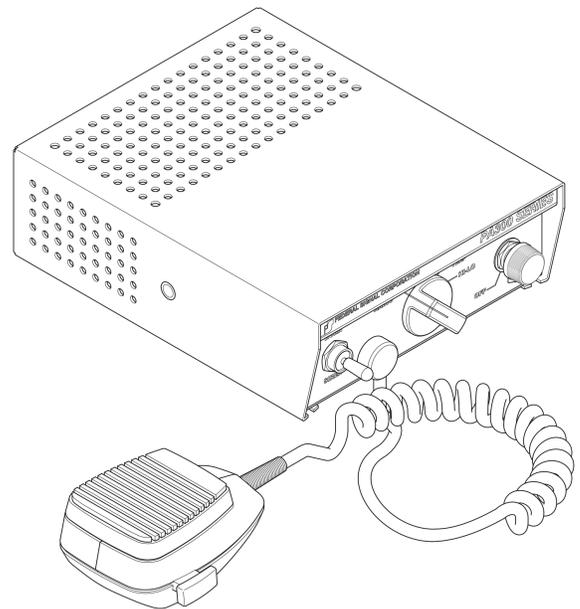


PA300 Electronic Siren

Models 690009 and 690010



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. 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 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
University Park, Illinois 60484

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

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⚠ WARNING

Safety Messages to Installers of Federal Signal Sound/Light Systems

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. 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 performing equipment installations 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 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 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.
- 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.

Safety Messages to Installers of Federal Signal Sound/Light Systems

- 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 air bag sensors.
- Installation of two speakers requires wiring speakers in phase.
- Never attempt to install aftermarket equipment that connects to the vehicle wiring without reviewing a vehicle wiring diagram 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.
- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper air bag deployment.
- Locate the control head so the vehicle, controls, and microphone can be operated safely.
- When drilling into a vehicle structure, ensure that both sides of the surface are clear of anything that could be damaged.

After Installation

- After installation, test the emergency warning 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.

RETAIN AND REFER TO THESE MESSAGES.

Overview

The Federal Models 690009 and 690010 (PA300 Series) (figure 1-1) are precision built, efficient and economical, full-featured electronic sirens of advanced design. They provide wail, yelp and hi-lo siren tones, as well as the Tap II feature, public address (PA), radio rebroadcast and an air horn sound.

The siren should be installed in negative ground vehicles. It is protected against failure modes (including reversed polarity) by a fuse that is replaceable without tools. No components protrude from the bottom of the siren to interfere with mounting arrangements.

A noise-cancelling microphone is wired-in to prevent loss or theft. It provides high quality voice reproduction without feedback "squeal". The microphone push-to-talk switch overrides any siren signal for instant PA use. PA and radio volume are adjustable by means of a front panel GAIN control. Radio inter-connect wires are built-in. No additional cables are required.

The Model PA300 Series can drive one or two 11-ohm impedance, high power (200 W) or low power (100 W) speakers. When two speakers are used, they must be connected in parallel and in phase.

The Tap II feature allows the driver to change the siren sound from wail to yelp (or vice-versa) via the vehicle's horn ring. Tap II provides especially effective traffic clearing capability. In addition to Tap II, additional alternate sounds can be activated in two other selector switch positions by pressing and holding the horn ring for as long as the alternate sound is desired.

Other special features of the Model PA300 Series include:

- High degree of reliability is achieved through the use of integrated circuits and silicon output transistors.
- Control panel is illuminated with LED's.
- Newly designed printed circuit board provides improved performance and durability under a wide range of environmental conditions.

PA300 Series Models:

- 690010: 12 V, 200 W, HI-LO with microphone
- 690009: 24 V, 200 W, HI-LO with microphone

Specifications

Table 1 Specifications

Input Voltage	11 Vdc to 15 Vdc (690010) 24 Vdc to 28 Vdc (690009)
Polarity	Negative ground only
Standby Current (MANUAL)	120 mA (typical) (690010) 120 mA (typical) (690009)
Operating Temperature Range	-30°C to +65°C
Operating Current (Wail mode)	10 A max. (at 13.6 Vdc) (690010) 5 A max. (at 25 Vdc) (690009) (11 ohm load, at high power)
Frequency Range (typical)	725 to 1800 Hz
Cycle Rate (typical)	Wail: 15 cycles/min. Yelp: 220 cycles/min. Hi-Lo: 70 cycles/min.
Voltage Output (approx.)	64 V _{P-P} (11 ohm load)
Dimensions (H x W x D)	2-1/2 x 6-1/2 x 8-1/2 inches (6.35 x 16.51 x 21.59 cm)
Net Weight (incl. microphone)	4-1/2 lb (2.04 kg)
Shipping Weight	6-1/2 lb (2.94 kg)
NOTE: The following parameters were obtained with the radio input potentiometer and GAIN control set at maximum.	
Audio Frequency Range	300 to 10,000 Hz
Harmonic Audio Distortion (300-3,000 Hz)	10% max. all power levels from 1/2 to 50 watts (frequency response ±3 dB)
Input Impedance (Radio)	2000 ohms
Input voltage required to obtain 20 V _{RMS} across speaker load (Radio)	0.30 V _{RMS}

Unpacking the Kit

After unpacking the Model PA300 Series, examine it for damage that may have occurred in transit. If the equipment has been damaged, file a claim immediately with the carrier stating the extent of damage. Carefully check all envelopes, shipping labels, and tags before removing or destroying them. Before proceeding with the installation, ensure that the following parts have been included in the carton.

Table 2 Kit Contents

Qty.	Description	Part No.
1	Cable Assembly (690010)	1461360
1	Cable Assembly (690009)	1461388
2	1/4-inch Lockwasher	7074A015
2	1/4-20 x 1/2-inch Screw	7002A008-08
1	Mtg. Bracket	85361059
1	Warning Label	1612339

Installing the Siren

NOTICE

PROPER FUSING: Damage to the unit will occur if it is not properly fused. Ensure that an in-line fuse (20 A) and fuse holder are installed in the red power cable lead for the 690010. A chassis-mounted fuse holder is mounted on the 690009; ensure that a 10 A fuse is installed.

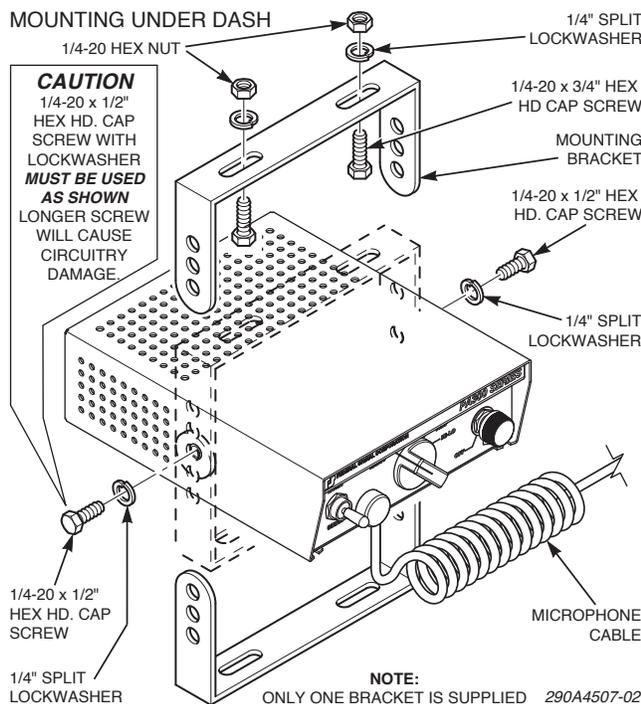
WARNING

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.

The electronic siren comes equipped with a swinging bracket that enables it to be mounted in variety of positions. Positioning the bracket above the unit allows mounting to the underside of the dash. Positioning the bracket below the unit will permit mounting on any horizontal surface.

The unit should be mounted in a position that is both comfortable and convenient to the operator. Keep visibility and accessibility of the controls in mind. To install the unit under the dashboard, determine the mounting location and proceed as follows. See Figure 1.

Figure 1 Installation of PA300 Under Dashboard



NOTICE

UNRESTRICTED AIR FLOW REQUIRED: Do not install it in areas where air flow is restricted. Do not mount the unit near a heater duct or under the hood.

Mounting the Bracket

To mount the bracket:

1. Use the mounting bracket as a template and scribe two drill position marks at the selected mounting location under the dash.

NOTICE

DRILLING PRECAUTIONS: *When drilling holes, check the area you are drilling into 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 wire routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.*

2. Drill two 1/4-inch diameter holes at the position marks.
3. Secure the mounting bracket to the dash with user-supplied 1/4-20 by 3/4-inch hex head screws, 1/4-inch split lockwashers and 1/4-20 hex nuts as shown in Figure 1.
4. Secure the electronic siren to the mounting bracket with 1/4-20 by 1/2-inch hex head screws and 1/4-inch split lockwashers as shown in Figure 1.

NOTICE

To avoid damage to the unit, the 1/4-20 by 1/2-inch hex head cap screws and the 1/4-inch split lockwashers must be used as shown in Figure 1.

5. Tilt the unit to the desired position. Tighten the 1/4-20 by 1/2-inch hex head screws.

Installing the Power Cable

NOTICE

Wiring changes have been made that use a new type of power cable. If this unit is replacing an older PA300, use the optional cable adaptor (761300) to connect the originally installed power cable to the new siren.

NOTICE

PROPER WIRING: *Damage to the unit will occur if speaker wires are improperly connected. NEVER CONNECT the brown SPEAKER HIGH POWER (200 W) wire and orange SPEAKER LOW POWER (100 W) wire together to the speaker(s).*

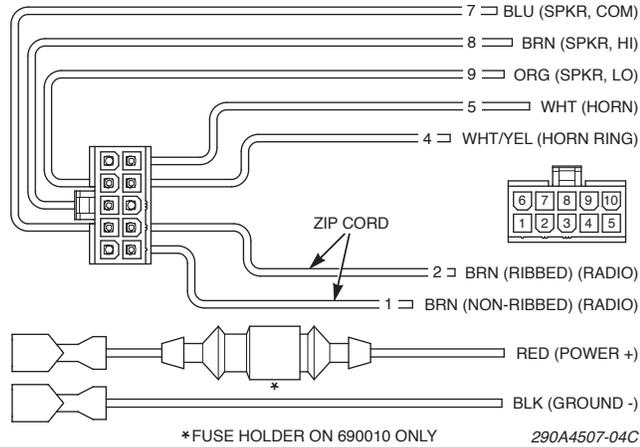
To install the power cable:

1. The unit is designed to operate with one 11-ohm impedance speaker or two 11-ohm impedances, low power (100 W) or high power (200 W) speakers connected in parallel and in phase. On Federal Signal speakers, connect the two speaker leads marked "1" to the SPEAKER COMMON control cable lead and the two speaker leads marked "2" to the SPEAKER HIGH POWER or SPEAKER LOW POWER control cable leads. See Figure 2.

Installing the Siren

- Using 18-gauge wire, connect the speaker leads (100 W speakers to SPEAKER LOW POWER and 200 W speakers to SPEAKER HIGH POWER) as shown in the Control Cable Wiring Diagram, Figure 2.

Figure 2 Control Cable Wiring Diagram



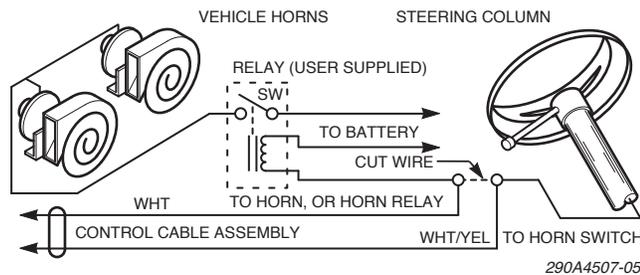
- To allow incoming radio messages to be rebroadcast over the outside speakers, connect the two brown zip cord leads (pins 1 and 2) across the two-way radio's speaker.

Connecting the Horn Ring

In order to utilize the Tap II and Press-and-Hold features of the siren, perform the following procedure:

- Locate the wire that connects the vehicle horn ring switch to the horn or horn relay. Cut this wire.
- Splice the white/yellow control cable wire (pin 4) to the horn ring side of the wire that was cut in step 1. Insulate the splice with user-supplied wire nuts. See Figure 3.

Figure 3 Horn Ring Connections



CAUTION

The horn ring transfer circuit of the siren is capable of switching a maximum of 2 A. Some vehicles do not have a horn relay and, consequently, will draw more than 2 A when the vehicle horn is activated. Consult your vehicle service manual or a qualified mechanic to determine the current required to activate the horn. If it is less than 2 A, perform the procedure in step 3. If it is greater than 2 A, perform steps 4 through 10.

3. Splice the white control cable wire (pin 5) to the horn side of the cut wire. Insulate the splice with a user-supplied wire nut.
4. Obtain a SPST relay of sufficient contact current capacity to activate the vehicle horn. Refer to Figure 2 and 3 while performing the following steps.
5. Mount the relay in a suitable location.
6. Connect the horn side of the wire cut in step 1 to the relay contact terminal.
7. Determine the “sense” of the vehicle’s horn ring activation circuit, i.e., does the horn circuit require a switched positive voltage or switched ground for activation?
8. Connect the relay wiper terminal to the positive or negative potential determined in step 7.
9. Connect the white control cable wire to one end of the relay coil.
10. Connect the other end of the relay coil to the opposite potential of that connected to the wiper in step 8.

Connecting to a Power Source

NOTICE

PROPER FUSING: Damage to the unit will occur if it is not properly fused. Ensure that an in-line fuse (20 A) and fuse holder are installed in the red power cable lead for the 690010. A chassis-mounted fuse holder is mounted on the 690009; ensure that a 10 A fuse is installed.

The PA300 Series can operate only from a negative ground vehicle electrical system. Therefore, before making any electrical connections, determine the polarity of the vehicle electrical system ground.

NOTICE

DRILLING PRECAUTIONS: When drilling holes, check the area you are drilling into 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 wire routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.

Power for the siren can be obtained from the vehicle’s power distribution center or directly from the vehicle battery. If power is going to be obtained directly from the vehicle battery, drill a hole in the vehicle firewall for the power lead to enter the engine compartment. Place a grommet or similar device in the hole to protect the wire against damage from rough edges.

If your vehicle has a negative ground electrical system, perform this procedure:

NOTE: This unit is **NOT** designed to operate with positive ground.

Installing the Siren

To connect to the power source:

1. Route the red power (+) and the black power (-) control cable leads, through the previously drilled hole, into the engine compartment. Route the wires through existing clamps and holders toward the battery.
2. To protect the red wire when connected to the battery terminal, use an in-line fuse holder and appropriate (10 A for 690009 and 20 A for 690010) user-supplied fuse. The fuse holder should be installed as close as practical to the battery. If necessary, additional #14 gauge or heavier wire can be spliced to the red lead.

Wiring the Unit

⚠ WARNING

FIRE HAZARD: If shorted to the vehicle frame, high current conductors can cause hazardous sparks, resulting in electrical fires or molten metal. DO NOT connect this system to the vehicle battery until ALL other electrical connections are made and mounting of all components is complete. Verify that no short circuits exist before connecting to the positive (+) battery terminal. Failure to follow this warning can cause a fire and may result in serious injury or death to you or others.

To complete the wiring:

1. Connect the in-line fuse holder lead to the positive (+) battery terminal.
2. Connect the black wire to the negative terminal of the battery.

Air Horn Press-and-Hold Modification

The unit comes from the factory set so that the peak-and-hold sound will be heard when the Selector switch is set to MANUAL and the vehicle horn ring is activated. To change the sound to air horn, merely move jumpers J8 and J9 from the “PEAK” position on the P.C. board to the “AIR” position. See Figures 4 and 5.

Figure 4 Factory Configuration - Manual Peak and hold

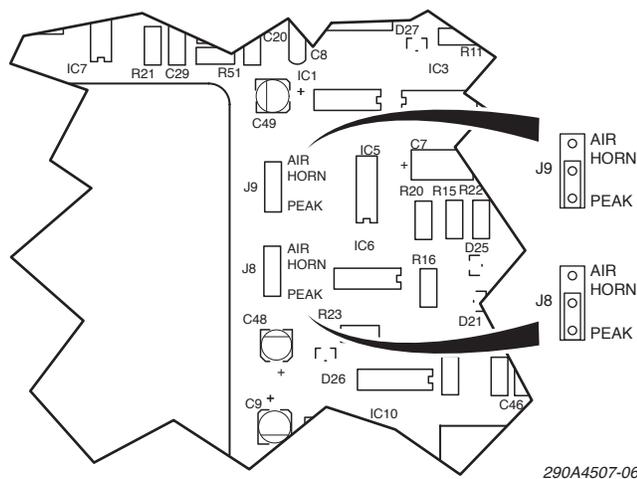
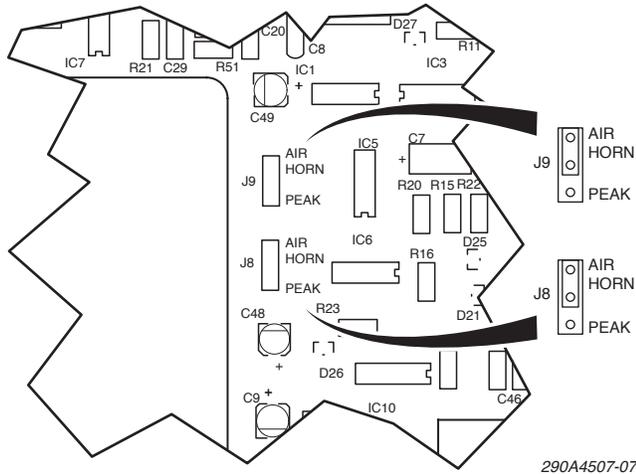


Figure 5 Horn Configuration - Air Horn



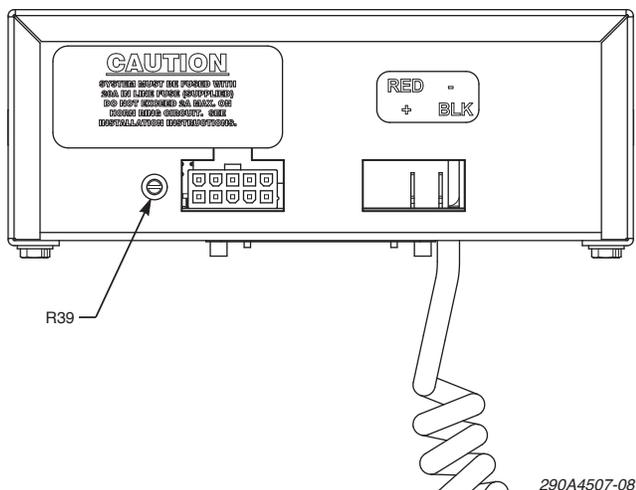
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Relative PA Loudness and Adjustment

After the electronic siren is completely installed in the vehicle, set the Selector switch to MANUAL. Press the microphone push-to-talk switch, speak in a normal voice, and adjust the GAIN control for the desired sound level outside the vehicle. Turn-on the vehicle's two-way radio and adjust the volume to a comfortable listening level inside the vehicle. Then set the Selector switch to RADIO. Stand outside the vehicle and note the radio rebroadcast loudness. If the sound volume is too loud or too soft, using a small flat blade screwdriver, adjust R39 from the back of the siren to the desired sound level. See Figure 6.

After the adjustment is completed, the loudness of the radio rebroadcast and public address may be varied with the front panel GAIN control.

Figure 6 Relative Loudness Adjustment



290A4507-08

Testing the Installation

⚠ 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 sounds 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 installation test the electronic siren, including horn operation, to ensure that it is operating properly.

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

Getting Technical Support and Service

For technical support and service, please contact:

Service Department
Federal Signal Corporation
Phone: 1-800-433-9132
Email: empserviceinfo@fedsig.com
www.fedsig.com

Getting Repair 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 an RMA from a local Distributor or Manufacturer's Representative.

Provide a brief explanation of the service requested, or the nature of the malfunction.

Address all communications and shipments to the following:

Federal Signal Corporation
Service Department
2645 Federal Signal Drive
University Park, IL 60484-3167

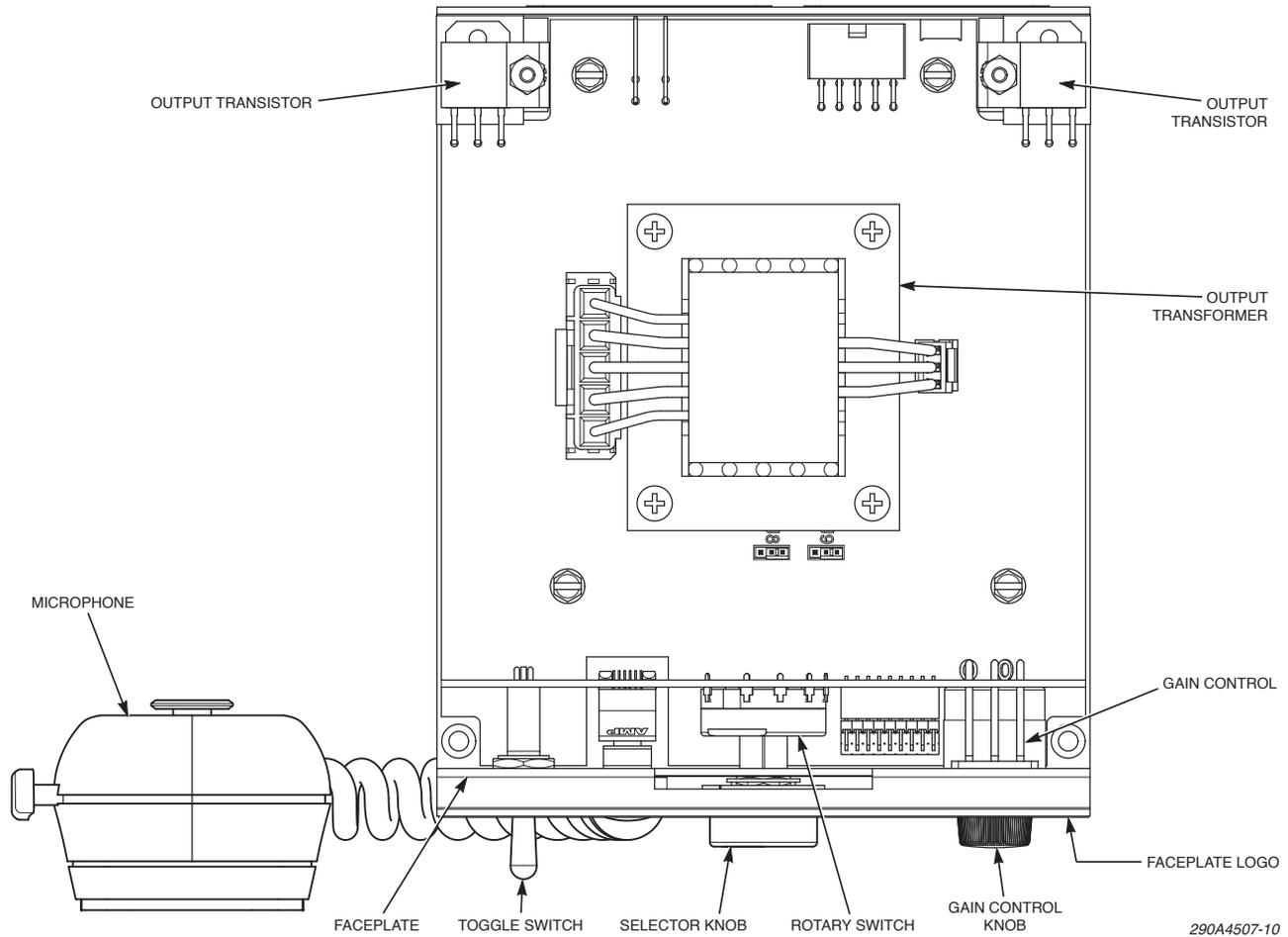
Ordering Replacement Parts

To order replacement parts, call Customer Support at 1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday (CT) or contact your nearest distributor.

Table 3 Replacement Parts

Description	Part No.
Transistor, Output, BUT70W	125467
Transformer, Output (690010)	1461358
Transformer, Output (690009)	1461359
Fuse, 20 A, 3 AG, 32 V (690010)	148A127
Fuse, 10 A, 3 AG, 32 V (690009)	148A108
Switch, Rotary	122376
Switch, Toggle	122377
Header, 10 Pole Molex®	140454-05
Microphone	258B577-03
Microphone Clip	85361082
Microphone Strain Relief	231A148
Knob, Gain Control	141A102
Knob, Selector	141A111
Circuit Board Assembly (690009)	2005183-24
Circuit Board Assembly (690010)	2005183-14
Switch, Gain Control	106128
Harness, Wiring (690009)	1461388
Harness, Wiring (690010)	1461360
Kit, Installation Accessory (690009)	8537572
Kit, Installation Accessory (690010)	8537561
Bracket, Mounting	8536B022
Faceplate, Logo PA300	81461864
Faceplate, PA300	81461865
Adapter Cable	761300

Figure 7 Internal View



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Customer Support

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