FEDERAL SIGNAL
Safety and Security Systems

Global Series Model G-SPA

Amplified Speaker for Use in
Hazardous Conditions

25500188 Rev B8 0523

Limited Warranty: This product's limited warranty can be found at www.fedsig.com/SSG-Warranty

SAFETY MESSAGES TO INSTALLERS AND USERS ⚠:
It is important to follow all instructions shipped with this product. This amplified speaker is to be installed by a trained electrician who is thoroughly familiar with and will follow all applicable national and local codes in the country of use.

This amplified speaker should be considered a part of the warning system and not the entire warning system.

The selection of the mounting location for the amplified speaker, its controls, and the routing of the wiring are to be accomplished under the direction of the facilities engineer and the safety engineer. Listed below are some other important safety instructions and precautions you should follow:

- Read and understand all instructions before installing or operating this equipment.
- To avoid electrical shock hazards, do not connect wires when power is applied. Failure to observe this warning may lead to serious injury or death.
- Never alter the unit in any manner. Safety in hazardous locations may be endangered if additional openings or other alterations are made in units specifically designed for use in these locations.
- Do not connect this amplified speaker to the system when power is on.
- All effective warning speakers produce loud sounds, which may cause, in certain situations, permanent hearing loss. Take appropriate precautions such as hearing protection. The device should be installed far enough away from potential listeners to limit their exposure while still maintaining its effectiveness.
- After installation, ensure that all threaded joints are properly tightened.
- After installation, test the amplified speaker system to ensure that it is operating properly
- Keep the unit tightly closed when in operation.
- After testing is complete, provide a copy of this instruction sheet to all personnel.
- Brass inserts have the potential to store a charge when they are not plugged. Consideration should be taken to prevent these from becoming a sparking hazard.
- Establish a procedure to routinely check the amplified speaker system for proper activation and operation.
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F and G; Class III or non-hazardous locations only.
- **WARNING - EXPLOSION HAZARD:** Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations.
- **WARNING - EXPLOSION HAZARD:** Do not remove or replace the fuse when energized.
- The purchaser should make the manufacturer aware of any external effects or aggressive substances to which the equipment may be exposed.

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

With respect to the potential electrostatic charging hazard as mentioned in the certificate "Specific Conditions of Use," under normal conditions of use, these devices are for fixed installations and not generally in contact with people. The risk of ignition is low. In addition, maintenance, cleaning, and extreme environmental factors (e.g., high velocity dust-laden atmospheres or high-pressure steam) should be taken into account by the end user using local Explosive Atmosphere (Ex) Electrical installation design, selection, inspection, and maintenance Codes and Standards. Cleaning of the devices should be done only with a damp cloth.

Certification

Certificate Nos:	•	ATEX Cert No.: Baseefa15ATEX0155X
	•	IECEx Cert No.: IECEx BAS 15.0104X
	•	UKEX Cert No. SGS23UKEX0086X
	•	ATEX coding: ⟨Ex⟩ II 2 G D
Protection:	•	Ex db IIB T5 Gb or Ex db e IIB T5 Gb
	•	Ex tb IIIC T100°C Db IP66 (Tamb= -55°C to + 49°C)
	•	Ex db IIC T4 Gb or Ex db e IIC T4 Gb
	•	Ex tb IIIC T135°C Db IP66 (Tamb= -55°C to + 70°C)
Standards:	•	EN60079-0:2018
	•	EN60079-1:2014
	•	EN IEC 60079-7:2015+A1:2018,
	•	EN60079-31:2014
	•	IEC60079-0:2017 7th Ed
	•	EC60079-1:2014-06 7th Ed
	•	IEC60079-7:2017 5.1 Ed
	•	IEC60079-31:2013 2nd Ed.

Specific Conditions of Use

1. The Modular Audible Device enclosure incorporates a sinter and the volume is greater than 100 cm^3; therefore, use of the Modular Audible Device in carbon disulphide gas atmospheres is not permitted.

2. The Modular Audible Device has external non-metallic surfaces that may provide an electrostatic charging hazard. See the manufacturer's instructions for further information.

3. The Modular Audible Device has metallic components in the non-metallic walls of the enclosure, which can store electrical charge and therefore may provide a potential electrostatic discharge. The metallic brass inserts have a capacitance of 24 pF. See the manufacturer's instructions for further information.

cULus Zone Certifications

This equipment is for use in Class I, Zone 1 and Zone 21 hazardous (classified) locations. It has been investigated with reference to risks to life and property and for conformity to the installation and use in provisions of Articles 505 and 506 of NFPA 70 (NEC).

These models use protections:

- Class I, Zone 1, AEx db IIC T4 Gb or AEx db eb IIC T4 Gb
- Zone 21, AEx tb IIIC T135°C Db IP66 (Tamb= -55°C to +70°C)
- Ex db IIC T4 Gb or Ex db eb IIC T4 Gb
- Ex tb IIIC T135°C Db IP66 (Tamb= -55°C to +70°C)

Unpacking the Device: After unpacking the device, examine it for damage and verify parts. If a part is missing or damaged, do not attempt to install, and contact Federal Signal Customer Support.

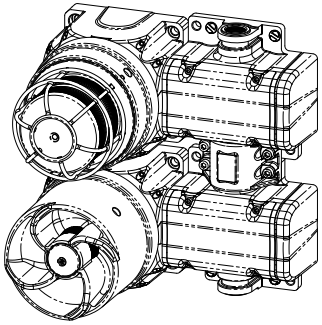
Creating Combination Fixtures in the Field

The Federal Signal Global Series Ex de products can be connected together in the field using interchangeable E-box end caps and a proprietary coupling system.

The proprietary coupling system allows for simple and cost-effective wiring from product to product, often eliminating the need for expensive Ex wiring practices and Ex rated glands. The E-box is available only when factory installed on an Ex d unit or when used as an E-box spacer adjoining an existing E-box. Please refer to the accessories listed on page 11 for available options. When creating certain fixture combinations, it is necessary to replace E-box end caps before mounting the product. If you are creating combination fixtures, refer to instruction manual 25500259 for specific instructions and details.

A note about combination fixtures: If the product is Ex db marked only, it is for use in gas atmospheres. If the product is Ex db e marked, it uses the increased-safety terminal enclosures and is only for gas atmospheres. If the product is Ex tb marked, it is for installation in dust atmospheres.

Figure 1 Beacon and amplified speaker combination fixture



Mounting the Amplified Speaker

⚠ WARNING

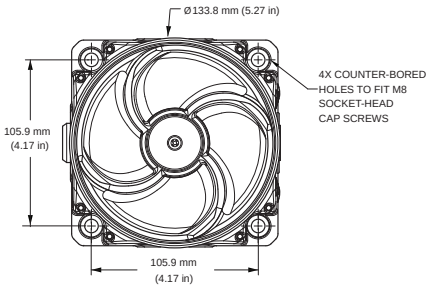
ATTACH THE AMPLIFIED SPEAKER SECURELY: To prevent injury, this apparatus must be securely attached to the mounting surface in accordance with the installation instructions. Use installer-supplied fasteners suitable for the mounting surface.

The mounting method and the installer-supplied mounting hardware depend on which of the two G-SPA models you are installing.

Mounting the Surface-Mount Ex d Amplified Speaker

Mount the amplified speaker to a flat surface using the four 8.5 mm mounting holes. Use installer-supplied fasteners suitable for the surface to which the device will be mounted.

Figure 2 Front view of Ex d amplified speaker



Mounting the Ex de Surface-Mount Amplified Speaker

Mount the amplified speaker to a flat surface using the six 8.5 mm mounting holes. Use installer-supplied fasteners suitable for the surface to which the device will be mounted.

Figure 3 Front view of Ex de surface mount

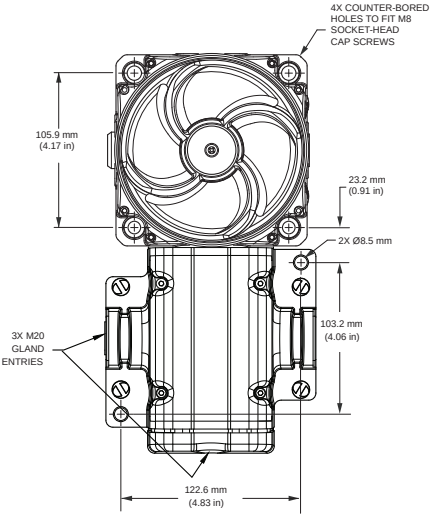
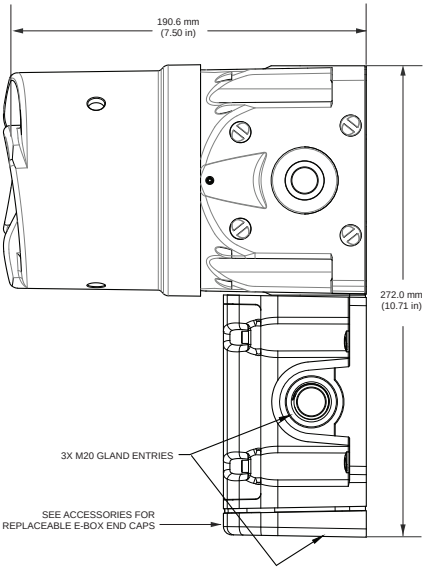


Figure 4 Side view of Ex de surface mount



Wiring the Device

SAFETY MESSAGES FOR WIRING ⚠: When installing and operating flameproof electrical equipment, the relevant national regulations for installation and operation (e.g., EN60079-14, IEC Wiring Regulations, and NEC/CEC) must be observed.

- To avoid electrical shock hazards, do not connect wires when power is applied. Failure to observe this warning may lead to serious injury or death.
- To maintain the flameproof integrity of the enclosure, DO NOT damage the cover or threads while disassembling or reassembling the unit.
- Painting and surface finishes, other than those applied by Federal Signal Corporation, are not permitted.

- Cable termination should be in accordance with the specifications that apply to the application. Federal Signal recommends that all cables and cores be fully identified.
- Ensure that only the correct, equipment-certified glands are used and that the assembly is shrouded and correctly earthed.
- Gland entries are M20-1.5 6 H with an option for the M25 entry on the end of the increased safety box models. See Table 3 on page 11 for choosing the correct cable entry devices for Equipment in Potentially Explosive Atmospheres.
- Because of space limitations, ensure that the cable cores within the unit are not too slack.
- In all countries, the wiring must comply with all national and local codes and standards.
- Ensure that all nuts, bolts, and fixings are secure.

Preparing to Wire the Ex d Flameproof Models

⚠ WARNING

SHOCK HAZARD: To avoid electrical shock, do not connect wires when power is applied. Failure to observe this warning may lead to serious injury or death.

NOTICE

CIRCUIT BOARD DAMAGE: The DC amplified speakers are polarity sensitive and MAY BE DAMAGED by incorrect electrical hookup. When connecting the DC amplified speaker to the voltage supply lines, POLARITY MUST BE OBSERVED. Damage will result if the voltage rating of the particular model is exceeded by more than 10 percent.

This section has wiring instructions for the flameproof models G-SPA 24 Vdc, 120 Vac, 220-240 Vac.

The models come in either 25 V_{RMS} or 2.8/0.8 V_{RMS} (selectable) audio input versions.

Ex d units are supplied with a ten-position PCB mounted-screw terminal block. The maximum wire gauge is 4.0 mm (12 AWG). The wire must be rated 85 °C or higher. Use only stranded cable to terminate the amplified speaker. The cross-sectional area of the primary earth (ground) must equal the cross-sectional area of the phase conductor.

Cable termination for these models should be in accordance with the specifications that apply to the application. It is recommended that all cables and cores be fully identified. Use the appropriate cable gland for the application. Gland entry threads are M20-1.5 x 6 H.

Tools needed:

- 1.5 mm A/F hexagon key
- No. 1 Phillips® screwdriver
- Wire stripper

Figure 5 Ex d in/out PCB connections (2.8 V/0.8 V_{RMS})

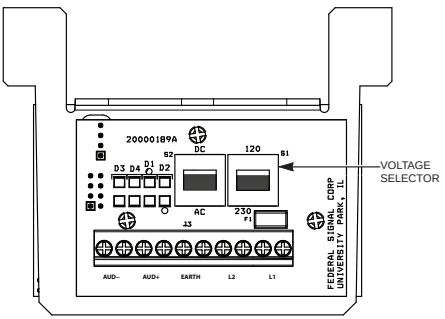
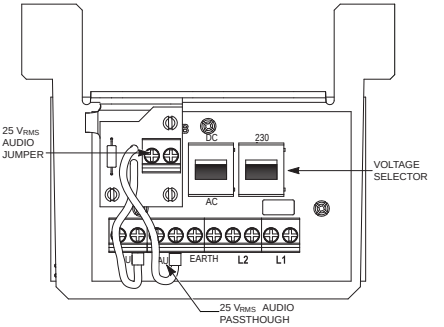


Figure 6 Ex d in/out PCB connections (25 V_{RMS})



Wiring the Ex d Models

To wire the Ex d flameproof amplified speaker:

1. Unscrew the M3 hex set screw on the side of the housing one full turn.
2. Remove the cover from the housing by turning the cover counterclockwise. Three 120-degree spaced reliefs are provided for a 3/8" spanner wrench if needed. If the cover will not unscrew, back out the set screw a few additional turns.
3. Loosen the captive Phillips screw retaining the driver/printed circuit board (PCB).
4. Slide out the PCB until the terminals clear the housing. Strip the wire insulation 6.5 mm (0.25"). Maximum screw tightening torque is 0.5 N•m (4.5 in-lb).
5. Follow the instructions below for your line voltage and continue to Step 6 on 5. Refer to Figures 5 or 6 for the voltage selector switch.

120 Vac operation

- **a.** Set the voltage selector switches to 120 and AC.
- **b.** Connect the line (hot) power source wire to the terminal block position marked L1 on the PCB.
- **c.** Connect the neutral (common) power source wire to the terminal block position marked L2 on the PCB.
- **d.** Connect the ground wire to the terminal block position marked EARTH.
- **e.** Connect the positive (+) audio source wire to the terminal block position marked AUD+.
- **f.** Connect the negative (−) audio source to the terminal block position marked AUD-.

220-240 Vac operation

- **a.** Set the voltage selector switches to 230 and AC.
- **b.** Connect the line (hot) power source wire to the terminal block position marked L1 on the PCB.
- **c.** Connect the neutral (common) power source wire to the terminal block position marked L2 on the PCB.
- **d.** Connect the ground wire to the terminal block position marked EARTH.
- **e.** Connect the positive (+) audio source wire to the terminal block position marked AUD+.
- **f.** Connect the negative (−) audio source to the terminal block position marked AUD-.

24 Vdc operation

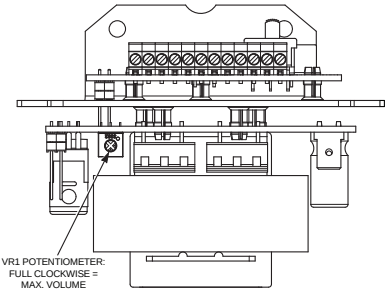
- **a.** Set the voltage selector switches to 230 and DC.
- **b.** Connect the positive (+) power-source wire to the terminal block position marked L1 on the PCB
- **c.** Connect the negative (−) power-source wire to the terminal block position marked L2 on the PCB.
- **d.** Connect the ground wire to the terminal block position marked EARTH.
- **e.** Connect the positive (+) audio source wire to the terminal block position marked AUD+.

f. Connect the negative (–) audio source to the terminal block position marked AUD-.

Adjusting the Sound Pressure and Audio Input (Ex d)

Sound Pressure: See Figure 7. The 3/4-turn VR1 potentiometer on the PCB is factory set to the maximum sound pressure level (MAX). To reduce the level, turn VR1 counterclockwise to the desired setting.

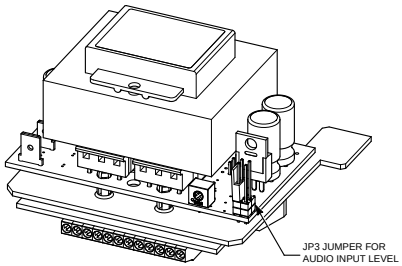
Figure 7 Location of VR1 potentiometer (sound pressure)



Audio Input: Two audio input levels are available to match the audio level provided by the peripheral system. To change the level from 2.8 V_{RMS}, move jumper JP3 to 0.8 V_{RMS}. See Figure 8.

NOTE: This step is not necessary for the 25 V_{RMS} versions; the jumper is factory s,et.

Figure 8 Location of jumper JP3 (audio input)



6. Insert the PCB into the enclosure and fully tighten the PCB captive screw.

7. Place the cover on the housing and tighten it by turning it clockwise.

8. To ensure O-ring compression, the cover must be fully seated against the housing when the threads are tightened. Turn the M3 set screw on the side of the housing until the screw contacts the housing.

9. Ensure that the unused wire entry is sealed with the provided brass M20-1.5 x 6 g stopping plug (equipment-certified).

Preparing to Wire the Ex de Increased Safety Models

⚠ WARNING

SHOCK HAZARD: To avoid electrical shock, do not connect wires when power is applied. Failure to observe this warning may lead to serious injury or death.

NOTICE

CIRCUIT BOARD DAMAGE: The DC amplified speakers are polarity sensitive and MAY BE DAMAGED by incorrect electrical hookup. When connecting the DC amplified speaker to the voltage supply lines, POLARITY MUST BE OBSERVED. Damage will result if the voltage rating of the particular model is exceeded by more than 10 percent.

This section has wiring instructions for the three increased safety models: G-SPA 120 Vac, G-SPA 220-240 Vac, and G-SPA 24 Vdc.

Ex de units are supplied with a six-pole, spring-tension clamp-style terminal block. The maximum wire gauge is 4.0 mm (12 AWG). The wire must be rated 85 °C or higher. Use only stranded cable to terminate the amplified speaker. The cross-sectional area of the primary earth (ground) must equal the cross-sectional area of the phase conductor.

Cable termination should be in accordance with the specifications that apply to the application. It is recommended that all cables and cores be fully identified. Use the appropriate cable gland for the application. Gland entry threads are M20-1.5 6 H.

Conductive metalwork, including cable glands, must be a minimum of 5 mm away from the terminals.

Leads connected to the terminals shall be insulated for the appropriate voltage, and this insulation shall extend to within 1 mm of the metal of the terminal throat.

The G-SPA terminal block is supplied with two conductors per pole. The terminal block allows for easy supply-in and loop-out wiring to connect amplified speakers in series.

Tools needed:

- 3.0 mm A/F hexagon key
- No. 1 Phillips® screwdriver
- Wire stripper

To wire the Ex de models:

1. Unscrew the four M4 socket-head cap screws and remove the terminal box cover.

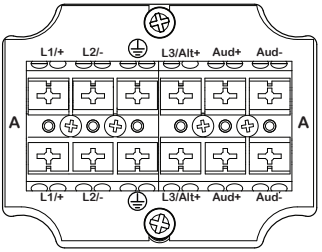
2. Strip the wire insulation 8 mm to 9 mm (0.33 in).

NOTE: When using more than one single or multiple strand lead, the connection into either side of any terminal must be joined in a suitable manner, e.g., two conductors into a single insulated crimped bootlace ferrule.

3. To connect wires, press the button on the terminal block with a Phillips screwdriver and insert the wire into the round opening. Release the button to make the connection.

4. Follow the instructions starting below for your line voltage and continue to Step 5. Refer to Figures 5 and 6 on page 14 for the voltage selector switches.

Figure 9 Connections for DC or AC Ex de amplified speaker



220-240 Vac operation

a. Connect the line (hot) power source wire to the position marked L1/+ on the terminal block.

b. Connect the neutral (common) power source wire to the position marked L2/- on the terminal block.

c. Connect the ground wire to the position marked on the terminal block.

d. Connect the positive (+) audio source wire to the position marked Aud + on the terminal block.

e. Connect the negative (-) audio source wire to the position marked Aud - on the terminal block.

120 Vac operation

a. Connect the line (hot) power source wire to the position marked L1/+ on the terminal block.

b. Connect the neutral (common) power source wire to the position marked L2/- on the terminal block.

c. Connect the ground wire to the position marked on the terminal block.

d. Connect the positive (+) audio source wire to the position marked Aud + on the terminal block.

e. Connect the negative (-) audio source wire to the position marked Aud - on the terminal block.

24 Vdc Operation

a. Connect the positive (+) power source wire to the position marked L1/+ on the terminal block.

b. Connect the negative (-) power source wire to the position marked L2/- on the terminal block.

c. Connect the ground wire to the position marked on the terminal block.

d. Connect the positive (+) audio source wire to the position marked Aud + on the terminal block.

e. Connect the negative (-) audio source wire to the position marked Aud - on the terminal block.

5. Secure the cover on the terminal box with the four M4 screws. Ensure that the gasket is properly seated to maintain IP rating. Do not overtighten the screws.

Adjusting the Sound Pressure and Audio Input (Ex de)

To set levels for the Ex de models:

1. Unscrew the M3 hex set screw on the side of the housing one full turn.

2. Remove the cover from the housing by turning the cover counterclockwise. Three 120-degree spaced reliefs are provided for a 3/8" spanner wrench if needed. If the cover will not unscrew, back out the set screw a few additional turns.

3. Loosen the captive Phillips screw retaining the driver/printed circuit board (PCB).

4. Slide out the PCB.

Sound Pressure: See Figure 7 on page 7. The 3/4-turn VR1 potentiometer on the PCB is factory set to the maximum sound pressure level (MAX). To reduce the level, turn VR1 counterclockwise to the desired setting.

Audio Input: See Figure 8 on page 7. Two audio input levels are available to match the audio level provided by the peripheral system. To change the level from the factory set 2.8 V_{RMS}, move jumper JP3 to 0.8 V_{RMS}.

5. Insert the PCB into the enclosure and fully tighten the PCB captive screw.

6. Place the cover on the housing and tighten it by turning it clockwise.

7. To ensure O-ring compression, the cover must be fully seated against the housing when the threads are tightened. Turn the M3 set screw on the side of the housing until the screw contacts the housing.

Maintaining the Amplified Speaker

SAFETY MESSAGES TO MAINTENANCE PERSONNEL ⚠ Listed below are some important safety instructions and precautions you should follow:

- Read and understand all instructions before operating this system.
- Repair of flamepaths is not recommended.
- If you acquired a significant quantity of units, it is recommended that spares also be made available.
- To avoid electrical shock hazards, do not connect wires when power is applied. Failure to observe this warning may lead to serious injury or death.
- Any maintenance to the amplified speaker system must be performed by a trained electrician who is thoroughly familiar with all applicable national and local codes in the country of use.
- Any maintenance to the amplified speaker system must be done with power turned off.

- Check the amplified speaker periodically to ensure that the effectiveness of the device has not been reduced because it has been clogged with a foreign substance or because objects have been placed in front of it.
- Never alter the unit in any manner. Safety of the unit may be affected if additional openings or other alterations are made to the internal components or housing.
- The nameplate, which may contain cautionary or other information of importance to maintenance personnel, should NOT be obscured in any way. Ensure that the nameplate remains readable.
- After performing any maintenance, test the amplified speaker system to ensure that it is operating properly.

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

⚠ WARNING

EXPLOSION HAZARD: To prevent ignition of hazardous atmosphere, disconnect the amplified speaker from the supply circuit before opening it. Do not open the amplified speaker in the presence of explosive gases in the atmosphere. Failure to follow this warning may result in serious injury or death.

During the working life of the amplified speaker, it should require little or no maintenance. The non-metallic housing will resist attack by most acids, alkalis, and chemicals and is as resistant to concentrated acids and alkalis as most metal products. However, if abnormal or unusual environment conditions occur due to plant damage or accident, etc., visual inspection of the amplified speaker is recommended.

Cleaning the Enclosure

The enclosure should be cleaned periodically with a damp cloth to maintain maximum sound output. Periodic checks should be made to ensure the effectiveness of this device has not been reduced because the amplified speaker has become clogged with a foreign substance or because objects have been placed in front of the amplified speaker.

Lubricating the Threaded Joints

A silicone-based, non-hardening, chemically compatible grease can be applied if required.

Maintenance and Service

Technical Assistance: Contact our Technical Support Team at +1 708-587-3587 or signalsupport@fedsig.com.

Repair Service: A return authorization is required. Contact your Authorized Distributor or Federal Signal Customer Support. Defective products under warranty will be repaired or replaced at Federal Signal's discretion.

Product Returns: Returns require authorization from Federal Signal. Contact your Authorized Distributor for more information on our return policy or to request a return.

Replacement Parts

Contact the factory for spare parts availability and part numbers. Typical spare parts are listed below. Due to certification, certain component parts are not available for field replacement. Units with this type of damage must be either replaced entirely or returned to Federal Signal for service.

Table 1 Replacement Part

Description	Part Number
Multi-Voltage G-GPA Speaker Kit (Includes PCBAs,Bracket, Driver, & Mounting Screws)	K859501403

Table 2 Accessories

Description	Part Number
Indicator Ring/Legend Kit, Black	G-KIT-RP-BK
Indicator Ring/Legend Kit, Blue	G-KIT-RP-B
Indicator Ring/Legend Kit, Green	G-KIT-RP-G
Indicator Ring/Legend Kit, Magenta	G-KIT-RP-M
Indicator Ring/Legend Kit, Red	G-KIT-RP-R
Indicator Ring/Legend Kit, Yellow	G-KIT-RP-Y
E-Box Endcap with M20 Opening	K859500805-02
E-Box Endcap with M25 Opening	K859500805-01
E-Box Cover Assembly (Includes two terminal blocks, mounting plate, retention hardware)	K859501414
In-Line E-Box Coupler Kit	G-KIT-EC180
90-Degree E-Box Coupler Kit	G-KIT-EC90
Extension Box Spacer Kit	G-KIT-EXTB
Single Trunnion Kit	G-KIT-ST
Dual Trunnion Kit	G-KIT-DT
Adapter, M20 Male to 1/2" Female NPT	K231246A
Adapter, M20 Male to 3/4" Female NPT	K231247
15 W Audible Acoustic Insert	G-KIT-15WINSERT

Table 3 Choosing cable-entry devices for Equipment in Potentially Explosive Atmospheres

Models Ex	Atmospheres	Cable Entry Devices (cable glands, stopping plugs, etc.)
G-SPA-XXX-D (Ex db surface mount)	Gas	Cable entry devices shall be equipment certified as flameproof. To maintain the ingress protection of the flameproof amplified loudspeaker enclosure, we recommend the cable entry device be IP66 certified.
G-SPA-XXX-E (Ex db e surface mount)	Gas	For the flameproof amplified loudspeaker enclosure, cable entry devices shall be equipment certified as flameproof. To maintain the ingress protection of the flameproof amplified loudspeaker enclosure, we recommend the cable entry device be IP66 certified. For the increased safety terminal enclosures (terminal boxes), cable entry devices shall be equipment certified as increased safety and shall maintain an IP rating of IP54.
G-SPA-XXX-D (Ex db surface mount) G-SPA-XXX-E (Ex db e surface mount)	Dust	Cable entry devices for the terminal enclosures shall be equipment certified as dust protected. To maintain the ingress protection of the amplified loudspeaker and terminal enclosures, the cable entry devices shall be IP6X certified.

FEDERAL SIGNAL
Safety and Security Systems

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Additional translations available at signaling.fedsig.com
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