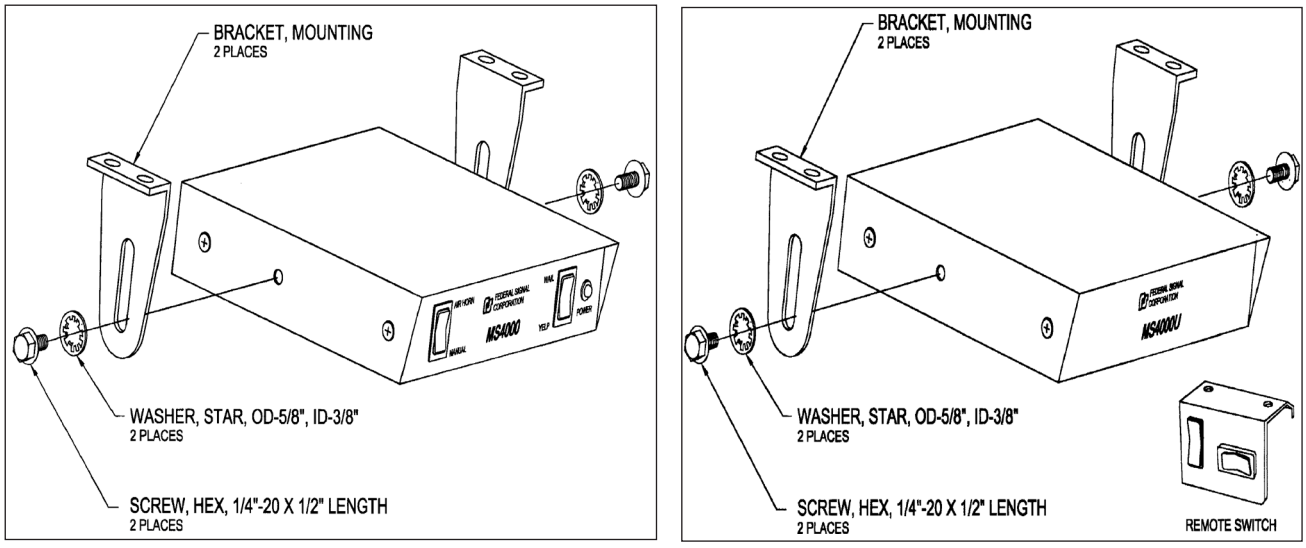
⚠ WARNING ***AIRBAG DEPLOYMENT — Do not install equipment or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.***

NOTICE ***SIREN REQUIRES VENTILATION — This siren needs to radiate heat. Do not install it in an area where it cannot dissipate heat into the air. Do not mount it near a heater duct.***

NOTICE ***DRILLING PRECAUTIONS—When drilling holes, check the area you are drilling into to be sure you do not damage vehicle components. All drilled holes should be deburred 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.***

See Figure 1. Both electronic sirens are equipped with two mounting brackets, which enable them to be mounted in a variety of positions. Positioning the brackets above the siren enables you to mount the siren to the underside of the dashboard.

Figure 1 Front view of MS4000 (left) and MS4000U (right)



The siren should be mounted in a position that is both comfortable and convenient for the operator. Keep the visibility and accessibility of controls in mind. Positioning the brackets below the siren enables you to mount the siren on any horizontal surface.

1. Select a mounting location for the siren.
2. Use a mounting bracket as a template through which to scribe two sets of mounting holes 7 inches apart.
3. Drill a mounting hole at each of the four marks.

4. Secure the mounting brackets to the dash with the supplied 10-32 x 3/4 hex head screws, 10-32 split lock washers, and 10-32 hex nuts.
5. Secure the electronic siren to the mounting brackets with the supplied 1/4 inch self tapping machine screws and 3/8 inch internal tooth washers.
6. Tilt the siren to the in the position you want.
7. Tighten the 1/4-20 x 3/8 hex-head screws.

Connecting the Siren System

⚠ WARNING ***HIGH CURRENT ARCING — Do not connect this system to the vehicle battery until all other electrical connections are completed, mounting of all components is complete, and you have verified that no shorts exist. High current shorts can cause hazardous sparks or burning wire resulting in an electrical fire.***

This procedure includes connecting a 11-ohm speaker, a switch (MS4000U only), and the electronic siren. A speaker is not included as part of the electronic siren.

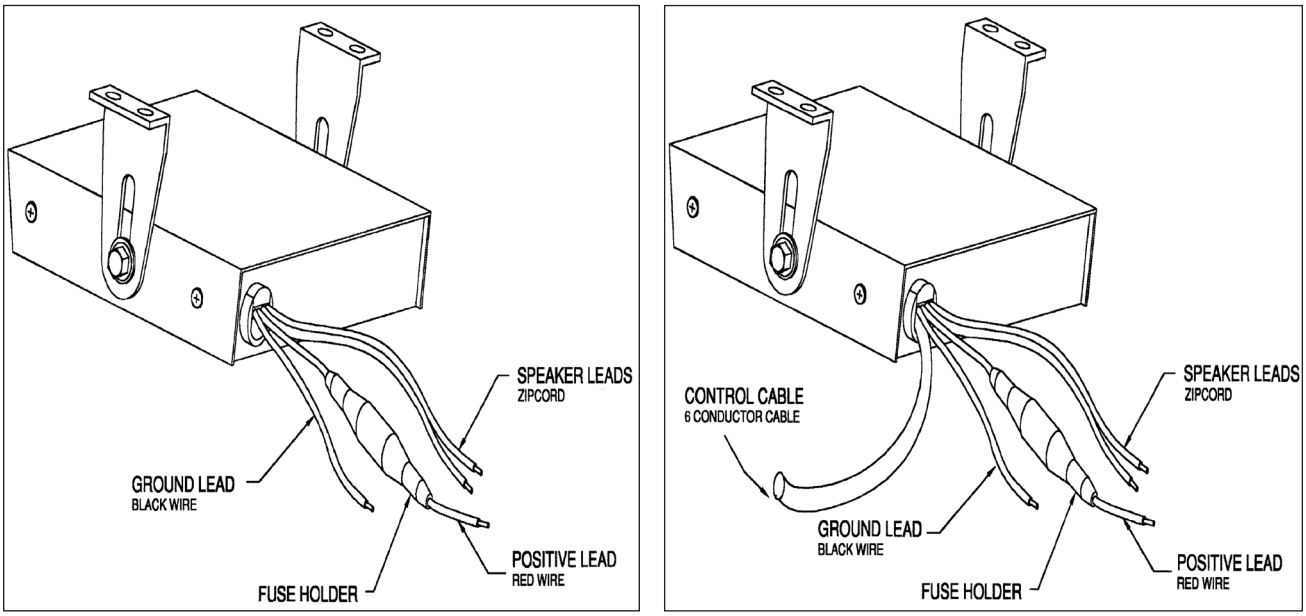
Connecting the Speaker

Federal Signal speakers are weatherproof and may be installed in any convenient location: on the fender, behind the grill, etc. Any instructions applicable to the type of speaker you have selected will be found the speaker carton.

See Figure 2. To connect the speaker to the siren:

1. Using 18 AWG wire, connect the speaker leads (zip cord) to the speaker.
2. Ensure that exposed connections are properly insulated.

Figure 2 Rear view of MS4000 (left) and MS4000U (right)



Connecting the Switch (MS4000U Only)

The switch and quick-disconnect terminals are included with the Model MS4000U.

Figure 3 MS4000U switch with connections

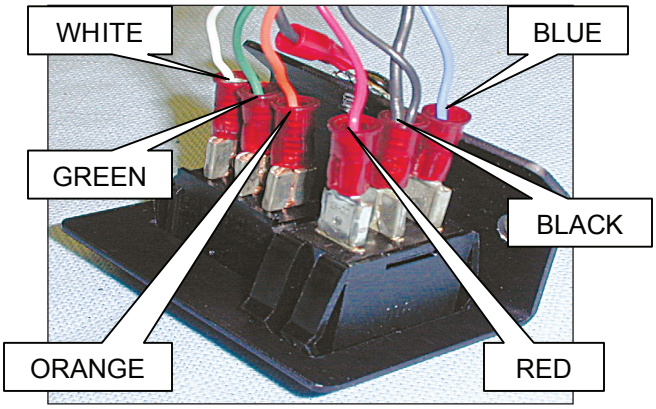
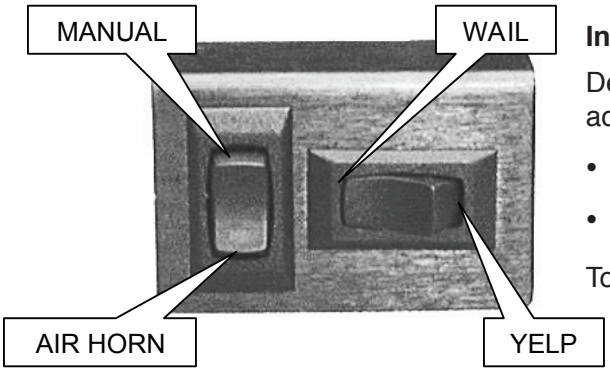


Figure 4 Siren tone switch positions



Intersection Clearing Feature

Depressing the MANUAL momentary rocker switch activates additional alternate sounds:

- Switch set to WAIL for 8-second Yelp tone
- Switch set to YELP for 8-second Priority tone

To eliminate the Priority tone, see pages 11 and 12.

To wire the switch to the MS4000U:

1. Select a mounting location for the switch bracket assembly.

NOTICE

DRILLING PRECAUTIONS—When drilling holes, check the area you are drilling into to be sure you do not damage vehicle components. All drilled holes should be deburred 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.

2. Route and install the control cable into the vehicle.
3. Trim the cable length to fit.
4. Strip the plastic sheath of the control cable back approximately 3 inches and strip the individual wires approximately 1/4 inch.
5. Crimp the remaining end of the 5-inch black wire into the quick-disconnect terminal with the black wire from the control cable.
6. Crimp the quick-disconnect terminals onto the ends of the remaining wires.

7. Use the tie wrap provided to secure the cable onto the rear of the switch bracket. **Do not cinch down the cable yet**.
8. Mount the switch bracket into the vehicle in the selected location.
9. Thread the wires through the switch bracket for the your selected switch configuration.
10. Connect the quick-disconnect connectors to the rear of the switches in the following manner:
    - **a.** BLACK wire to the CENTER pole of the momentary switch.
    - **b.** BLUE wire to the AIR HORN pole of the momentary switch.
    - **c.** RED wire to the MANUAL pole of the momentary switch.
    - **d.** GREEN wire to the CENTER pole of the 3-position switch.
    - **e.** WHITE wire to the WAIL pole of the 3-position switch.
    - **f.** ORANGE wire to the YELP pole of the 3-position switch.
    - **g.** Snap the switches into the bracket.
    - **h.** Tighten down the tie wrap holding the control cable**.**

Connecting Power to the Siren System

The MS4000 Siren Series can operate from any 12-volt NEGATIVE ground vehicle electrical system. Therefore, before making any electrical connections, determine the polarity of the electrical system ground.

NOTICE ***BATTERY DISCHARGE — The MS4000 Series Sirens do not have an on/off switch. If power is obtained directly from the vehicle battery, it will continuously draw approximately 0.060 A. Because this will eventually discharge the vehicle battery, it is recommended that power for the system comes from the switched side of the ignition switch circuit.***

NOTICE ***DRILLING PRECAUTIONS —When drilling holes, check the area you are drilling into to be sure you do not damage vehicle components. All drilled holes should be deburred 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.***

To wire the siren system to the 12 Vdc power source:

1. Use 14 AWG wires to route the red and black wires through the existing hole into the engine compartment. The wires should be routed through existing clamps and holders toward the battery.

2. Connect the black lead to the vehicle battery negative (-) terminal.
3. Connect the red lead to the selected 12-volt power source through a 15 A fuse and in-line fuse holder.

Testing the Siren System

⚠ WARNING

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.

Test the siren for proper operation.

NOTE: The siren is designed to blow the fuse under reverse polarity conditions. If the fuse fails when power is supplied, check and correct the power lead wiring. Install a 15 A in-line fuse and reapply power.

After testing is complete, provide a copy of this manual to all operating personnel.

Safety Message to Operators of Federal Signal Sirens and Light/Sound Systems

⚠ WARNING

The lives of people depend on your safe operation of Federal products. It is important to read and follow all instructions shipped with the products. In addition, 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.

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.
- The effectiveness of an interior mounted warning light depends on the clarity, the tinting, and the angle of the glass it is being placed behind. Tinting, dirt, defects and steeply angled glass reduce the light output of the warning light. This may reduce the effectiveness of the light as a warning signal. If your vehicle has dirty, tinted or steeply angled glass, use extra caution when driving your vehicle or blocking the right of way with your vehicle.
- 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, you should 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 and Service

For technical support and service, please contact:

Service Department
Federal Signal Corporation
Phone: 1-800-433-9132
Fax: 1-800-343-9706
Email: empserviceinfo@fedsig.com
(7 AM to 5 PM, Monday through Friday, Central Time)

Safety Message to Personnel Servicing Federal Signal Sirens

⚠ WARNING

The lives of people depend on your safe servicing of products. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other safety instructions and precautions you should follow.

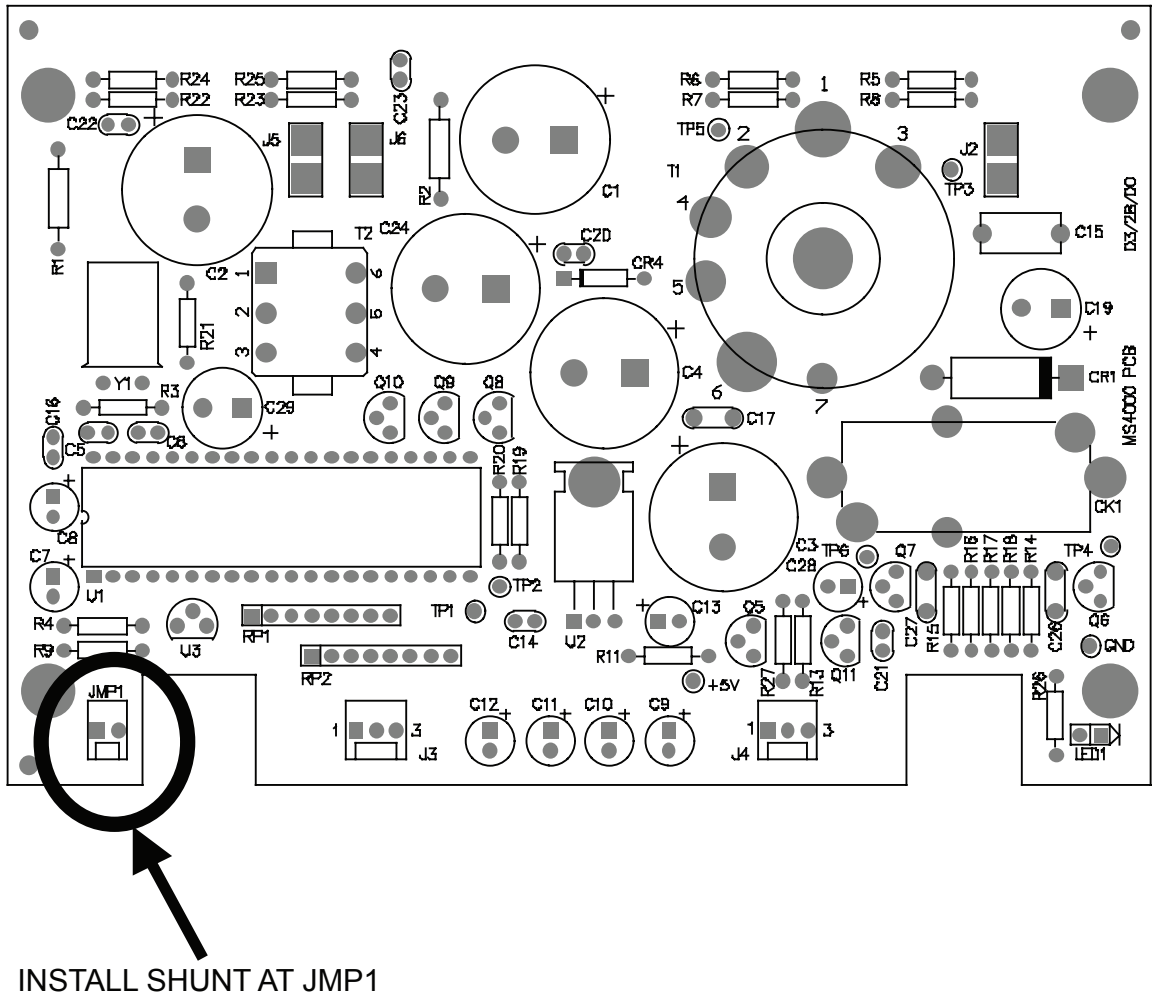
- Read and understand all instructions in this manual before servicing the electronic siren.
- To properly service an electronic siren: you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment.
- Electronic circuit repairs must be performed by a qualified and competent electronic technician.
- 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, which may cause, in certain situations, permanent hearing loss. You should take appropriate safety precautions such as wearing hearing protection.
- DO NOT connect this system to the positive terminal of the battery until servicing is complete, and you have verified that there are no short circuits to ground.
- In order for the electronic siren to function properly, the ground connection must be made to the NEGATIVE battery terminal.
- After repair, test the electronic siren and speakersystem to ensure that it is operating properly.

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

Appendix: Eliminating the Priority Tone

For agencies that operate in areas where the PRIORITY sounds are not authorized we are providing a shunt to be placed on the circuit board at location JMP1. If the end user installs this shunt, the siren will not produce the PRIORITY sounds.

Figure 5 Shunt to eliminate PRIORITY Tone



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