



FEDERAL SIGNAL
Safety and Security Systems
Protecting people and our planet

G-Series Modular Platform Audible and Visual Product Family



Application Guide for Product Installation and Configuration

850000454

Rev: A0

Printed in U.S.A.

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A. Scope

This document is intended to be used by internal technical support, sales personnel, and outside design and engineering resources responsible for the planning of future G-Series product installations. It documents what feature options are available for various product configurations, and details field wire termination for various applications. This document is intended to supplement the instruction manuals for the various signals (reference the Applicable and/or Referenced Documents section for specific document identification)

B. Applicable and/or Referenced Documents

The documents listed below pertain in some way to the design, construction, sourcing, testing, or performance of the G-Series Audible and Visual Product Family:

1. Instruction Manuals

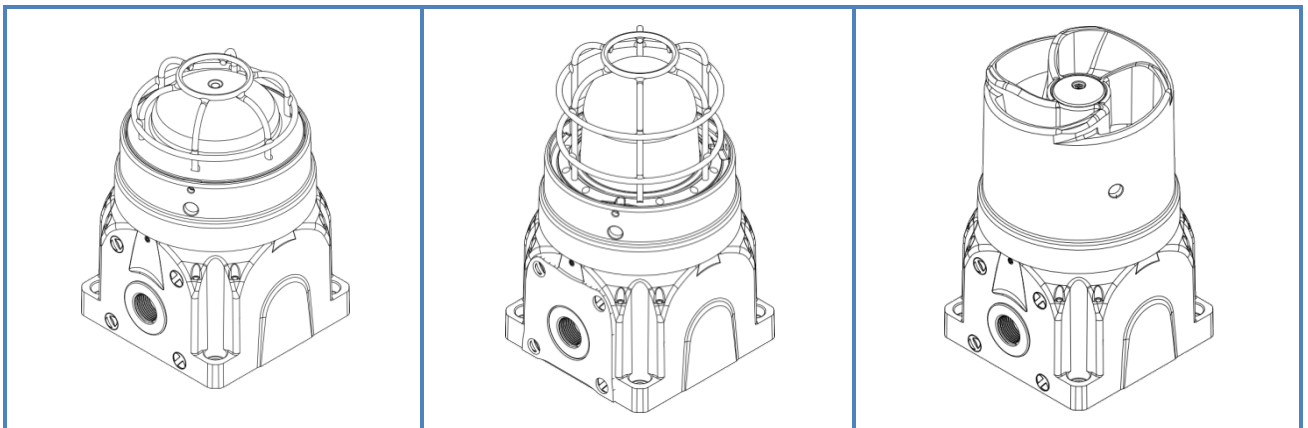
- 25500186 Instruction Manual, G-Series LED (G-LED)
- 25500187 Instruction Manual, G-Series Sounder (G-SND)
- 25500188 Instruction Manual, G-Series Amplified Speaker (G-SPA)
- 25500189 Instruction Manual, G-Series Loudspeaker (G-SPK)
- 25500185 Instruction Manual, G-Series Strobe (G-STR)
- 25500259 Instruction Manual, G-Series Multi-Signal Fixtures, Accessories, and Service Parts

2. Scheduled Drawings

- 850000297 Final Assembly, G-Series LED (G-LED)
- 850000298 Final Assembly, G-Series Sounder (G-SND)
Final Assembly, G-Series Amplified Speaker (G-SPA)
Final Assembly, G-Series Loudspeaker (G-SPK)
- 850000296 Final Assembly, G-Series Strobe (G-STR)
- 850000301 Final Assembly, G-Series eBox Option
- 850000302 Final Assembly, G-Series eBox Configuration Options
- 850000299 Sub-Assembly, G-Series Visual Cap Strobe
- 850000300 Sub-Assembly, G-Series Visual Cap LED
- 850000310 Sub-Assembly, G-Series Audible Cap
- 850000305 Nameplate, G-Series Visual Strobe (G-STR)
- 850000306 Nameplate, G-Series Visual LED (G-LED)
- 850000307 Nameplate, G-Series Audible Sounder (G-SND)
- 850000308 Nameplate, G-Series Audible Amplified Speaker (G-SPA)
- 850000309 Nameplate, G-Series Audible Loudspeaker (G-SPK)

C. About the Federal Signal G-Series Modular Platform

The G-Series Modular Platform is a highly versatile and rugged collection of effective and compact audible and visual signaling devices, constructed with non-metallic material and stainless steel hardware and accessories. Each product can be further customized with colored indicator rings (simulating a painted product), legend plates (for custom application labeling) and a variety of field termination and entry options. The can be surface mounted using the M6 holes in the base, or suspended from the mounting surface with a trunnion bracket and positioned to target a specific area. In addition, all G-Series devices can be combined together to form application-specific alerting modules, simplifying field wiring and increasing coherence of the over-all alarm and alerting system. Several combinations are available directly from the factory.



G-Series LED

G-Series Strobe

G-Series Amp/Speaker/Sounder

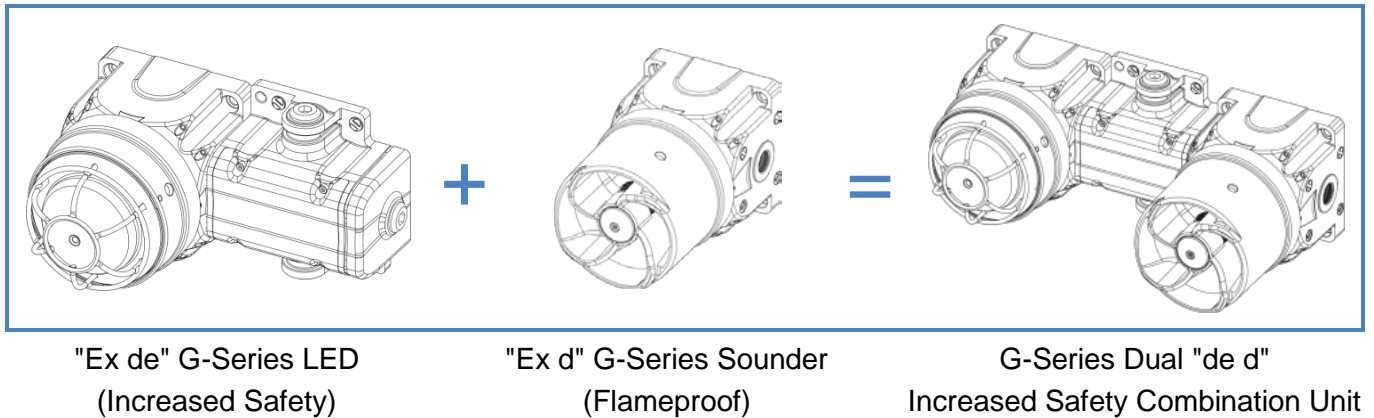


G-Series Indicator Ring

G-Series Legend Plate

G-Series Trunnion Mount

All G-Series Modular Platform products comes from the factory in three (3) standard enclosure varieties: "Ex d", "Ex de", and Dual "de d" units. The flameproof "Ex d" versions come standard with two (2) M20 entries for field cable gland connections. The increased safety "Ex de" versions include a separate terminal chamber for quick field termination, pass-through wiring, and accept three (3) M20 entries in a standard configuration. An optional flanged end cap for coupling an additional increased safety "Ex de" is also available. Two G-Series units can be combined into a Dual "de d" device. This assembly will accept two (2) M20 entries in a standard configuration. G-Series Dual "de d" devices are only available from the factory.



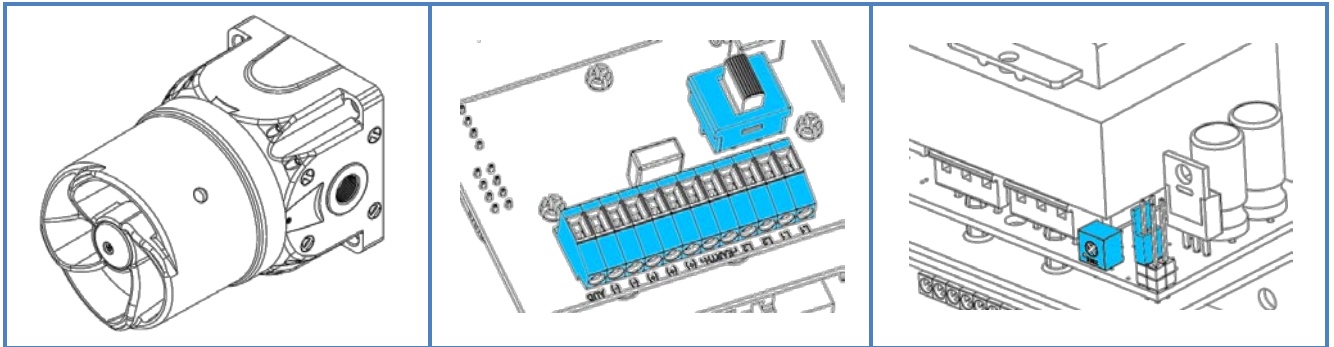
D. Audible Products

1. Amplified Loudspeaker

a. Feature Set

1. Multi-voltage input with loop-out terminal positions
 - AC or DC (selection based on field termination location)
 - 120VAC or 230VAC (selector switch)
2. Input audio terminals
 - 0.8V_{RMS} or 2.8V_{RMS} input levels (jumper selectable)
3. Cable Entries
 - Flameproof "Ex d": 2 x M20 entries (opposing sides)
 - Increased Safety "Ex de": 3 x M20 entries (opposing sides and base)
 - Dual "de d" Combination Devices: 2 x M20 entries (opposing sides)

b. Installing and Wiring the Flameproof "Ex d" Housing



III 1-1

Amplified Loudspeaker 'd'

III 1-2

Terminal Block and AC Switch

III 1-3

Volume and Input Level Jumper

Connection	Locations	Description
1 L1	2	AC Power ("Hot/L1")
2 L2	2	AC Return ("Neutral/L2")
3 EARTH	2	Earth Ground Termination Point
4 (+)	3	DC Power ("+")
5 (-)	2	DC/Audio Return ("-")
6 AUD	1	Input Audio
	12	

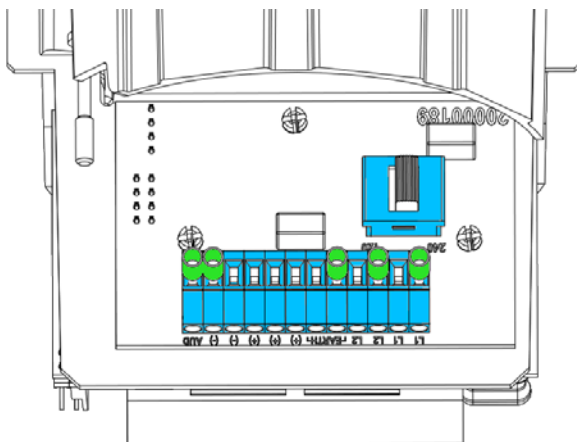
SW1 Position	Description
1 120	Amplifier is configured to operate at 110VAC-120VAC
2 230	Amplifier is configured to operate at 220VAC-240VAC (Factory Set)

JP1 Position	Description
1	0.8 Amplifier configured to amplify standard line-level audio ($0.8V_{RMS}$)
2	2.8 Amplifier configured to amplify ECHO product audio ($2.8V_{RMS}$) (Factory Set)

Wiring the G-Series Amplified Loudspeaker "Ex d" housing for AC power requires five (5) conductors: three (3) for input power (with an earth conductor) and two (2) for input audio and return (twisted pair recommended). In DC products, the audio return and input power return can be commonized, which reduces the conductor requirement to four (4). The G-Series Amplified Loudspeaker is factory set to the 230VAC position.

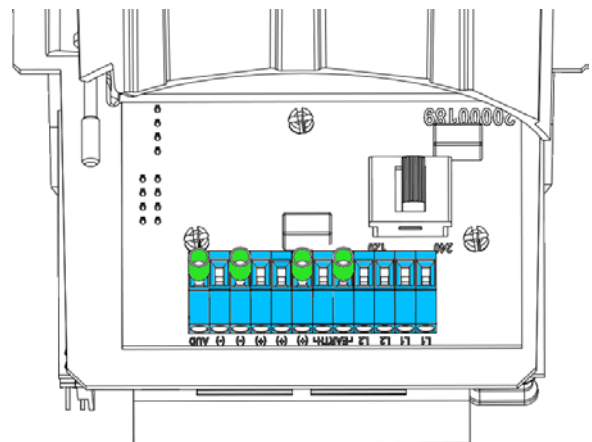
To change the AC input power

1. Locate the power configuration switch (SW1) on the connector PCBA (see III 1-2 on page 7)
2. Slide the switch to "120" for 120VAC power, and "240" for 220-240VAC



III 1-4

230VAC Amplified Loudspeaker
Typical Field Wiring Locations



III 1-5

24VDC Amplified Loudspeaker
Typical Field Wiring Locations

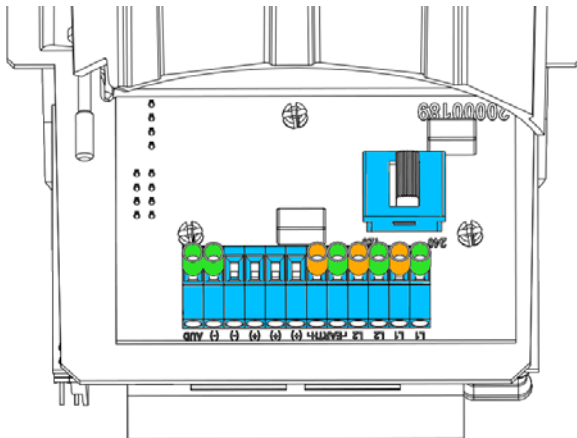
The G-Series Amplified Loudspeaker includes a volume potentiometer (located on the transformer PCBA) that allows for field adjustment of the output level (see III 1-3 on page 7). While the G-Series Amplified Loudspeaker is shipped from the factory at full volume, field reduction of the output level might be required or desired in certain applications.

To adjust the sound output level

1. Locate the volume potentiometer (VR1) on the connector PCBA (see III 1-3 on page 7)
2. Rotate the dial on the volume potentiometer counter-clockwise to reduce the volume (or clockwise to increase the volume).

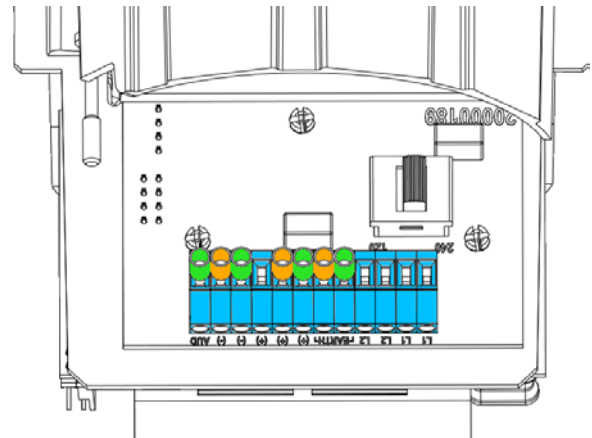
While the G-Series Amplified Loudspeaker allows for loop-in and loop-out power connections through the "Ex d" housing, it does not support loop-in and loop-out of the audio signal. Wiring line-level audio connections in parallel over long distances degrades the quality and perceptibility of the audio signal, and as such the G-Series Amplified Loudspeaker does not support audio signal looping.

If a nearby product requires AC or DC power loop-through, the G-Series Amplified Loudspeaker's "Ex d" housing supports power loop-out field termination. As the "Ex d" housing provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 1-6

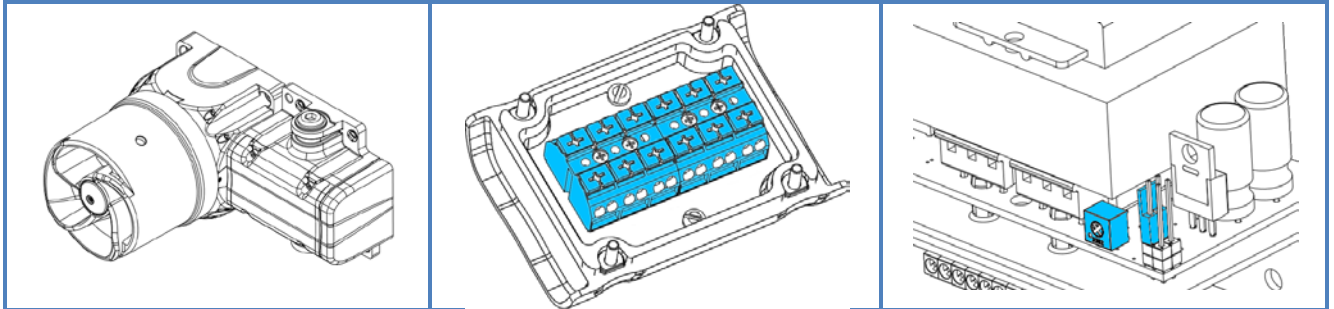
230VAC Amplified Loudspeaker
Wiring with Power Loop-Out



III 1-7

24VDC Amplified Loudspeaker
Wiring with Power Loop-Out

c. Installing and Wiring the Increased Safety "Ex de" Housing



III 1-8

"Ex de" Amplified Loudspeaker

III 1-9

"Ex de" Terminal Block

III 1-10

Volume and Input Level Jumper

Connection	Locations	Description
1 L1	2	AC Power ("Hot/L1")
2 L2	2	AC Return ("Neutral/L2")
3 EARTH	2	Earth Ground Termination Point
4 (+)	3	DC Power ("+")
5 (-)	2	DC/Audio Return ("-")
6 AUD	1	Input Audio
	12	

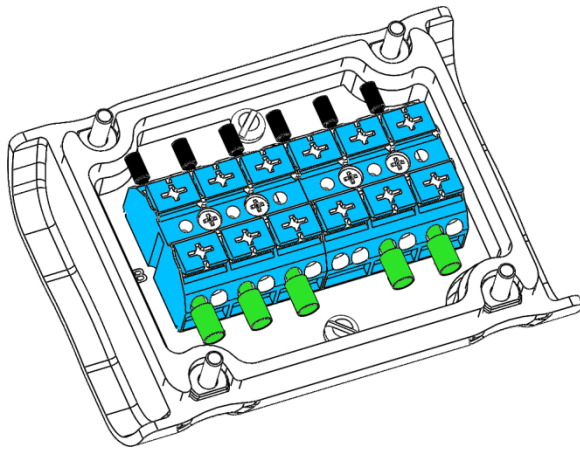
SW1 Position Description

1	120	Amplifier is configured to operate at 110VAC-120VAC
2	230	Amplifier is configured to operate at 220VAC-240VAC (Factory Set)

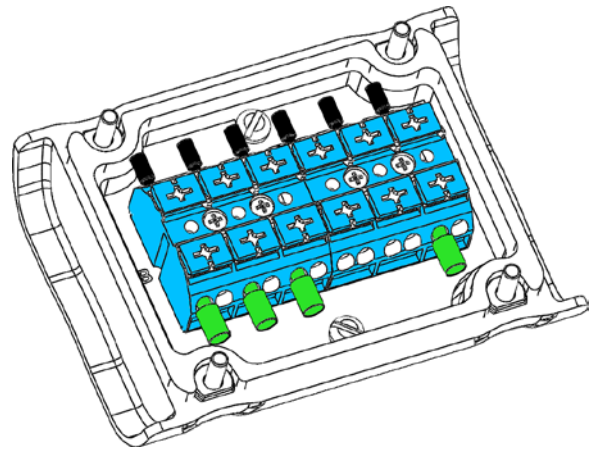
JP1 Position Description

1	0.8	Amplifier is configured to amplify standard line-level audio ($0.8V_{RMS}$)
2	2.8	Amplifier is configured to amplify ECHO product-level audio ($2.8V_{RMS}$)

Wiring the G-Series Amplified Loudspeaker "Ex de" terminal chamber for AC power requires five (5) conductors: three (3) for input power (with an earth conductor) and two (2) for input audio and return (twisted pair recommended). In DC products, the audio return and input power return can be commonized, which reduces the conductor requirement to four (4). The G-Series Amplified Loudspeaker setup and wiring within the "Ex de" terminal chamber is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.



III 1-11
230VAC Amplified Loudspeaker
Wiring Locations



III 1-12
24VDC Amplified Loudspeaker
Wiring Locations

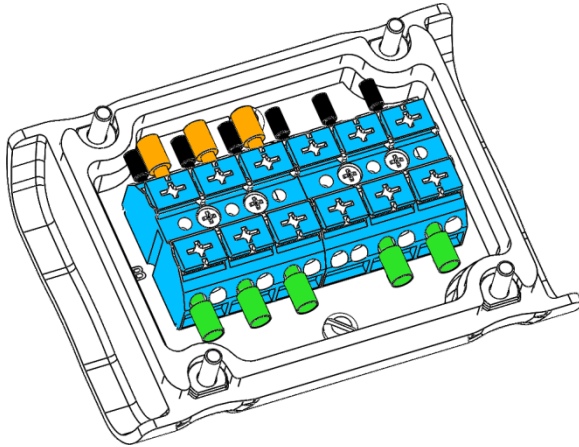
The G-Series Amplified Loudspeaker includes a volume potentiometer (located on the transformer PCBA) that allows for field adjustment of the output level (see III 1-10 on page 10). While the G-Series Amplified Loudspeaker is shipped from the factory at full volume, field reduction of the output level might be required or desired in certain applications.

To adjust the sound output level

1. Locate the volume potentiometer (VR1) on the connector PCBA (see III 1-3 on page 7)
2. Rotate the dial on the volume potentiometer counter-clockwise to reduce the volume (or clockwise to increase the volume).

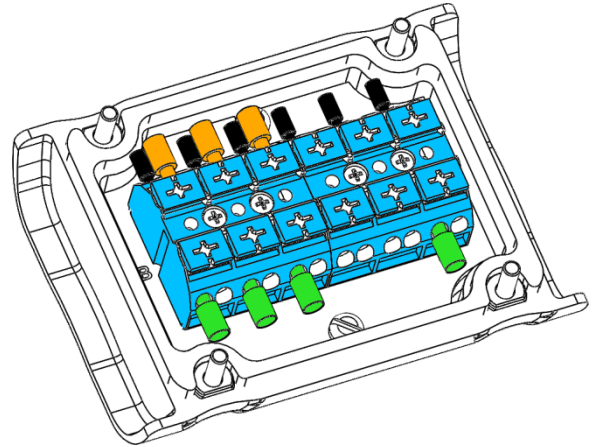
While the G-Series Amplified Loudspeaker allows for loop-in and loop-out connections through the "Ex de" terminal chamber, loop-in and loop-out of the audio signal is not recommended. Wiring line-level audio connections in parallel over long distances degrades the quality and perceptibility of the audio signal.

If a nearby product requires AC or DC power loop-through, the G-Series Amplified Loudspeaker "Ex de" terminal chamber supports power loop-out field termination. As the "Ex de" terminal chamber provides three (3) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry, or that input cabling occupies two entries but only one entry is required for loop-out cabling, before architecting a loop-in/loop-out topology.



III 1-13

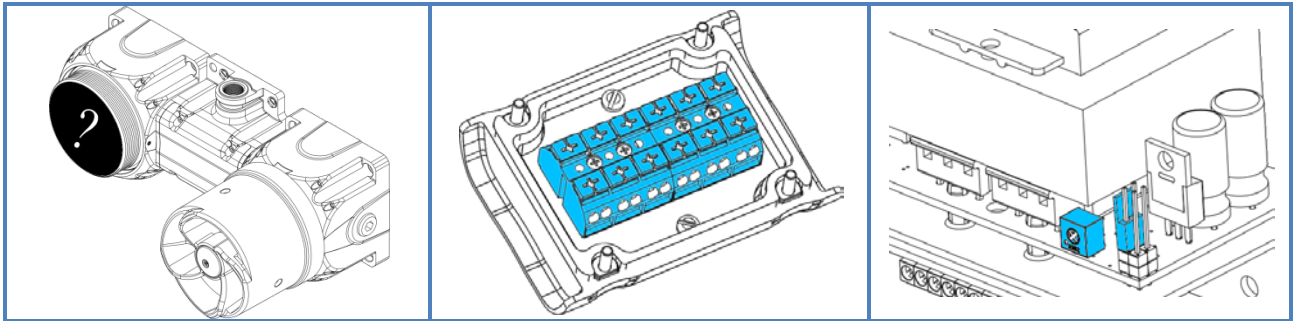
230VAC Amplified Loudspeaker
Wiring Locations with Power Loop-Out



III 1-14

24VDC Amplified Loudspeaker
Wiring Locations with Power Loop-Out

d. *Installing and Wiring Dual "de d" Combination Unit Housings*



III 1-15

Amplified Loudspeaker (AL)
and Unspecified Device (UD)

III 1-16

Dual "de d" Terminal Block
(Common Between Devices)

III 1-17

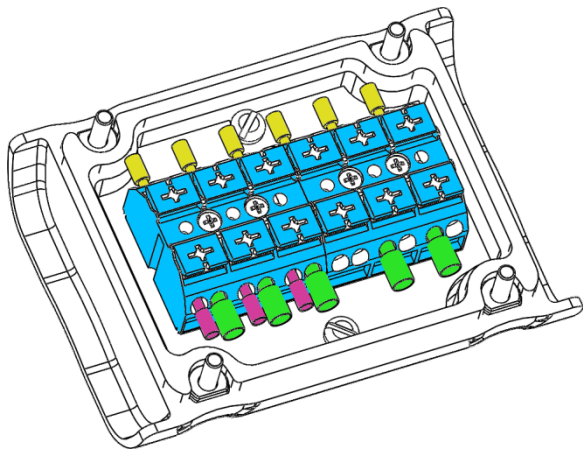
Volume and Input Level
Jumper (AL Only)

	Connection	Locations	Description
1	L1/+	4	Input Power In ("Hot/L1/DC+")
2	L2/-	4	Input Power Return ("Neutral/L2/DC-")
3	⊕	4	Earth Ground Termination Point
4	L3/Alt+	4	Secondary Power In ("Hot/L3/DC+")
5	Aud+	4	Input Audio
6	Aud-	4	DC/Audio Return ("-")
		24	

G-Series combination devices require wiring practices dependent on the devices combined. When combining the G-Series Amplified Loudspeaker with other audible or visual products, the Amplified Loudspeaker occupies a majority of the available terminal locations. As a result, the input power to the combination device must be shared between the two devices. This constrains the combination device to the following operation:

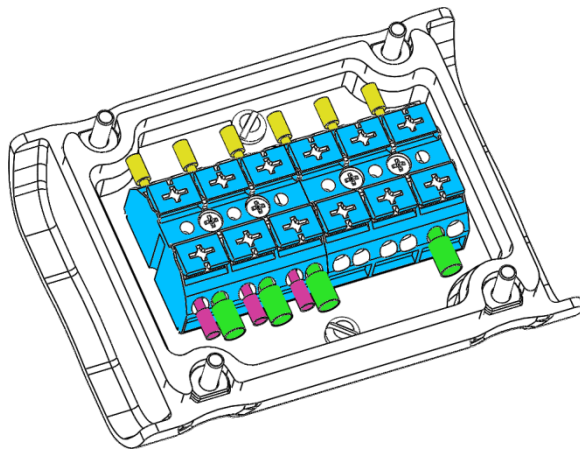
1. The combination device must be energized as a whole
2. The Unspecified Device (UD) can be deployed independently if audio is withheld from the amplified loudspeaker (AL)
3. Applying an audio signal to the combination device will deploy both the Unspecified Device (UD) and the amplified loudspeaker (AL)

Wiring a G-Series Amplified Loudspeaker Dual "de d" Terminal Chamber for AC power in the requires five (5) conductors: three (3) for input power (with an earth conductor) and two (2) for input audio and return (twisted pair recommended). In DC products, the audio return and input power return can be commonized, which reduces the conductor requirement to four (4). The G-Series Amplified Loudspeaker setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.



III 1-18

230VAC Dual-Unit with Amplified Loudspeaker
(AL) Wiring Locations

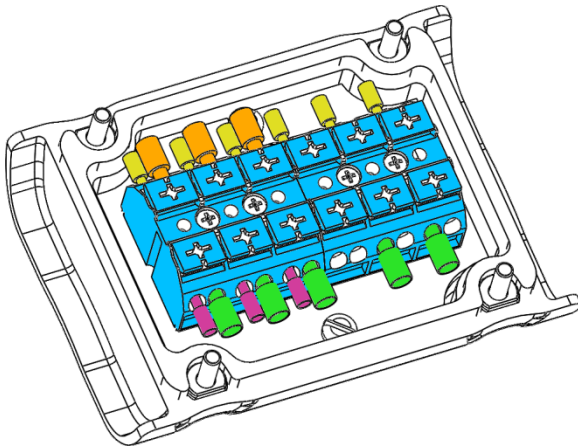


III 1-19

24VDC Dual-Unit with Amplified Loudspeaker
(AL) Wiring Locations

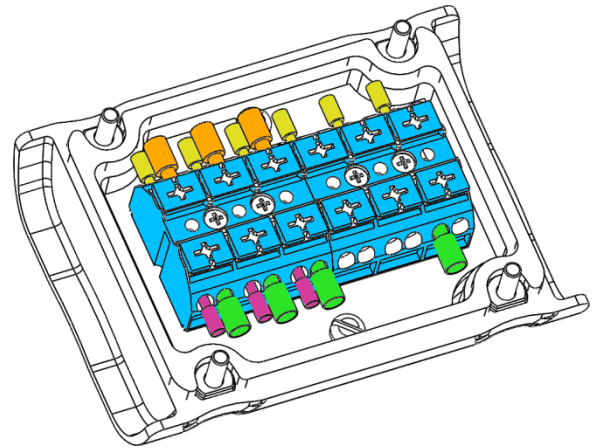
While G-Series combination units allow for loop-in and loop-out connections through the Dual "de d" Terminal Chamber, loop-in and loop-out of the audio signal is not recommended. Wiring line-level audio connections in parallel over long distances degrades the quality and perceptibility of the audio signal.

If a nearby product requires AC or DC power loop-through, the G-Series Dual "de d" Terminal Chamber supports power loop-out field termination. As the terminal chamber provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 1-20

230VAC Dual-Unit with Amplified Loudspeaker
(AL) Wiring with Power Loop-Out



III 1-21

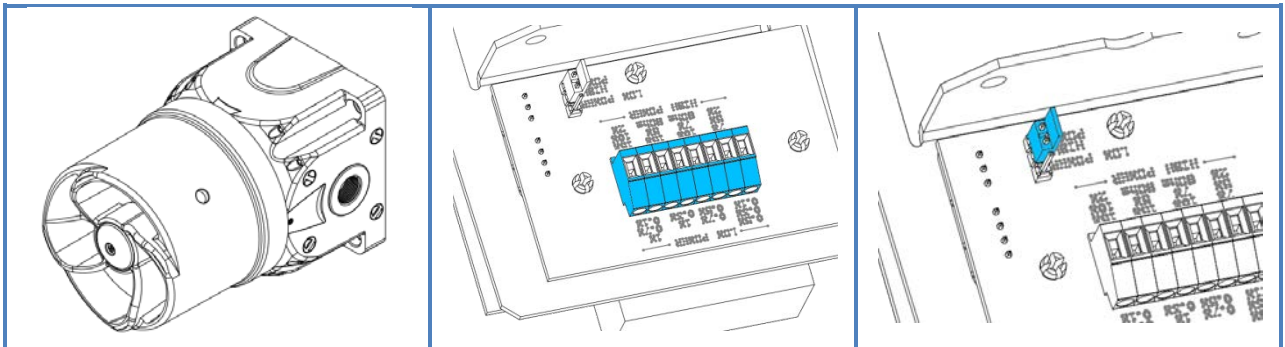
24VDC Dual-Unit with Amplified Loudspeaker
(AL) Wiring with Power Loop-Out

2. Loudspeaker

a. Feature Set

1. 70V_{RMS} and 100V_{RMS} models
 - Loop-In and Loop-Out terminal positions
 - Five (5) tapping positions at two (2) power levels for local level attenuation
 - **High Power:** 15W, 10W, 7W, 5W, 2W
 - **Low Power:** 1W, 0.7W, 0.5W, 0.2W, 0.1W
2. Cable Entries
 - Flameproof "Ex d": 2 x M20 entries (opposing sides)
 - Increased Safety "Ex de": 3 x M20 entries (opposing sides and base)
 - Dual "de d" Combination Devices: 2 x M20 entries (opposing sides)

b. Installing and Wiring the Flameproof "Ex d" Housing



III 2-1

Loudspeaker 'd'

III 2-2

Terminal Block

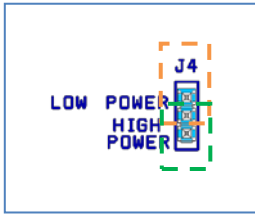
III 2-3

Power Level Jumper (JP1)

Connection	Locations	Description
1	"1"	2 Available Taps: 7W/5W/2W or 0.5W/0.3W/0.1W
2	"2"	2 Available Taps: 10W/7W or 0.7W/0.5W
3	"3"	2 Available Taps: 15W/5W or 1.0W/0.3W
4	"4"	2 Available Taps: 15W/10W/2W or 1.0W/0.7W/0.1W
	8	

JP4 Position	Description
1 High Power	The high-power taps are available on the terminal block J3 (Factory Set)
2 Low Power	The low-power taps are available on the terminal block J3

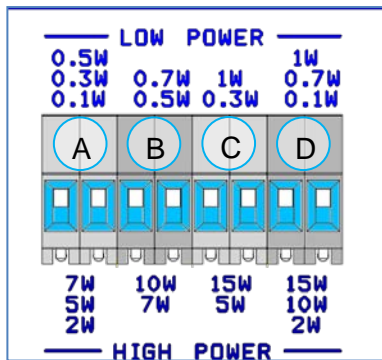
Wiring the G-Series Loudspeaker "Ex d" housing requires two (2) conductors terminated at the desired power tap locations. To run multiple tap connections to an external junction box (eg: for remote taping or selective attenuation), terminate four (4) wires to each of the four (4) positions on the terminal block.



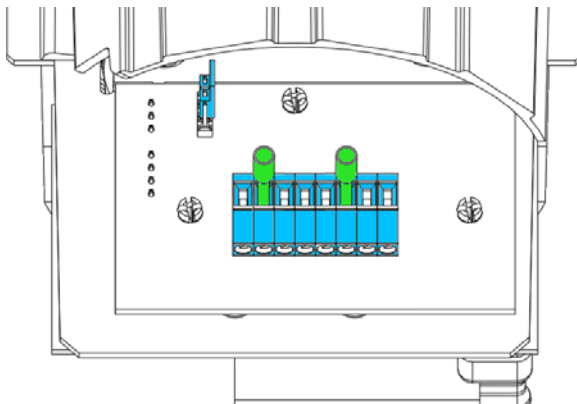
When choosing a power level to operate the G-Series Loudspeaker:

- Choose "LOW POWER" with JP4 to access the lower power taps
- Choose "HIGH POWER" with JP4 to access the higher power taps
- The G-Series Loudspeaker is factory-set to "HIGH POWER"

When selecting a single tap level:

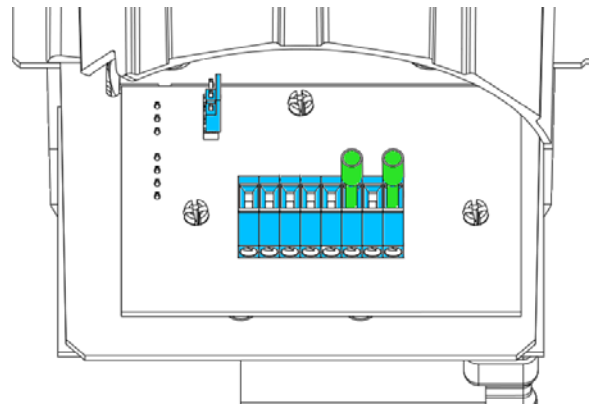


- Choose either "HIGH" or "LOW" power level (using JP4)
- Terminate each of the two (2) conductors in terminal positions matching the desired power level
 - **Example 1:** To drive the speaker output at 10W levels, first set JP4 to "HIGH POWER", then terminate one of the audio conductors to position "B", and the other to position "D"
 - **Example 2:** To drive the speaker output at 0.5W levels, first set JP4 to "LOW POWER", then terminate one of the audio conductors to position "A", and the other to position "B"



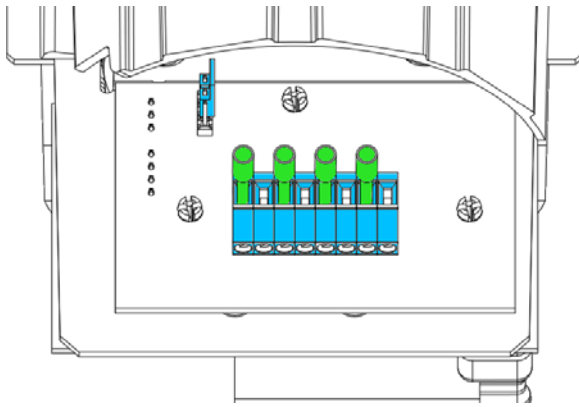
III 2-4

10W Field Wiring Location
(70V_{RMS} or 100V_{RMS})



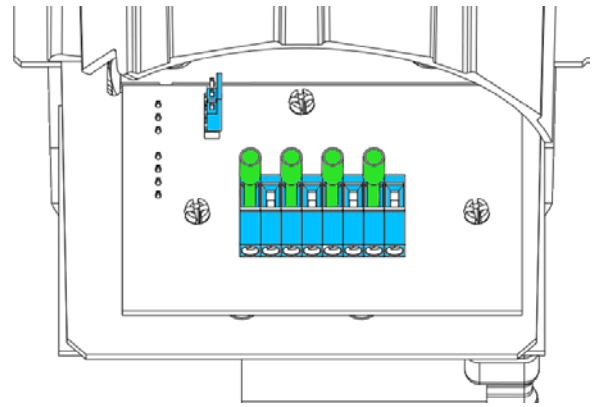
III 2-5

0.5W Field Wiring Location
(70V_{RMS} or 100V_{RMS})



III 2-6

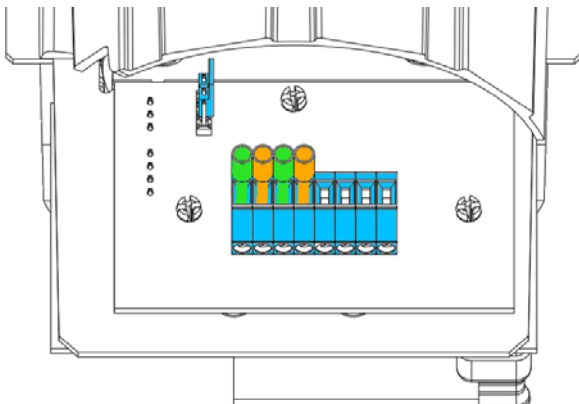
Loudspeaker Wired for Remote Tapping
(High Power, 70V_{RMS} or 100V_{RMS})



III 2-7

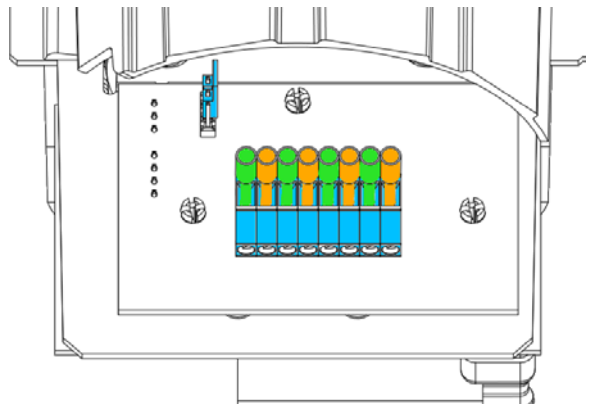
Loudspeaker Wired for Remote Tapping
(Low Power, 70V_{RMS} or 100V_{RMS})

The G-Series Loudspeaker allows for loop-in and loop-out connections through "Ex d" housing, where connecting another G-Series Loudspeaker assembly or loop-back supervision is desired or required. As the "Ex d" housing provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 2-8

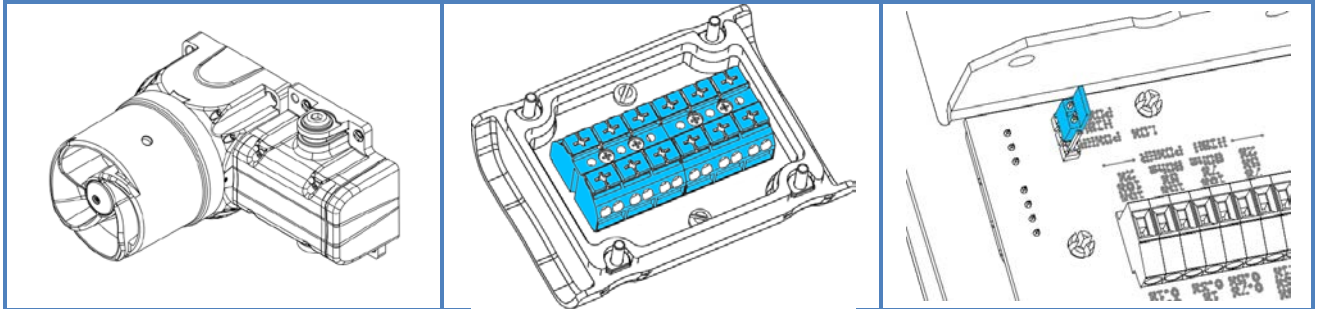
15W Loudspeaker Wiring Location
(Loop-In/Loop-Out, 70V_{RMS} or 100V_{RMS})



III 2-9

Loudspeaker Wired for Remote Tapping
(Loop-In/Loop-Out, High Power,
70V_{RMS} or 100V_{RMS})

c. *Installing and Wiring the Increased Safety "Ex de" Housing*



III 2-10

"Ex de" Loudspeaker

III 2-11

"Ex de" Terminal Block

III 2-12

Power Level Jumper (JP1)

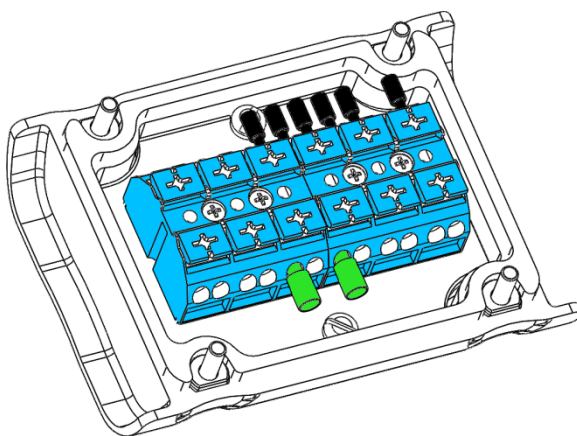
Connection	Locations	Description
1	L1/+	4 (Not Used)
2	L2/-	4 (Not Used)
3	Alt1	4 Available Taps: 15W/10W/2W or 1.0W/0.7W/0.1W (Position "D")
4	Alt2	4 Available Taps: 15W/5W or 1.0W/0.3W (Position "C")
5	Alt3	4 Available Taps: 10W/7W or 0.7W/0.5W (Position "B")
6	Alt4	4 Available Taps: 7W/5W/2W or 0.5W/0.3W/0.1W (Position "A")

24

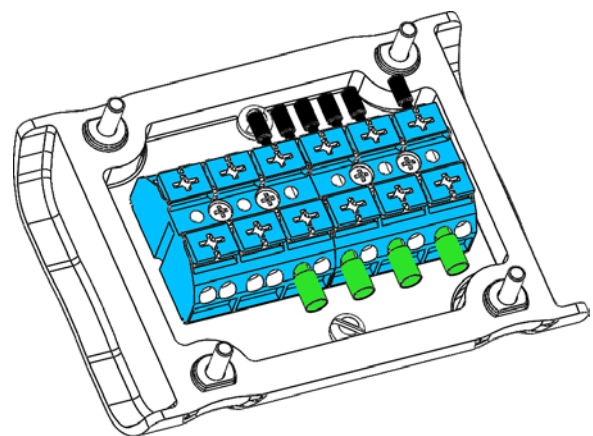
JP4 Position Description

- 1 High Power The high-power taps are available on the terminal block (Factory Set)
- 2 Low Power The low-power taps are available on the terminal block

Wiring the G-Series Loudspeaker "Ex de" terminal chamber requires two (2) conductors terminated at the desired power locations. To run multiple tap connections to an external junction box (for remote tapping or selective attenuation), terminate four (4) wires to each of the 4 positions on the terminal block.



III 2-13

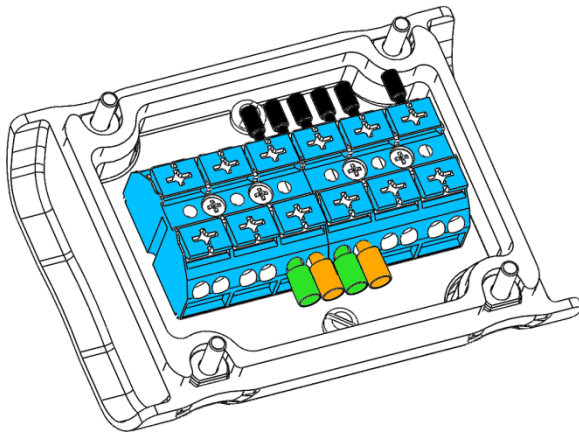


III 2-14

15W Loudspeaker Wiring Location
(70V_{RMS} OR 100V_{RMS})

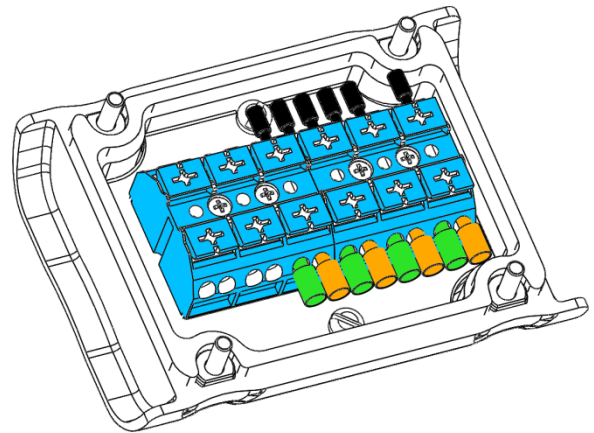
Loudspeaker Wired for Remote Tapping
(70V_{RMS} OR 100V_{RMS})

The G-Series Loudspeaker allows for loop-in and loop-out connections through the "Ex de" terminal chamber, where connecting another G-Series Loudspeaker assembly or loop-back supervision is desired or required. As the terminal chamber provides three (3) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry, or that input cabling occupies two entries but only one entry is required for loop-out cabling, before architecting a loop-in/loop-out topology.



III 2-15

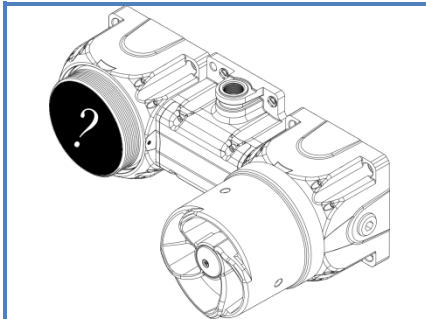
15W Loudspeaker Wiring Location
(Loop-In/Loop-Out, 70V_{RMS} OR 100V_{RMS})



III 2-16

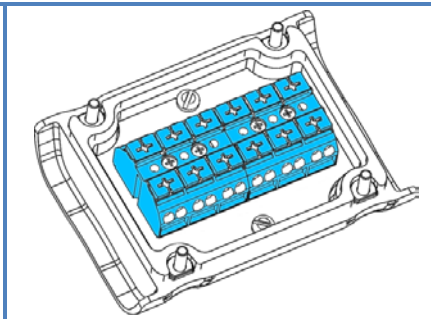
Loudspeaker Wired for Remote Tapping
(Loop-In/Loop-Out, 70V_{RMS} OR 100V_{RMS})

d. Installing and Wiring Dual "de d" Combination Unit Housings



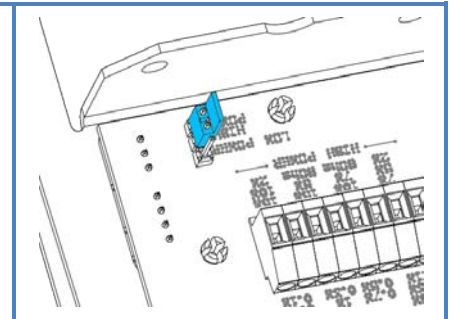
III 2-17

Loudspeaker (LD) and
Unspecified Device (UD)



III 2-18

Dual "de d" Terminal Block
(Common Between Devices)



III 2-19

Audio Level Jumper
(Specific to Loudspeaker)

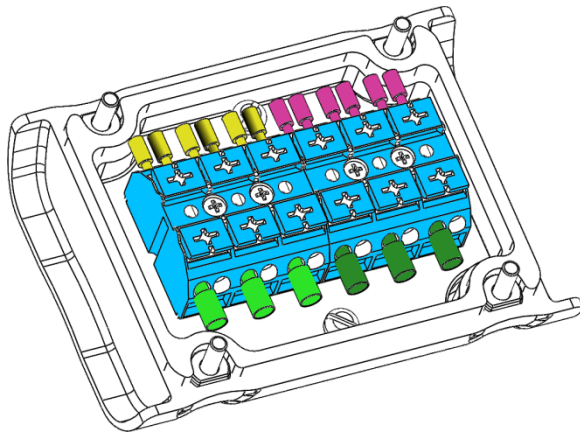
Connection Locations Description

1	L1/+	4	(Reserved for secondary device)
2	L2/-	4	(Reserved for secondary device)
3	Alt1	4	(Reserved for secondary device)
4	Alt2	4	Available Taps: 15W/10W or 1.0W/0.7W (Position "D")
5	Alt3	4	Available Taps: 15W or 1.0W (Position "C")
6	Alt4	4	Available Taps: 10W or 0.7W (Position "B")
		24	

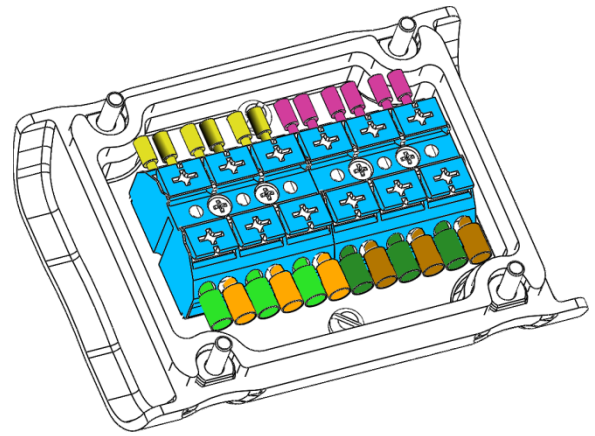
G-Series combination devices require wiring practices dependent on the devices combined. When combining the G-Series Loudspeaker with other audible or visual products, the Loudspeaker can occupy either the first or the second half of the Dual "de d" terminal block (depending on the second device (UD) type); the remaining half is dedicated to powering the Unspecified Device (UD). This constrains the combination device to the following operation:

1. The G-Series Loudspeaker (LD) leaves the factory with the 15W and 10W taps available in the terminal chamber
 - a. These taps are available for remote selection
 - b. The additional tap levels are available, but the "Ex d" housing wiring must be re-configured
 - c. The low power levels are available, but JP4 on the PCBA in the "Ex d" housing must be re-configured
 - i. Moving JP4 from "HIGH POWER" to "LOW POWER" in the field will make available the 1.0W and 0.7W taps on the "Ex de" terminal block without additional rewiring
2. The Unspecified Device (UD) can be energized independently of the G-Series Loudspeaker (LD)

Wiring a G-Series Dual "de d" terminal chamber for use with a Loudspeaker (LD) as one of the two devices requires six (6) conductors. If the Unspecified Device (UD) requires AC or DC power to function, three (3) conductors are required for input power (with an earth conductor), leaving three (3) for the Loudspeaker (LD) audio. If the Unspecified Device (UD) is an additional Loudspeaker, the terminal chamber wiring will be duplicated. The Loudspeaker cannot be combined with an Amplified Loudspeaker. The product setup and wiring within "Ex d" housing of both devices is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.



III 2-20
Dual-Unit (LD) Wiring Configuration
100V_{RMS} or 70V_{RMS}



III 2-21
Dual-Unit (LD) Power and Remote Tapping
(Loop-In/Loop-Out, 70V_{RMS} or 100V_{RMS})

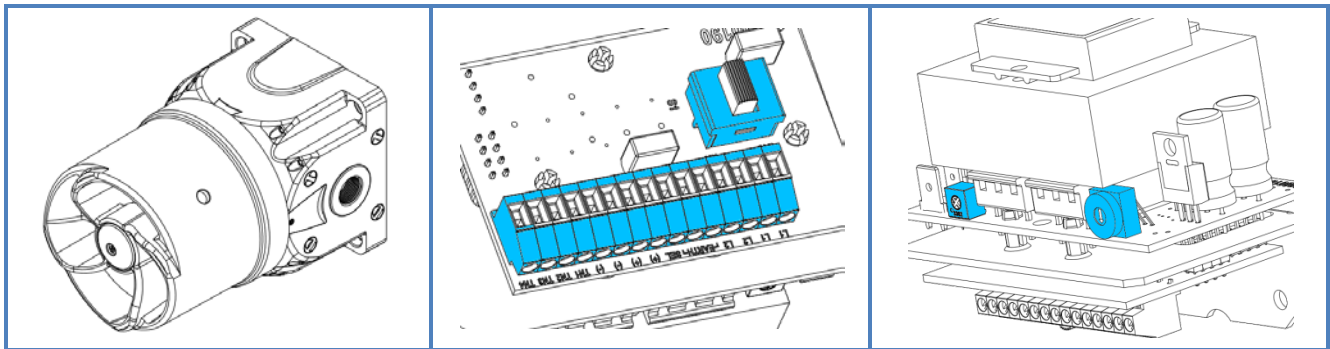
G-Series Combination Devices allow for loop-in and loop-out connections through the Dual "de d" terminal chamber, intended for connecting to other G-Series combination units or other G-Series products and assemblies. As with the other G-Series devices, if a near-by product requires AC or DC power loop-through (and if the Unspecified Device (UD) uses AC or DC power), the G-Series Dual "de d" terminal chamber supports power loop-out connection from the Unspecified Device's (UD) input power connection. In addition, should the application require connecting another G-Series Loudspeaker or Loudspeaker assembly, or loop-back supervision is desired or required, the terminal chamber allows for Loudspeaker audio loop-out. As the G-Series "Ex d" terminal chamber provides two (2) M20 entries for cable passage, at least one entry must be dedicated for all incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.

3. Sounder

a. Feature Set

1. Multi-voltage input with loop-out terminal positions
 - o AC or DC (selection based on field termination location)
 - o 120VAC or 230VAC (selector switch)
2. 15 On-board tones
 - o Single-tone selection with operation on power-up
 - o Remote tone selection of all 15 on-board tones possible
 - o Output attenuation adjustment for all on-board tones
3. Cable Entries
 - o Flameproof "Ex d": 2 x M20 entries (opposing sides)
 - o Increased Safety "Ex de": 3 x M20 entries (opposing sides and base)
 - o Dual "de d" Combination Devices: 2 x M20 entries (opposing sides)

b. Installing and Wiring the Flameproof "Ex d" Housing



III 3-1

"Ex d" Sounder

III 3-2

Terminal Block and AC Switch

III 3-3

Level Adjust and Tone Selection

Connection	Locations	Description
1 L1	2	AC Power ("Hot/L1")
2 L2	2	AC Return ("Neutral/L2")
3 EARTH	2	Earth Ground Termination Point
4 SEL	1	Contact voltage for remote tone selection
5 (+)	2	DC Power ("+")
6 (-)	2	DC Return ("-")
7 T1-T4	4	Remote tone selection termination points
	15	

SW1 Position Description

1	120	Amplifier is configured to operate at 110VAC-120VAC
2	230	Amplifier is configured to operate at 220VAC-240VAC (Factory Set)

HEX SW	Freq. Range	SEL ¹	Terminal Wiring				Description	
			T4	T3	T2	T1		
-	0	--					Off (Use for remote access to all tones)	
1	1	588-714	x				x	Tone Up
2	2	600-700	x			x		Sweep Up (High)
3	3	1000-1400	x			x	x	Pulse Up
4	4	700	x		x			Tone (Low)
5	5	--	x		x		x	Bell
6	6	1200-1600	x		x	x		Sweep Down (High)
7	7	1000-700	x		x	x	x	Pulse Down
8	8	700	x	x				Pulse (Low)
9	9	400-1600	x	x			x	Sweep Bounce
10	A	500-770	x	x		x		Sweep Up (Low)
11	B	1000	x	x		x	x	Pulse (High)
12	C	1000	x	x	x			Tone (High) (Factory default)
13	D	700-500	x	x	x		x	Tone Down
14	E	1000-1400	x	x	x	x		Warble
15	F	1200-400	x	x	x	x	x	Sweep Down (Low)
Conductor Sum²:			+	+	+	+	=	
Common Sum³:				+	+	+	=	

Wiring the G-Series Sounder "Ex d" housing to play a single tone on AC or DC power requires three (3) conductors for input power (with an earth conductor). Wiring the G-Series Sounder "Ex d" housing for remote tone selection on AC power requires a minimum of six (6) conductors; the full range of tones can be accessed with eight (8) conductors. Wiring the G-Series Sounder "Ex d" housing for remote tone selection on DC power requires a minimum of four (4) conductors; the full range of tones can be accessed with six (6) conductors. The G-Series Sounder is factory set to the "C" tone position (1kHz steady), and the power switch is set to the 230VAC position.

To change the AC input power

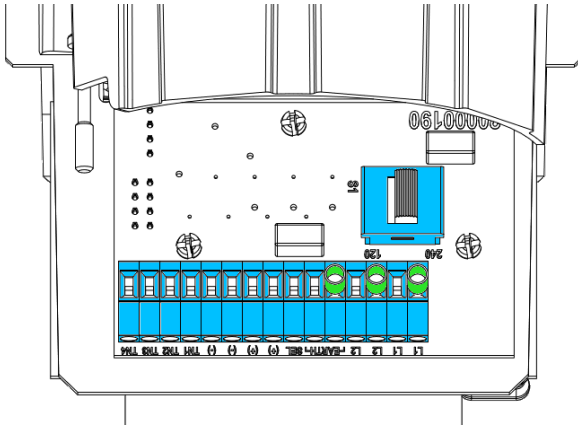
1. Locate the power configuration switch (SW1) on the connector PCBA (see Ill 3-2 on page 23)

¹ Select line ("SEL") required to make tone selections with sounders powered from AC voltage; loop back to T1/T4 through a contact closure to select a tone

² Use "Conductor Sum" to count up the number of conductors required to remotely activate (a) tone(s). First, select the tone(s) desired. Second, for every column with an "x", place a "1" in the corresponding Conductor Sum column. Sum the columns for a conductor count.

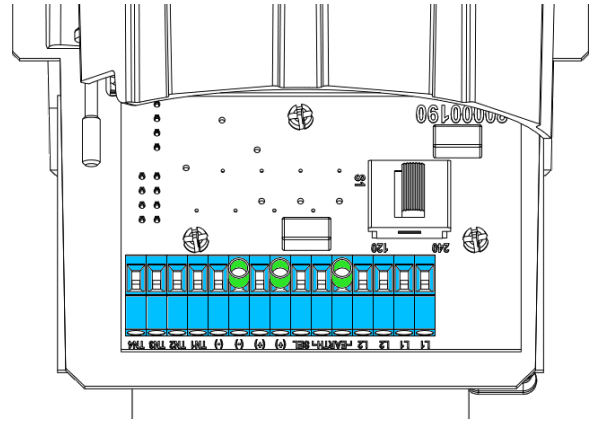
³ Use "Common Sum" to determine if the HEX switch can be used to reduce the total conductor count. First, select the tone(s) desired. Second, complete the "Conductor Sum" count. Third, inspect all columns (excluding "SEL") of the selected tone(s) marked with an "x"; if all of the tones share a column (eg: all tones have "x" for column "T1"), place a "1" in the corresponding column. Sum the columns for a conductor count and subtract from "Conductor Sum". Lastly, replace all "1"s in the "Common Sum" row with "x", and match to a HEX position; this will correspond to the required HEX switch setting

2. Slide the switch to “120” for 120VAC power, and “240” for 220-240VAC



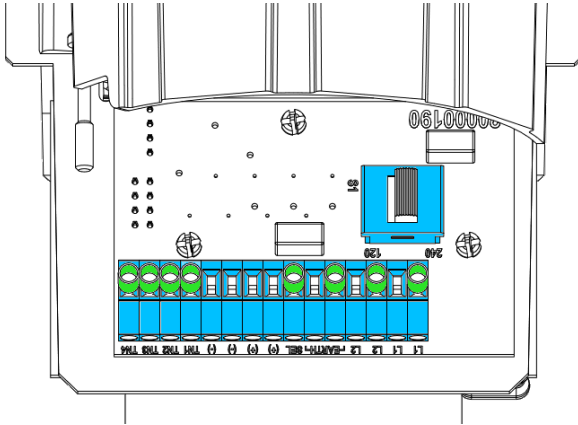
III 3-4

230VAC Sounder Single-Tone Wiring Locations



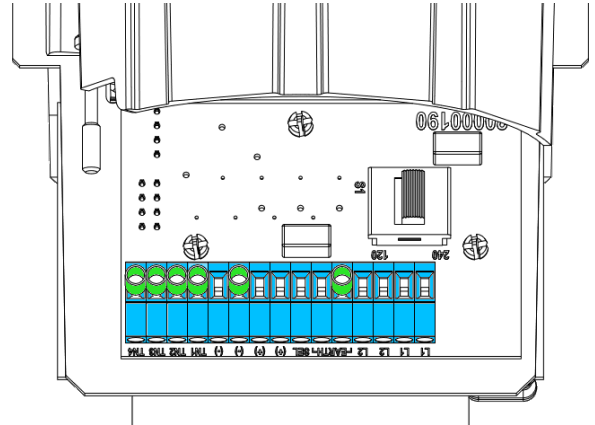
III 3-5

24VDC Sounder Single-Tone Wiring Locations



III 3-6

230VAC Sounder with Full Remote Selection



III 3-7

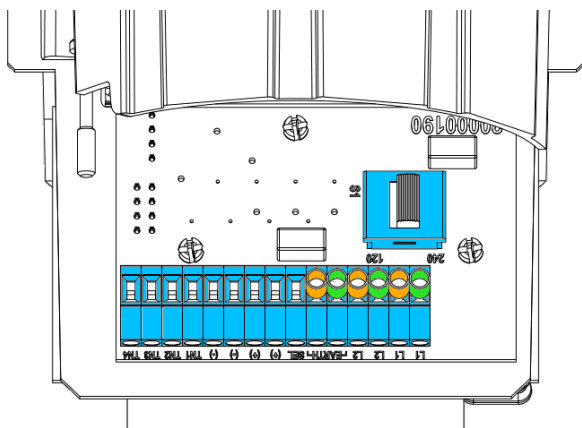
24VDC Sounder with Full Remote Selection

The G-Series Sounder includes a volume potentiometer (located on the transformer PCBA) that allows for field adjustment of the output level (see III 3-3 on page 23). While the G-Series Sounder is shipped from the factory at full volume, field reduction of the output level might be required or desired in certain applications.

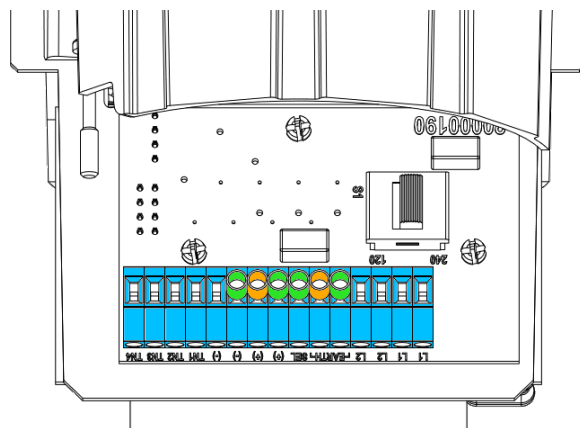
To adjust the sound output level

1. Locate the volume potentiometer (VR1) on the connector PCBA (see III 3-3 on page 23)
2. Rotate the dial on the volume potentiometer counter-clockwise to reduce the volume (or clockwise to increase the volume).

While the G-Series Sounder allows for loop-in and loop-out power connections through the "Ex d" housing, it does not support loop-in and loop-out wiring of the tone selection lines. If a nearby product requires AC or DC power loop-through, the G-Series Sounder "Ex d" housing supports power loop-out connection. As the "Ex d" housing provides two (2) M20 entries for cable passage, one entry must be dedicated for incoming conductors, and one entry for outgoing conductors.



III 3-8
230VAC Single-Tone Sounder Wiring
with Power Loop-Out



III 3-9
24VDC Single-Tone Sounder Wiring
with Power Loop-Out

Remote tone selection is limited by the number of available conductors entering the "Ex d" housing. The tables below help identify tones available with limited numbers of conductors, based on the type of G-Series Sounder product.

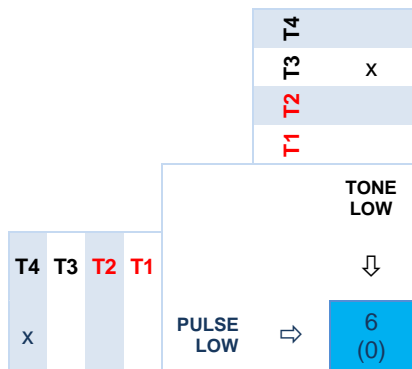
To use the table:

1. Identify two tones for remote selection
2. Note the square where the two tones intersect
3. Follow the color code and cell contents for further instructions

n (H)	This tone can be selected with the number of conductors “n” shown To accomplish this task, the HEX switch must be first set to position “H”
n (H)	This tone is a duplicate selection
	This tone is not available with the limited number of conductors

4. Access to tone selection pins (T#) marked in red requires device rewiring

For example, consider the following tone selection of “Tone Low” and “Pulse Low” in an AC Sounder application:



This tone can be selected using a total of 6 conductors (3 for AC power and ground, one for SEL, and two for tone select), and the tone select wires should be landed at T4 (shown with an “x” on the left of “Pulse Low”) and T3 (shown with an “x” above “Tone Low”), and the HEX switch should be set to position “0”

G-Series AC Sounder "Ex d" Housing Products, Limited to 6 or Fewer Conductors

T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)
T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)
T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)

T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)	
T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)	
T4	T3	T2	T1	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)	
				OFF	BELL	PULSE LOW	PULSE HIGH	PULSE DOWN	PULSE UP	SWEEP BOUNCE	SWEEP DOWN LOW	SWEEP DOWN HIGH	SWEEP UP LOW	SWEEP UP HIGH	TONE DOWN	TONE UP	TONE LOW	TONE HIGH	WARBLE	
				4 (0)	6 (0)	5 (0)			6 (0)	6 (0)		6 (0)	6 (0)	5 (0)		5 (0)	5 (0)	6 (0)		
	x		x	6 (0)	4 (5)			5 (5)	6 (1)	6 (1)	6 (5)	6 (4)			5 (5)	5 (1)	5 (4)	6 (4)		
x				5 (0)		4 (8)	6 (8)			5 (8)			5 (8)	6 (0)	6 (8)	6 (0)	6 (0)	6 (8)	5 (8)	6 (8)
x		x	x			6 (8)	4 (B)	6 (3)	5 (3)	5 (9)	5 (B)		5 (A)	6 (2)	6 (9)	6 (1)			6 (A)	
	x	x	x		5 (5)		6 (3)	4 (7)	5 (3)		5 (7)	5 (6)		6 (2)	6 (5)	6 (1)	6 (4)		6 (6)	
			x	6 (0)	6 (1)		5 (3)	5 (3)	4 (3)	6 (1)	6 (3)	6 (2)	6 (2)	5 (2)		5 (1)				
x			x	6 (0)	6 (1)	5 (8)	5 (9)		6 (1)	4 (9)	6 (9)		6 (8)		5 (9)	5 (1)		6 (8)		
x	x	x	x		6 (5)		5 (B)	5 (7)	6 (3)	6 (9)	4 (F)	6 (6)	6 (A)		5 (D)			6 (C)	5 (E)	
	x	x		6 (0)	6 (4)			5 (6)	6 (2)		6 (6)	4 (6)	6 (2)	5 (2)			5 (4)	6 (4)	5 (6)	
x		x		6 (0)		5 (8)	5 (A)		6 (2)	6 (8)	6 (A)	6 (2)	4 (A)	5 (2)				6 (8)	5 (A)	
			x	5 (0)		6 (0)	6 (2)	6 (2)	5 (2)			5 (2)	5 (2)	4 (2)		6 (0)	6 (0)		6 (2)	
x	x		x		5 (5)	6 (8)	6 (9)	6 (5)		5 (9)	5 (D)				4 (D)	6 (1)	6 (4)	5 (C)	6 (C)	
			x	5 (0)	5 (1)	6 (0)	6 (1)	6 (1)	5 (1)	5 (1)				6 (0)	6 (1)	4 (1)	6 (0)			
	x			5 (0)	5 (4)	6 (0)		6 (4)				5 (4)		6 (0)	6 (4)	6 (0)	4 (4)	5 (4)	6 (4)	
x	x			6 (0)	6 (4)	5 (8)				6 (8)	6 (C)	6 (4)	6 (8)		5 (C)		5 (4)	4 (C)	5 (C)	
x	x	x				6 (8)	6 (A)	6 (6)			5 (E)	5 (6)	5 (A)	6 (2)	6 (C)		6 (4)	5 (C)	4 (E)	

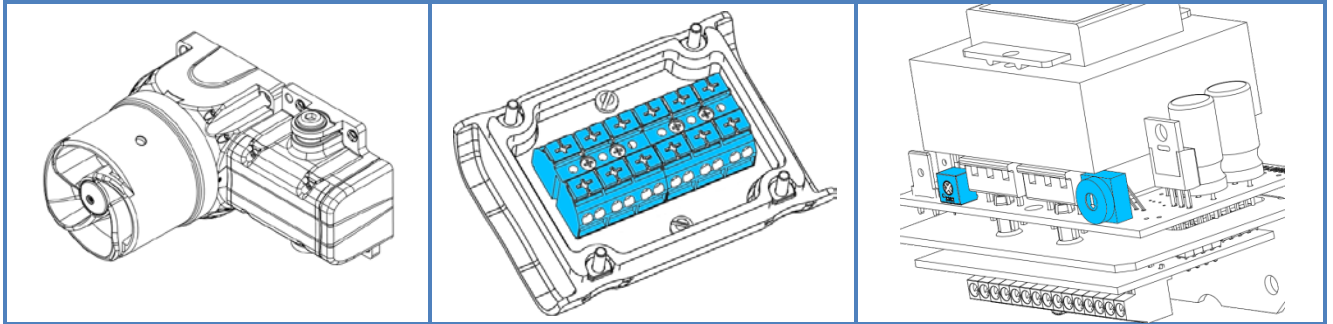
G-Series DC Sounder "Ex d" Housing Products, Limited to 4 or Fewer Conductors

T4			X	X			X	X		X		X		X	X	
T2 T3 T4		X			X			X	X		X		X		X	
T1				X	X	X		X	X	X		X			X	
	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)

T4	T3	T2	T1	[4]	OFF	BELL	PULSE LOW	PULSE HIGH	PULSE DOWN	PULSE UP	SWEEP BOUNCE	SWEEP DOWN LOW	SWEEP DOWN HIGH	SWEEP UP LOW	SWEEP UP HIGH	TONE DOWN	TONE UP	TONE LOW	TONE HIGH	WARBLE
				(0)	OFF 2 (0)	4 (0)	3 (0)			4 (0)	4 (0)		4 (0)	4 (0)	3 (0)		3 (0)	3 (0)	4 (0)	
	X		X	(5)	BELL 4 (0)	2 (5)			3 (5)	4 (1)	4 (1)	4 (5)	4 (4)			3 (5)	3 (1)	3 (4)	4 (4)	
X				(8)	PULSE LOW 3 (0)		2 (8)	4 (8)			3 (8)			3 (8)	4 (0)	4 (8)	4 (0)	4 (0)	3 (8)	4 (8)
X		X	X	(B)	PULSE HIGH 4 (8)		2 (B)	4 (3)	3 (3)	3 (9)	3 (B)			3 (A)	4 (2)	4 (9)	4 (1)			4 (A)
	X	X	X	(7)	PULSE DOWN 3 (5)		4 (3)	2 (7)	3 (3)		3 (7)	3 (6)		4 (2)	4 (5)	4 (1)	4 (4)			4 (6)
		X	X	(3)	PULSE UP 4 (0)	4 (1)		3 (3)	3 (3)	2 (3)	4 (1)	4 (3)	4 (2)	4 (2)	3 (2)		3 (1)			
X			X	(9)	SWEEP BOUNCE 4 (0)	4 (1)	3 (8)	3 (9)		4 (1)	2 (9)	4 (9)		4 (8)		3 (9)	3 (1)		4 (8)	
X	X	X	X	(F)	SWEEP DOWN LOW 4 (5)		3 (B)	3 (7)	4 (3)	4 (9)	4 (F)	4 (6)	4 (A)		3 (D)			4 (C)	3 (E)	
	X	X		(6)	SWEEP DOWN HIGH 4 (0)	4 (4)		3 (6)	4 (2)		4 (6)	2 (6)	4 (2)	3 (2)				3 (4)	4 (4)	3 (6)
X		X		(A)	SWEEP UP LOW 4 (0)		3 (8)	3 (A)		4 (2)	4 (8)	4 (A)	4 (2)	2 (A)	3 (2)				4 (8)	3 (A)
			X	(2)	SWEEP UP HIGH 3 (0)		4 (0)	4 (2)	4 (2)	3 (2)			3 (2)	3 (2)	2 (2)		4 (0)	4 (0)		4 (2)
X	X		X	(D)	TONE DOWN 3 (5)	3 (8)	4 (9)	4 (5)		3 (9)	3 (D)				2 (D)	4 (1)	4 (4)	3 (C)	4 (C)	
			X	(1)	TONE UP 3 (0)	3 (1)	4 (0)	4 (1)	4 (1)	3 (1)	3 (1)			4 (0)	4 (1)	2 (1)	4 (0)			
	X			(4)	TONE LOW 3 (0)	3 (4)	4 (0)		4 (4)				3 (4)	4 (0)	4 (4)	4 (0)	2 (4)	3 (4)	4 (4)	
X	X			(C)	TONE HIGH 4 (0)	4 (4)	3 (8)				4 (8)	4 (C)	4 (4)	4 (8)		3 (C)		3 (4)	2 (C)	3 (C)
X	X	X		(E)	WARBLE 4 (8)		4 (A)	4 (6)				3 (E)	3 (6)	3 (A)	4 (2)	4 (C)		4 (4)	3 (C)	2 (E)

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c. Installing and Wiring the Increased Safety "Ex de" Housing



III 3-10

"Ex de" Sounder

III 3-11

"Ex de" Terminal Block

III 3-12

Level Adjust and Tone Selection

	Connection	Locations	Description
1	L1/+	4	Input Power In ("Hot/L1/DC+")
2	L2/-	4	Input Power Return ("Neutral/L2/DC-")
3	Alt1	4	Earth Ground Termination Point
4	Alt2	4	(AC): SEL Terminal Location (DC): T2 Terminal Location
5	Alt3	4	T3 Terminal Location
6	Alt4	4	T4 Terminal Location
		24	

SW1 Position Description

1	120	Amplifier is configured to operate at 110VAC-120VAC
2	230	Amplifier is configured to operate at 220VAC-240VAC (Factory Set)

	HEX SW	Freq. Range	SEL ⁴	Terminal Wiring				Description
				T4	T3	T2	T1	
-	0	--						Off (Use for remote access to all tones)
1	1	588-714	x				x	Tone Up
2	2	600-700	x			x		Sweep Up (High)
3	3	1000-1400	x			x	x	Pulse Up
4	4	700	x		x			Tone (Low)
5	5	--	x		x		x	Bell
6	6	1200-1600	x		x	x		Sweep Down (High)
7	7	1000-700	x		x	x	x	Pulse Down
8	8	700	x	x				Pulse (Low)
9	9	400-1600	x	x			x	Sweep Bounce
10	A	500-770	x	x		x		Sweep Up (Low)
11	B	1000	x	x		x	x	Pulse (High)
12	C	1000	x	x	x			Tone (High) (Factory default)
13	D	700-500	x	x	x		x	Tone Down
14	E	1000-1400	x	x	x	x		Warble
15	F	1200-400	x	x	x	x	x	Sweep Down (Low)
Conductor Sum⁵:				+	+	+	+	=
Common Sum⁶:					+	+	+	=

Wiring the G-Series Sounder "Ex de" terminal chamber for a single-tone on AC or DC power requires three (3) conductors for input power (with an earth conductor). The G-Series Sounder setup and wiring within the "Ex d" housing is configured at the factory to match the input power ordered, and tone "C" is preselected. If this is the desired tone, the only field requirement for installation is wire termination to the proper position. If single-tone operation is desired other than the 1kHz tone "C", the "Ex d" housing must be opened and the HEX switch set to the desired tone.

⁴ Select line ("SEL") required to make tone selections with sounders powered from AC voltage; loop back to T1/T4 through a contact closure to select a tone

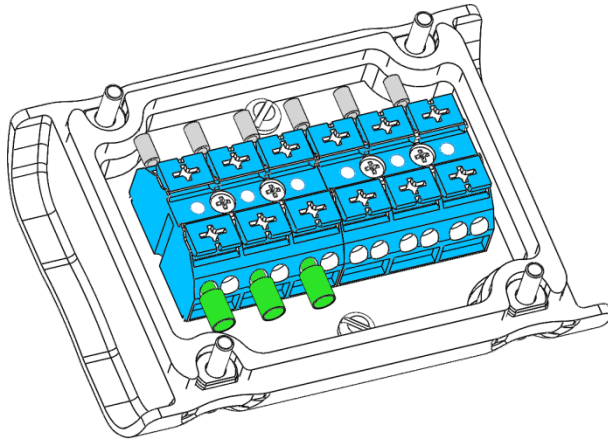
⁵ Use "Conductor Sum" to count up the number of conductors required to remotely activate (a) tone(s). First, select the tone(s) desired. Second, for every column with an "x", place a "1" in the corresponding Conductor Sum column. Sum the columns for a conductor count.

⁶ Use "Common Sum" to determine if the HEX switch can be used to reduce the total conductor count. First, select the tone(s) desired. Second, complete the "Conductor Sum" count. Third, inspect all columns (excluding "SEL") of the selected tone(s) marked with an "x"; if all of the tones share a column (eg: all tones have "x" for column "T1"), place a "1" in the corresponding column. Sum the columns for a conductor count and subtract from "Conductor Sum". Lastly, replace all "1"s in the "Common Sum" row with "x", and match to a HEX position; this will correspond to the required HEX switch setting

The G-Series Sounder includes a volume potentiometer (located on the transformer PCBA) that allows for field adjustment of the output level (see III 3-12 on page 30). While the G-Series Sounder is shipped from the factory at full volume, field reduction of the output level might be required or desired in certain applications.

To adjust the sound output level

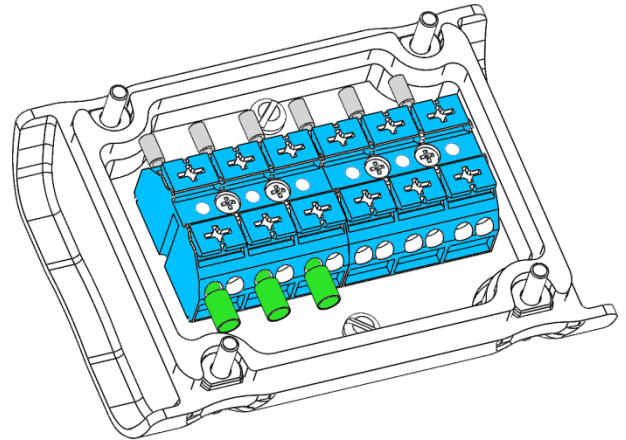
1. Locate the volume potentiometer (VR1) on the connector PCBA (see III 3-12 on page 30)
2. Rotate the dial on the volume potentiometer counter-clockwise to reduce the volume (or clockwise to increase the volume).



■ INPUT POWER ■ LINE BUSHING

III 3-13

230VAC Sounder Single-Tone Wiring Locations

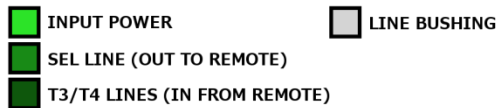
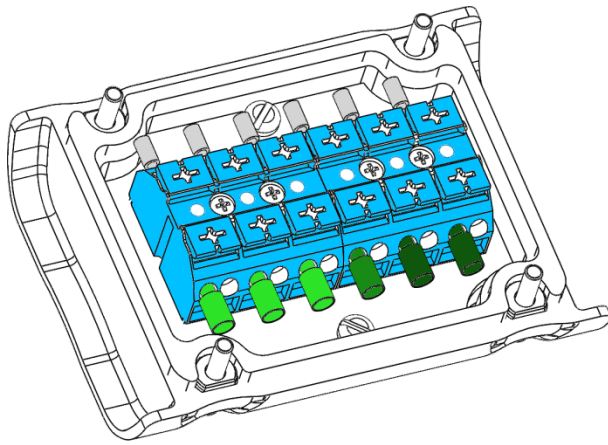


■ INPUT POWER ■ LINE BUSHING

III 3-14

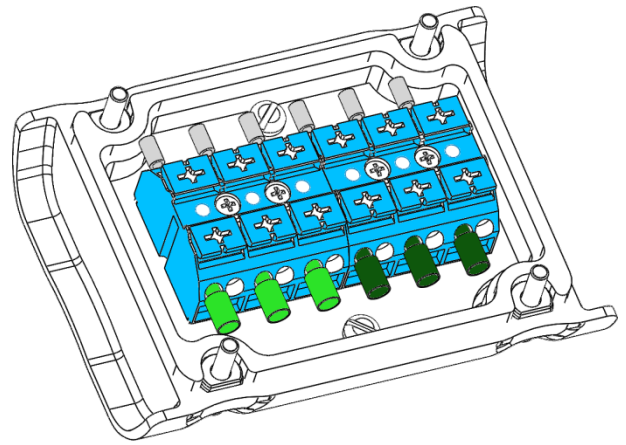
24VDC Sounder Single-Tone Wiring Locations

The G-Series Sounder "Ex de" terminal chamber can be wired for limited remote tone selection. For AC products, the remote tone select line SEL is made available, as well as tone select lines T3 and T4. For DC products, T2, T3, and T4 are made available.



III 3-15

230VAC Sounder with Limited Remote Selection



III 3-16

24VDC Sounder with Limited Remote Selection

Remote tone selection is also limited by the number of available conductors entering the "Ex de" terminal chamber. The tables below help identify tones available with limited numbers of conductors, based on the type of G-Series Sounder product.

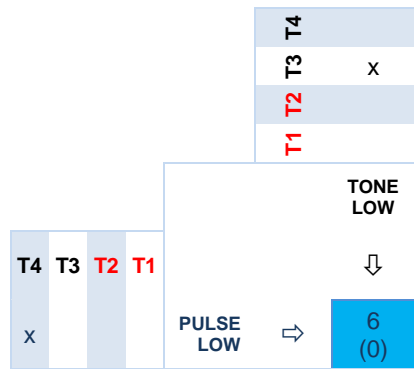
To use the table:

1. Identify two tones for remote selection
2. Note the square where the two tones intersect
3. Follow the color code and cell contents for further instructions

n (H)	This tone can be selected with the number of conductors "n" shown To accomplish this task, the HEX switch must be first set to position "H"
n (H)	This tone is a duplicate selection
	This tone is not available with the limited number of conductors

4. Access to tone selection pins (T#) marked in red requires device rewiring

For example, consider the following tone selection of “Tone Low” and “Pulse Low” in an AC Sounder application:



This tone can be selected using a total of 6 conductors (3 for AC power and ground, one for SEL, and two for tone select), and the tone select wires should be landed at T4 (shown with an “x” on the left of “Pulse Low”) and T3 (shown with an “x” above “Tone Low”), and the HEX switch should be set to position “0”

G-Series AC Sounder "Ex de" Terminal Chamber Products, Limited to 6 or Fewer Conductors

			X	X			X	X		X		X		X		X	X
		X			X			X	X			X		X		X	X
				X	X	X		X	X	X	X						X
		X		X	X	X	X	X					X	X			
		(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)

T4	T3	T2	T1	[6]																		
					OFF	BELL	PULSE LOW	PULSE HIGH	PULSE DOWN	PULSE UP	SWEEP BOUNCE	SWEEP DOWN LOW	SWEEP DOWN HIGH	SWEEP UP LOW	SWEEP UP HIGH	STONE DOWN	STONE UP	STONE LOW	STONE HIGH	WARBLE		
				(0)	OFF	4 (0)	6 (0)	5 (0)			6 (0)	6 (0)		6 (0)	6 (0)	5 (0)		5 (0)	5 (0)	6 (0)		
	X		X	(5)	BELL	6 (0)	4 (5)			5 (5)	6 (1)	6 (1)	6 (5)	6 (4)			5 (5)	5 (1)	5 (4)	6 (4)		
X				(8)	PULSE LOW	5 (0)		4 (8)	6 (8)			5 (8)			5 (8)	6 (0)	6 (8)	6 (0)	6 (0)	6 (0)	5 (8)	6 (8)
X		X	X	(B)	PULSE HIGH			6 (8)	4 (B)	6 (3)	5 (3)	5 (9)	5 (B)		5 (A)	6 (2)	6 (9)	6 (1)			6 (A)	
	X	X	X	(7)	PULSE DOWN		5 (5)		6 (3)	4 (7)	5 (3)		5 (7)	5 (6)		6 (2)	6 (5)	6 (1)	6 (4)		6 (6)	
			X	(3)	PULSE UP	6 (0)	6 (1)		5 (3)	5 (3)	4 (3)	6 (1)	6 (3)	6 (2)	6 (2)	5 (2)		5 (1)				
X			X	(9)	SWEEP BOUNCE	6 (0)	6 (1)	5 (8)	5 (9)		6 (1)	4 (9)	6 (9)		6 (8)		5 (9)	5 (1)		6 (8)		
X	X	X	X	(F)	SWEEP DOWN LOW		6 (5)		5 (B)	5 (7)	6 (3)	6 (9)	4 (F)	6 (6)	6 (A)		5 (D)			6 (C)	5 (E)	
	X	X		(6)	SWEEP DOWN HIGH	6 (0)	6 (4)			5 (6)	6 (2)		6 (6)	4 (6)	6 (2)	5 (2)			5 (4)	6 (4)	5 (6)	
X		X		(A)	SWEEP UP LOW	6 (0)		5 (8)	5 (A)		6 (2)	6 (8)	6 (A)	6 (2)	4 (A)	5 (2)				6 (8)	5 (A)	
			X	(2)	SWEEP UP HIGH	5 (0)		6 (0)	6 (2)	6 (2)	5 (2)			5 (2)	5 (2)	4 (2)		6 (0)	6 (0)		6 (2)	
X	X		X	(D)	STONE DOWN		5 (5)	6 (8)	6 (9)	6 (5)		5 (9)	5 (D)				4 (D)	6 (1)	6 (4)	5 (C)	6 (C)	
			X	(1)	STONE UP	5 (0)	5 (1)	6 (0)	6 (1)	6 (1)	5 (1)	5 (1)				6 (0)	6 (1)	4 (1)	6 (0)			
	X			(4)	STONE LOW	5 (0)	5 (4)	6 (0)		6 (4)				5 (4)		6 (0)	6 (4)	6 (0)	4 (4)	5 (4)	6 (4)	
X	X			(C)	STONE HIGH	6 (0)	6 (4)	5 (8)				6 (8)	6 (C)	6 (4)	6 (8)		5 (C)		5 (4)	4 (C)	5 (C)	
X	X	X		(E)	WARBLE			6 (8)	6 (A)	6 (6)			5 (E)	5 (6)	5 (A)	6 (2)	6 (C)		6 (4)	5 (C)	4 (E)	

G-Series DC Sounder "Ex de" Terminal Chamber Products, Limited to 4 or Fewer Conductors

			X	X			X	X		X		X		X		X	X
		X			X			X	X		X		X		X	X	X
				X	X	X		X	X	X	X		X				X
T1		X		X	X	X	X	X					X	X			
	(0)	(5)	(8)	(B)	(7)	(3)	(9)	(F)	(6)	(A)	(2)	(D)	(1)	(4)	(C)	(E)	

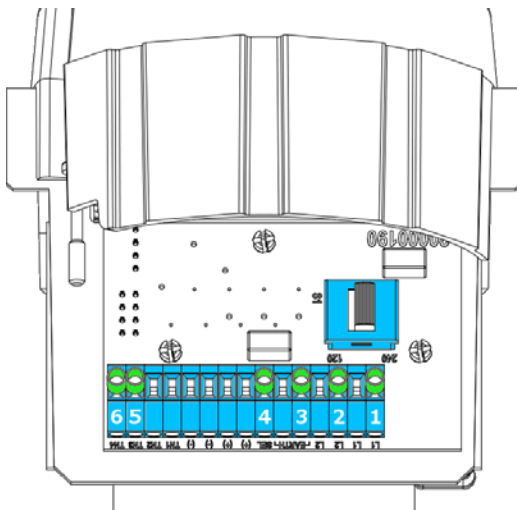
T4	T3	T2	T1	[4]	[4]																	
						OFF	BELL	PULSE LOW	PULSE HIGH	PULSE DOWN	PULSE UP	SWEEP BOUNCE	SWEEP DOWN LOW	SWEEP DOWN HIGH	SWEEP UP LOW	SWEEP UP HIGH	STONE DOWN	STONE UP	STONE LOW	STONE HIGH	WARBLE	
				(0)	OFF	2 (0)	4 (0)	3 (0)			4 (0)	4 (0)		4 (0)	4 (0)	3 (0)		3 (0)	3 (0)	4 (0)		
	X		X	(5)	BELL	4 (0)	2 (5)			3 (5)	4 (1)	4 (1)	4 (5)	4 (4)			3 (5)	3 (1)	3 (4)	4 (4)		
X				(8)	PULSE LOW	3 (0)		2 (8)	4 (8)			3 (8)			3 (8)	4 (0)	4 (8)	4 (0)	4 (0)	3 (8)	4 (8)	
X		X	X	(B)	PULSE HIGH			4 (8)	2 (B)	4 (3)	3 (3)	3 (9)	3 (B)		3 (A)	4 (2)	4 (9)	4 (1)			4 (A)	
	X	X	X	(7)	PULSE DOWN		3 (5)		4 (3)	2 (7)	3 (3)		3 (7)	3 (6)		4 (2)	4 (5)	4 (1)	4 (4)		4 (6)	
		X	X	(3)	PULSE UP	4 (0)	4 (1)		3 (3)	3 (3)	2 (3)	4 (1)	4 (3)	4 (2)	4 (2)	3 (2)		3 (1)				
X			X	(9)	SWEEP BOUNCE	4 (0)	4 (1)	3 (8)	3 (9)		4 (1)	2 (9)	4 (9)		4 (8)		3 (9)	3 (1)		4 (8)		
X	X	X	X	(F)	SWEEP DOWN LOW		4 (5)		3 (B)	3 (7)	4 (3)	4 (9)	2 (F)	4 (6)	4 (A)		3 (D)			4 (C)	3 (E)	
	X	X		(6)	SWEEP DOWN HIGH	4 (0)	4 (4)			3 (6)	4 (2)		4 (6)	2 (6)	4 (2)	3 (2)			3 (4)	4 (4)	3 (6)	
X		X		(A)	SWEEP UP LOW	4 (0)		3 (8)	3 (A)		4 (2)	4 (8)	4 (A)	4 (2)	2 (A)	3 (2)				4 (8)	3 (A)	
		X		(2)	SWEEP UP HIGH	3 (0)		4 (0)	4 (2)	4 (2)	3 (2)			3 (2)	3 (2)	2 (2)		4 (0)	4 (0)		4 (2)	
X	X		X	(D)	STONE DOWN		3 (5)	4 (8)	4 (9)	4 (5)		3 (9)	3 (D)				2 (D)	4 (1)	4 (4)	3 (C)	4 (C)	
			X	(1)	STONE UP	3 (0)	3 (1)	4 (0)	4 (1)	4 (1)	3 (1)	3 (1)				4 (0)	4 (1)	2 (1)	4 (0)			
	X			(4)	STONE LOW	3 (0)	3 (4)	4 (0)		4 (4)				3 (4)		4 (0)	4 (4)	4 (0)	2 (4)	3 (4)	4 (4)	
X	X			(C)	STONE HIGH	4 (0)	4 (4)	3 (8)				4 (8)	4 (C)	4 (4)	4 (8)		3 (C)		3 (4)	2 (C)	3 (C)	
X	X	X		(E)	WARBLE			4 (8)	4 (A)	4 (6)			3 (E)	3 (6)	3 (A)	4 (2)	4 (C)		4 (4)	3 (C)	2 (E)	

1.

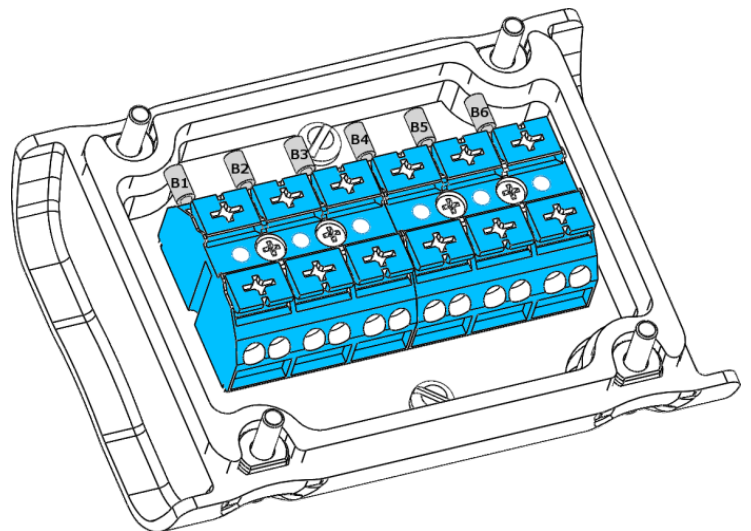
If the desired tones are accessible with the number of conductors available, but the tone selection positions are shown in red for one or more of the positions, the G-Series Sounder "Ex d" housing terminal block will need to be re-wired.

To rewire the terminal block, locate the T1-T4 terminal locations on the sounder PCBA. Note the factory locations for bushing wires "5" and "6" (installed in positions "T3" and "T4", respectively). In addition, note the location of bushing wires "5" and "6" on the "Ex de" terminal chamber.

To allow access to the desired tone(s), move bushing wires "5" and/or "6" to the designated "T" terminal locations on the "Ex d" housing PCBA. Once these wires have been relocated, the desired "T" terminal locations will also be available on the "Ex de" terminal block.

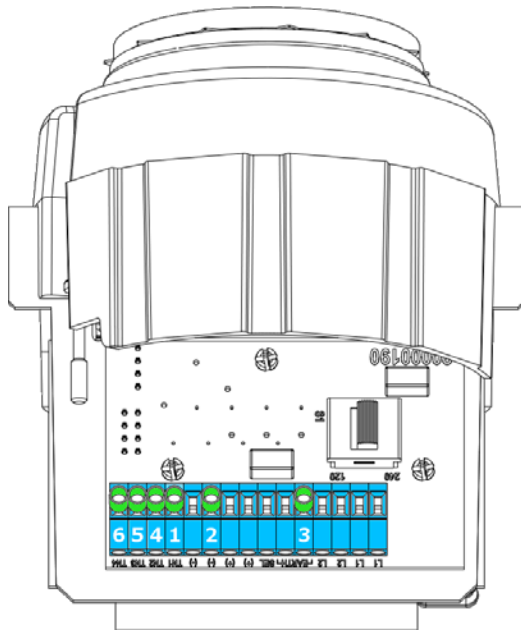


III 3-17
230VAC Sounder "Ex d" Housing
Factory Wiring Locations



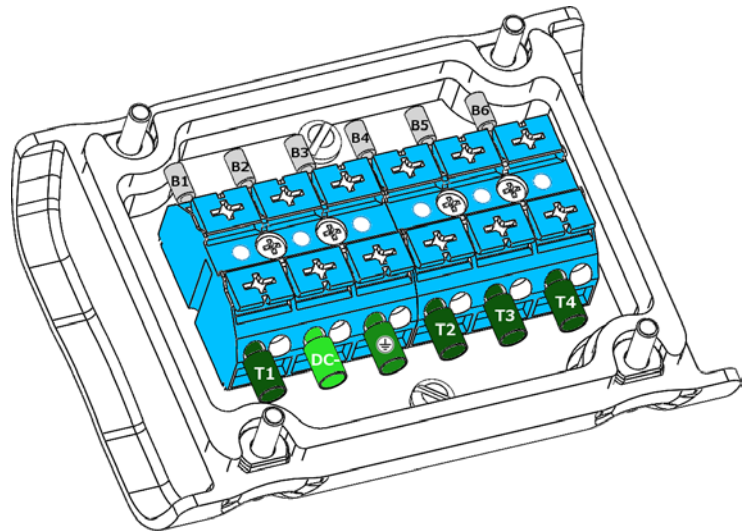
III 3-18
230VAC Sounder "Ex de" Terminal Block
Factory Wiring Locations

It is possible to wire a 24VDC G-Series Sounder for complete remote tone selection through the "Ex de" terminal chamber. To accomplish this, both the "Ex d" housing and the "Ex de" terminal chamber wiring must be re-configured. All 15 remote tones will now be available, and the device will be powered through the tone select lines T1-T4. To activate a tone, apply 24VDC on the desired tone pin(s).



III 3-19

G-Series Sounder Single-Tone Wiring
with Power Loop-Out

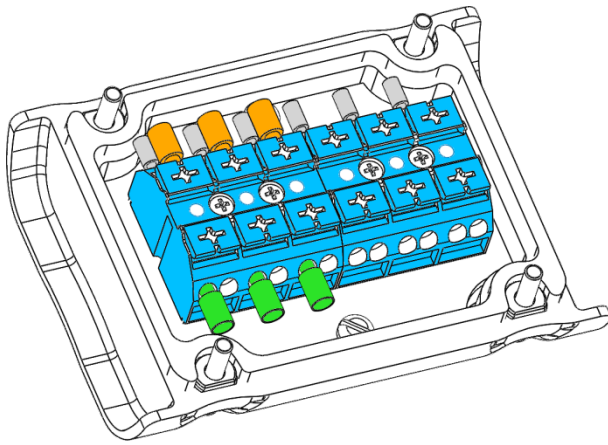


III 3-20

G-Series Sounder Wired for Limited Remote Selection
with Power Loop-Out

While the "Ex de" G-Series Sounder does accommodate loop-in and loop-out connections through the terminal chamber, it is not intended to facilitate loop-in and loop-out wiring of the tone selection lines.

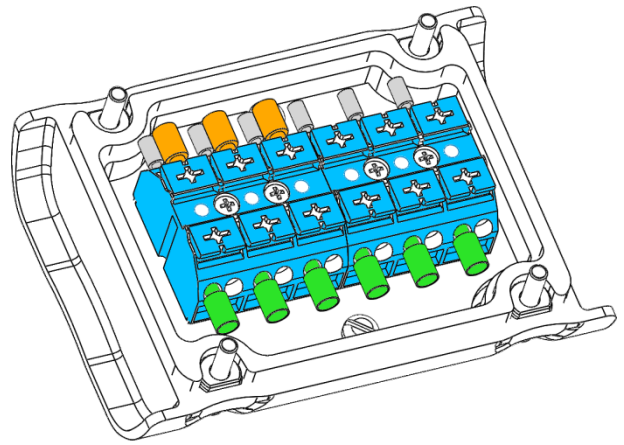
If a nearby product requires AC or DC power loop-through, the G-Series Sounder "Ex de" terminal chamber supports power loop-out field termination. As the terminal chamber provides three (3) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry, or that input cabling occupies two entries but only one entry is required for loop-out cabling, before architecting a loop-in/loop-out topology.



■ INPUT POWER ■ LOOP-OUT POWER
■ LINE BUSHING

III 3-21

G-Series Sounder Single-Tone Wiring
Locations with Power Loop-Out

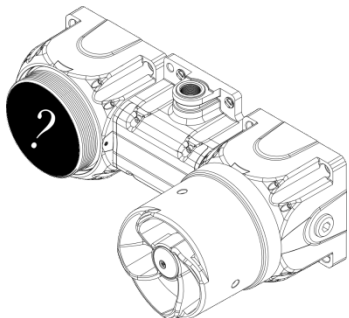


■ INPUT POWER/CONTROL ■ LOOP-OUT POWER
■ LINE BUSHING

III 3-22

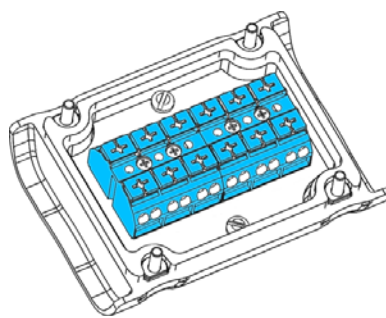
G-Series Sounder with Limited Remote
Selection and Power Loop-Out

d. *Installing and Wiring Dual "de d" Combination Unit Housings*



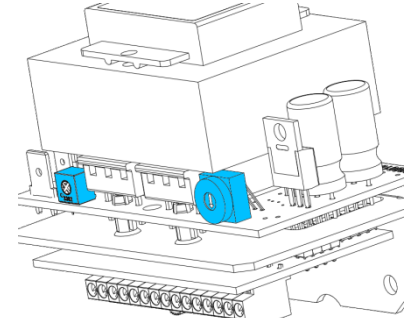
III 3-23

Sounder (SD) and
Unspecified Device (UD)



III 3-24

Dual "de d" Terminal Block
(Common between devices)



III 3-25

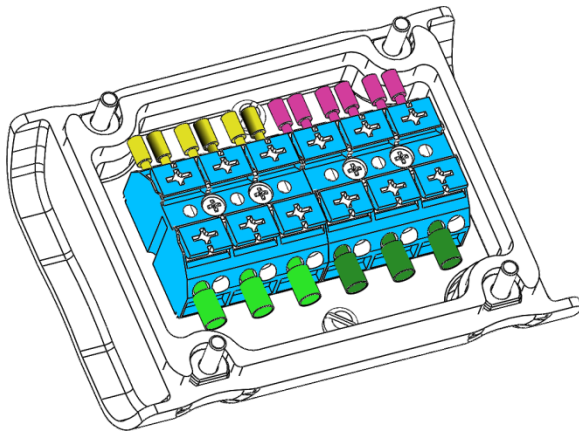
Level Adjust and Tone Selection
(Sounder Only)

Connection	Locations	Description
1	L1/+	4 Input Power In ("Hot/L1/DC+")
2	L2/-	4 Input Power Return ("Neutral/L2/DC-")
3	Alt1	4 Earth Ground Termination Point
4	Alt2	4 (Reserved for secondary device)
5	Alt3	4 (Reserved for secondary device)
6	Alt4	4 (Reserved for secondary device)
		24

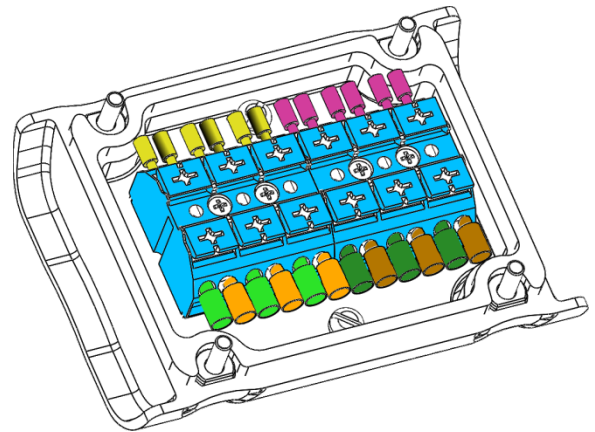
G-Series combination devices require wiring practices dependent on the devices combined. When combining the G-Series Sounder with other audible or visual products, the sounder can occupy either first or the second half of the "Ex de" terminal block; the Unspecified Device (UD) will occupy the other half. This constrains the combination device to the following operation:

1. The sounder (SD) leaves the factory with tone 'C' pre-selected on the HEX switch
2. The unspecified device (UD) can be energized independently of the sounder (SD)

Wiring G-Series combination unit Dual "de d" terminal chamber requires six (6) conductors. With an AC or DC combination unit, three (3) conductors are required for input power (with an earth conductor) to the sounder, and three (3) conductors are required for input power (with an earth conductor) to the unspecified device (UD). The product setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.



III 3-26
Dual-Unit (SD) Configuration



III 3-27
Dual-Unit (SD) with Power Loop-In/Loop-Out

G-Series combination devices allow for loop-in and loop-out connections through the "Ex de" terminal chamber, for connecting another G-Series combination unit, or another G-Series product. As with the other devices, if a near-by product requires AC or DC power loop-through, the G-Series "Ex de" terminal chamber supports power loop-out connection from the unspecified device's input power connection. As the "Ex de" terminal chamber provides two (2) M20 entries for cable passage, one entry must be dedicated for all incoming conductors, and one entry for all outgoing conductors.

E. Visual Products

4. LED Beacon

a. Feature Set

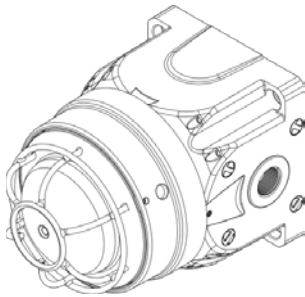
1. Multi-voltage input with loop-out terminal positions
 - o Universal AC (100-265VAC, 50/60Hz) with loop-out
 - o 24VDC with loop-out
2. 8 built-in light patterns with three (3) pattern speeds

Pattern	Auto-Sync ⁷
1 Steady-on	--
2 Flashing (60/75/90 FPM)	Yes
3 Swell (60/75/90 FPM)	Yes
4 Strobe (60/75/90 FPM)	Yes
5 Rotate Clockwise (60/75/90 RPM)	No
6 Rotate Counter-clockwise (60/75/90 RPM)	No
7 Rotate Bounce (60/75/90 RPM)	No
8 Double Rotate Clockwise (60/75/90 RPM)	No

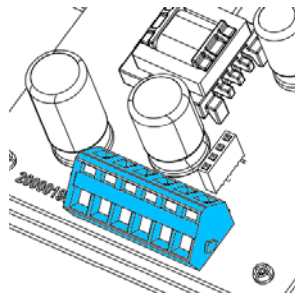
3. Cable Entries

- o Flameproof "Ex d": 2 x M20 entries (opposing sides)
- o Increased Safety "Ex de": 3 x M20 entries (opposing sides and base)
- o Dual "de d" Combination Devices: 2 x M20 entries (opposing sides)

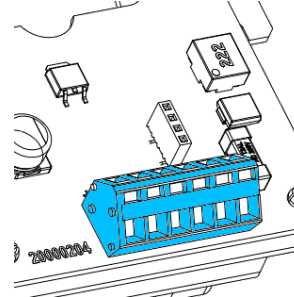
b. Installing and Wiring the Flameproof "Ex d" Housing



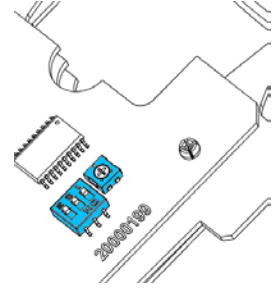
III 4-1
"Ex d" LED Beacon



III 4-2
AC Input Power
Terminal Block



III 4-3
DC Input Power
Terminal Block

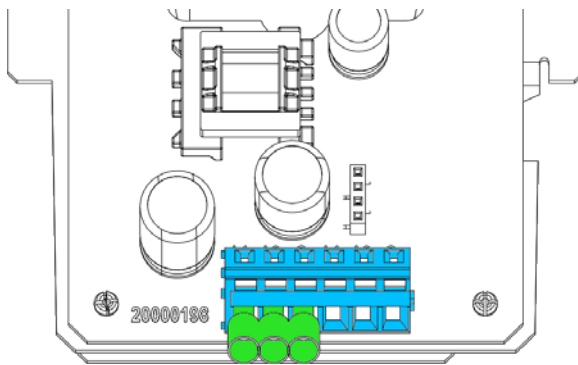


III 4-4
LED Pattern Select
and Speed Dial

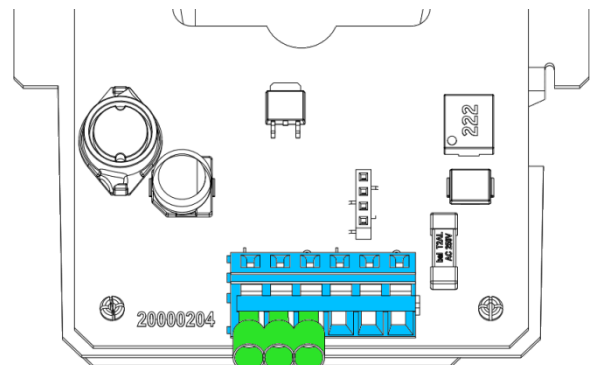
⁷ Auto-Sync synchronizes devices powered from the same AC source/phase at 60Hz, when activated simultaneously

Connection	Locations	Description
1	L1 or +	1 AC Power ("Hot/L1") or DC Power ("+")
2	L2 or -	1 AC Return ("Neutral/L2") or DC Return ("-")
3	Earth	1 Earth Ground Termination Point
4	L1 or +	1 AC Power ("Hot/L1") or DC Power ("+")
5	L2 or -	1 AC Return ("Neutral/L2") or DC Return ("-")
6	Earth	1 Earth Ground Termination Point

Wiring the G-Series LED Beacon "Ex d" housing for AC or DC power requires three (3) conductors for input power (with an earth conductor). The AC LED Beacon will accept a universal AC input (100-265VAC, 50/60Hz), and the DC LED Beacon will accept 24VDC.



III 4-5
AC LED Beacon Wiring Locations



III 4-6
DC LED Beacon Wiring Locations

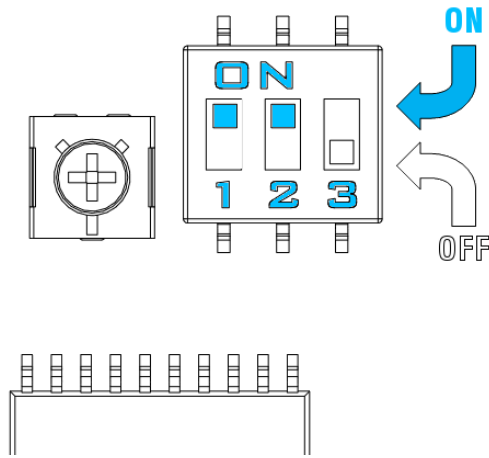
The G-Series LED Beacon is capable of displaying 8 discrete visual patterns at three selectable speeds. These selections must be made during or prior to installation (eg: they are not remotely changeable).

To adjust the LED pattern selection:

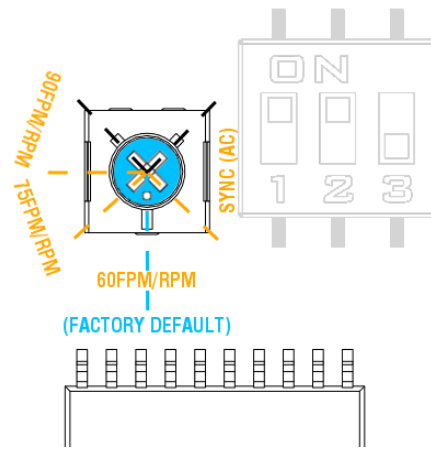
1. Locate the pattern switch on the 20000199 PCBA
2. Modify the switch positions "1", "2", and "3" to match the desired pattern selection

To adjust the LED pattern rate:

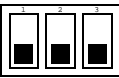
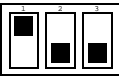
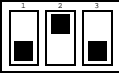
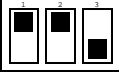

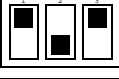
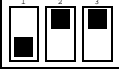
1. Locate the pattern rate potentiometer on the 20000199 PCBA
2. Align the "dot" on the potentiometer dial with the desired rate
 - a. Select patterns on AC LED Beacons are capable of auto-synchronization



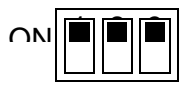
III 4-7
LED Flash Pattern Configuration
(Set to Strobe Position)



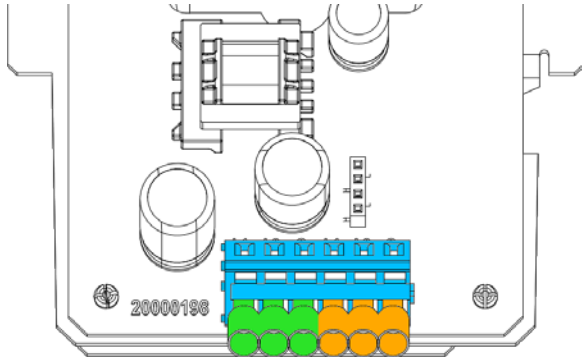
III 4-8
LED Flash Pattern Rate Configuration
(Set to 75FPM Position)

Switch Position	Auto-Sync ⁸	Pattern Name	Pattern Description
ON 	--	Steady On	All five segments active 100% duty cycle
ON 	Yes	Flash	Light flashes at 66% duty cycle 60/75/90FPM
ON 	Yes	Swell	Light gradually fades on and off 60/75/90FPM
ON 	Yes	Strobe Simulation	Three 10ms pulses with 10ms pauses 60/75/90FPM
ON 	No	Rotate (Clockwise)	Simulated reflector rotate (smooth) 60/75/90RPM
ON 	No	Rotate (Counter-Clockwise)	Simulated reflector rotate (smooth) 60/75/90RPM
ON 	No	Half-Rotate "Bounce"	Simulated reflector rotate (smooth) Stop and reverse at $\pm 90^\circ$ 60/75/90RPM

⁸ Auto-Sync synchronizes devices powered from the same AC source/phase at 60Hz, when activated simultaneously

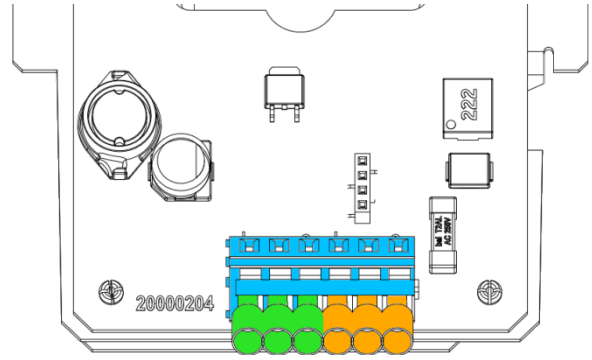
	No	Dual-Rotate (Clockwise)	Simulated dual light source reflector rotate (pinwheel) 60/75/90RPM
---	----	----------------------------	---

If a nearby product requires AC or DC power loop-through, the G-Series "Ex d" housing supports power loop-out field termination. As the "Ex d" housing provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 4-9

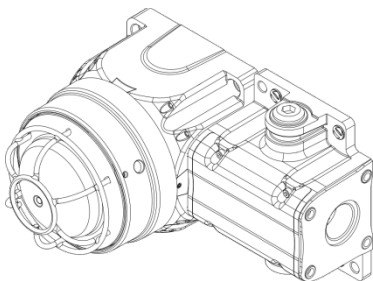
AC LED Beacon Wiring with Power Loop-Out



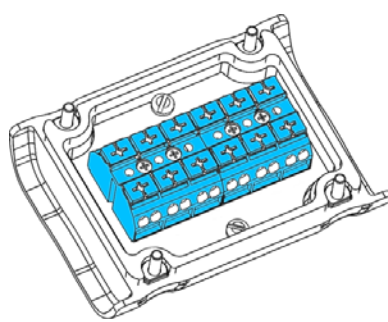
III 4-10

DC LED Beacon Wiring with Power Loop-Out

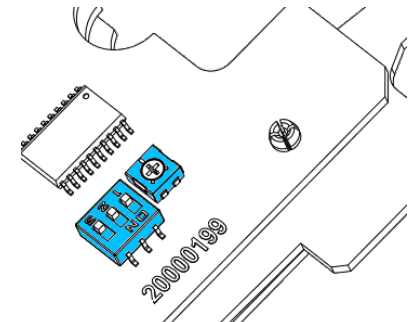
c. *Installing and Wiring the Increased Safety "Ex de" Housing*



III 4-11
LED Beacon 'd'



III 4-12
Terminal Block

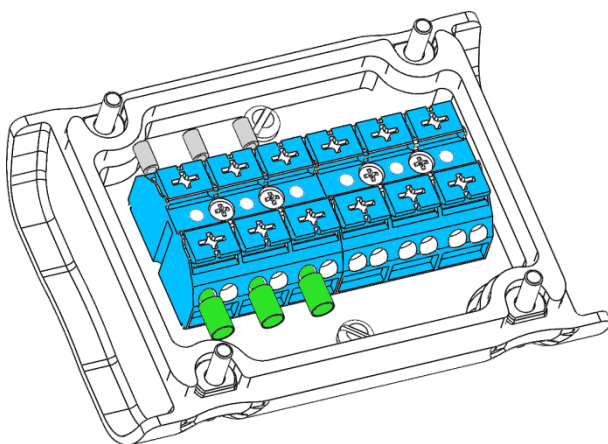


III 4-13
LED Pattern Select and Speed Dial

	Connection	Locations	Description
1	L1/+	4	Input Power In ("Hot/L1/DC+")
2	L2/-	4	Input Power Return ("Neutral/L2/DC-")
3	⊕	4	Earth Ground Termination Point
4	L3/Alt+	4	(Not Used)
5	Aud+	4	(Not Used)
6	Aud-	4	(Not Used)
		24	

Wiring the G-Series LED Beacon "Ex de" terminal chamber for AC or DC power requires three (3) conductors for input power (with an earth conductor). The G-Series LED Beacon setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.

If a nearby product requires AC or DC power loop-through, the G-Series LED Beacon "Ex de" terminal chamber supports power loop-out field termination. As the "Ex de" terminal chamber provides three (3) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry, or that input cabling occupies two entries but only one entry is required for loop-out cabling, before architecting a loop-in/loop-out topology.

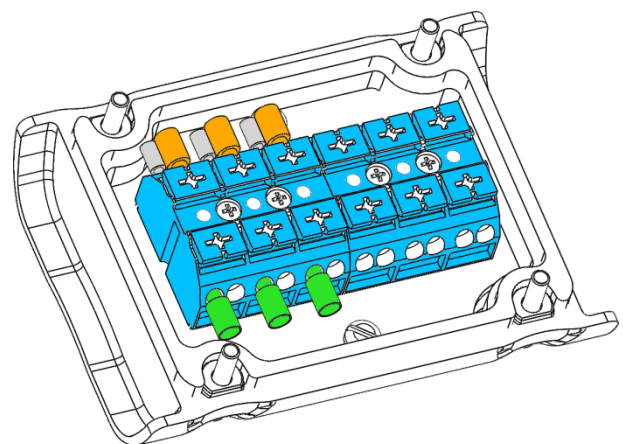


■ INPUT POWER

■ LINE BUSHING

III 4-14

LED Beacon Wiring Locations (AC or DC)



■ INPUT POWER

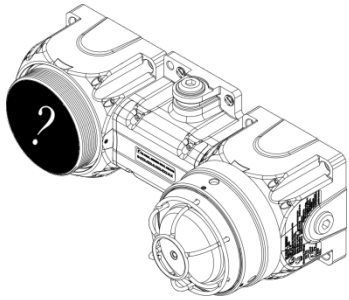
■ LOOP-OUT POWER

■ LINE BUSHING

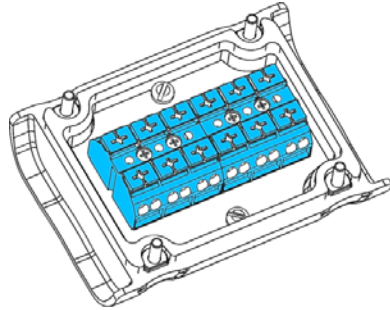
III 4-15

LED Beacon with Power Loop-Out (AC or DC)

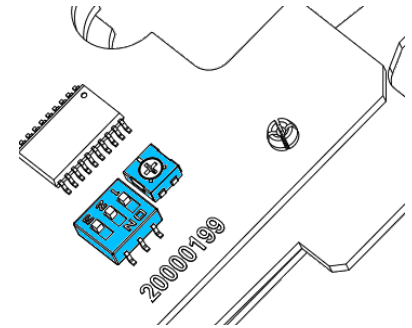
d. *Installing and Wiring Dual "de d" Combination Unit Housings*



III 4-16
LED Beacon (LB) and
Unspecified Device (UD)



III 4-17
Terminal Block
(Common between devices)



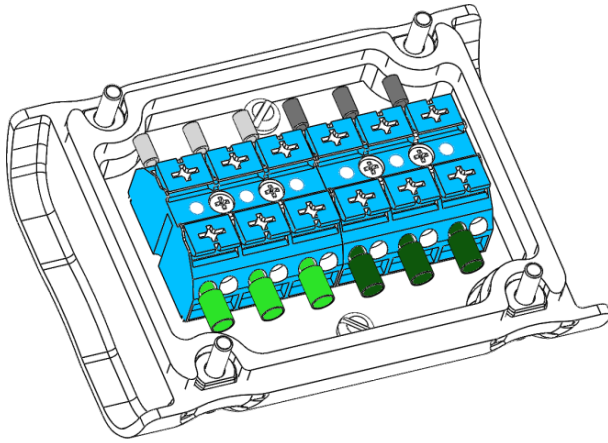
III 4-18
LED Pattern Select and Speed
Dial
(LED Device)

	Connection	Locations	Description
1	L1/+	4	Input Power In ("Hot/L1/DC+")
2	L2/-	4	Input Power Return ("Neutral/L2/DC-")
3	Alt1	4	Earth Ground Termination Point
4	Alt2	4	Input Power In ("Hot/L1/DC+")
5	Alt3	4	Input Power Return ("Neutral/L2/DC-")
6	Alt4	4	Earth Ground Termination Point

24

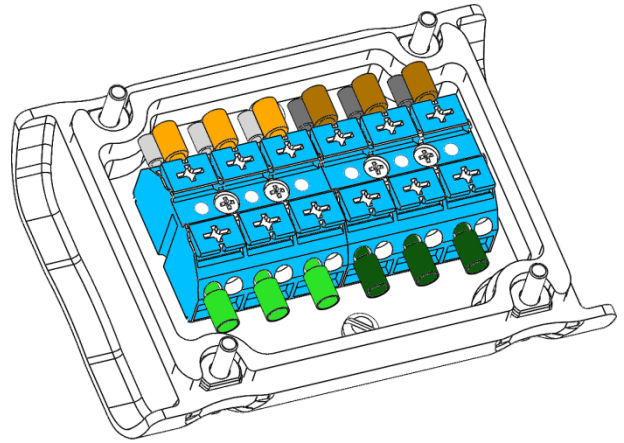
Wiring an AC or DC G-Series Combination Unit Dual "de d" terminal chamber with an LED Beacon requires three (3) conductors are required for input power (with an earth conductor), leaving three (3) terminal locations open for the unspecified device (UD). The product setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.

If a nearby product requires AC or DC power loop-through, G-Series combination unit Dual "de d" terminal chamber supports power loop-out field termination. As the Dual "de d" terminal chamber provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



- | | |
|---|--|
| INPUT POWER 1 | LINE BUSHING 1 |
| INPUT POWER 2 | LINE BUSHING 2 |

III 4-19
Dual-Unit (LB) Wiring Locations



- | | |
|--|--|
| INPUT POWER 1 | LOOP-OUT POWER 1 |
| INPUT POWER 2 | LOOP OUT POWER 2 |
| LINE BUSHING 1 | LINE BUSHING 2 |

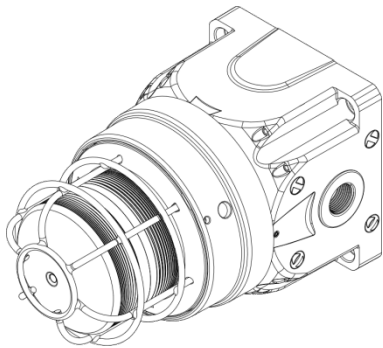
III 4-20
Dual-Unit (LB) with Power Loop-Out

5. Xenon Strobe Beacon

a. Feature Set

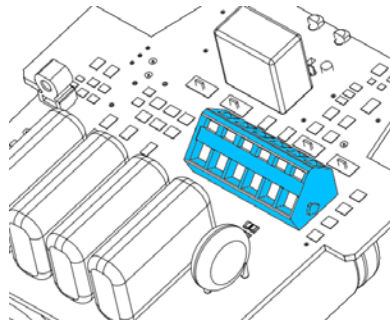
1. Model-Specific voltage input with loop-out terminal positions
 - 110/120VAC with loop-out
 - 220-240VAC with loop-out
 - 24VDC with loop-out
2. Cable Entries
 - Flameproof "Ex d": 2 x M20 entries (opposing sides)
 - Increased Safety "Ex de": 3 x M20 entries (opposing sides and base)
 - Dual "de d" Combination Devices: 2 x M20 entries (opposing sides)

b. Installing and Wiring the Flameproof "Ex d" Housing



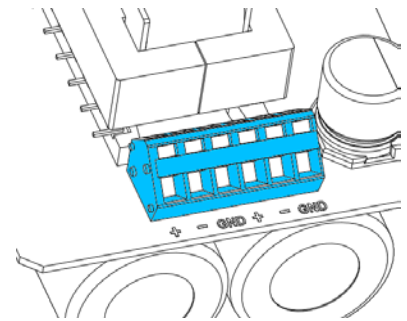
III 5-1

"Ex d" Xenon Strobe Beacon



III 5-2

AC Terminal Block



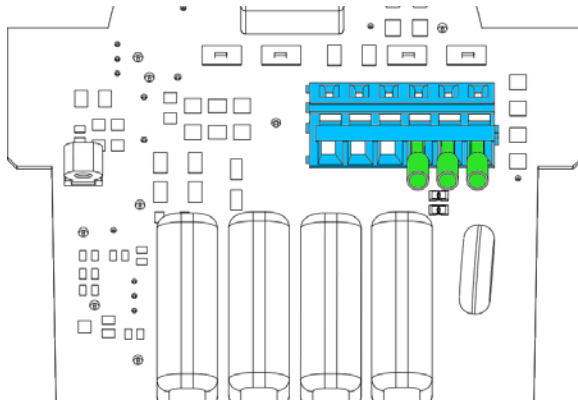
III 5-3

DC Terminal Block

Connection	Locations	Description
1	L1 or +	1 AC Power ("Hot/L1") or DC Power ("+")
2	L2 or -	1 AC Return ("Neutral/L2") or DC Return ("-")
3	Earth	1 Earth Ground Termination Point
4	L1 or +	1 AC Power ("Hot/L1") or DC Power ("+")
5	L2 or -	1 AC Return ("Neutral/L2") or DC Return ("-")
6	Earth	1 Earth Ground Termination Point

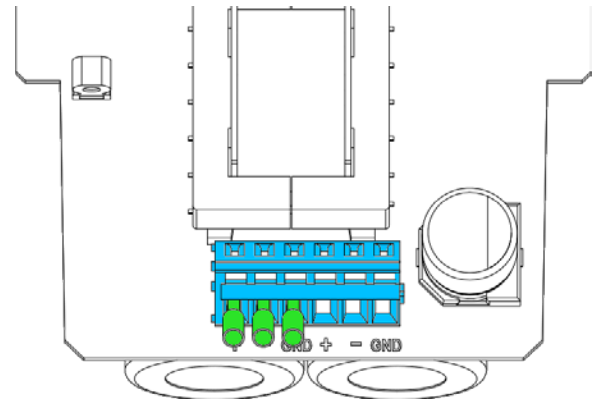
6

Wiring the G-Series Xenon Strobe Beacon "Ex d" housing for AC or DC power requires three (3) conductors for input power (with an earth conductor). Depending on the model ordered, the Xenon Strobe Beacon will accept either 110VAC, 50/60Hz or 220VAC, 50/60Hz. The DC Xenon Strobe Beacon will accept 24VDC.



III 5-4

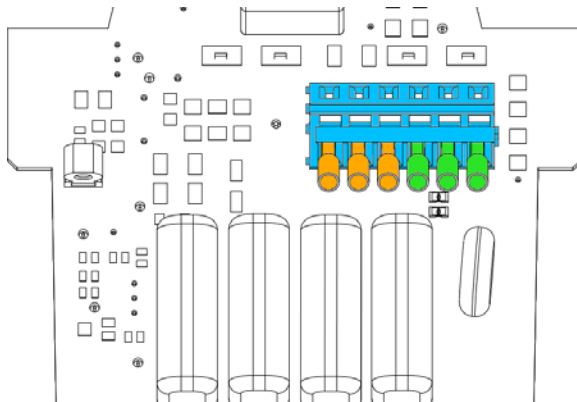
AC Xenon Strobe Beacon Wiring Locations



III 5-5

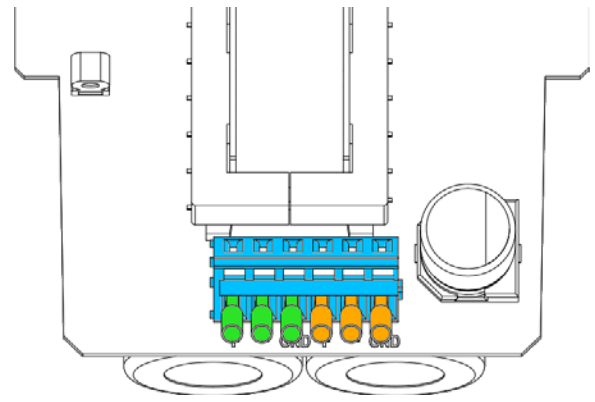
DC Xenon Strobe Beacon Wiring Locations

If a nearby product requires AC or DC power loop-through, the G-Series Xenon Strobe Beacon "Ex d" housing supports power loop-out field termination. As the "Ex d" housing provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 5-6

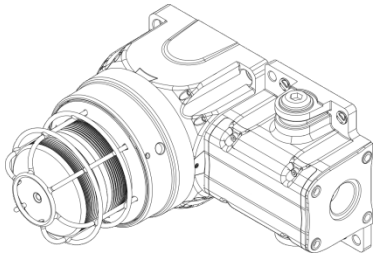
AC Xenon Strobe Beacon with Power Loop-Out



III 5-7

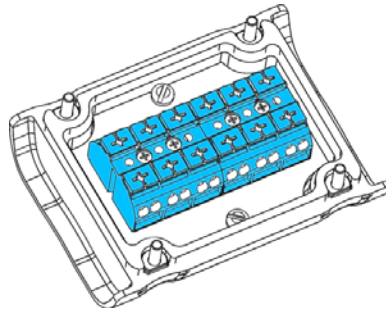
DC Xenon Strobe Beacon with Power Loop-Out

c. *Installing and Wiring the Increased Safety "Ex de" Housing*



III 5-8

Xenon Strobe Beacon 'de'



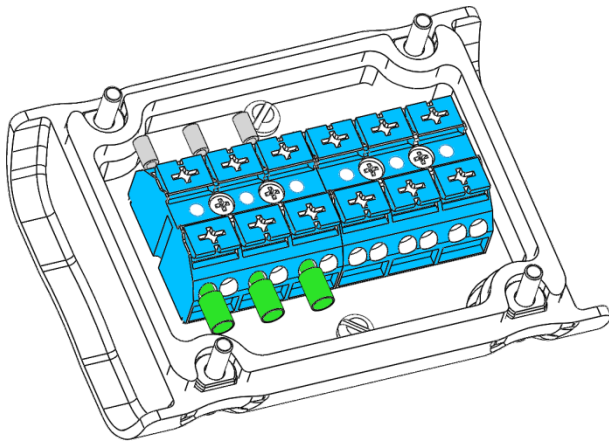
III 5-9

Terminal Block

	Connection	Locations	Description
1	L1/+	4	Input Power In ("Hot/L1/DC+")
2	L2/-	4	Input Power Return ("Neutral/L2/DC-")
3	⊕	4	Earth Ground Termination Point
4	L3/Alt+	4	(Not Used)
5	Aud+	4	(Not Used)
6	Aud-	4	(Not Used)
			24

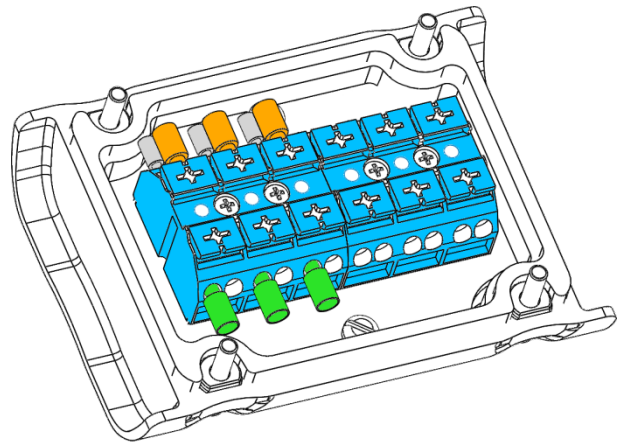
Wiring the G-Series Xenon Strobe Beacon "Ex de" terminal chamber for AC or DC power requires three (3) conductors for input power (with an earth conductor). The G-Series Xenon Strobe Beacon setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.

If a nearby product requires AC or DC power loop-through, the G-Series Xenon Strobe Beacon 'e'-chamber supports power loop-out field termination. As the "Ex de" terminal chamber provides three (3) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry, or that input cabling occupies two entries but only one entry is required for loop-out cabling, before architecting a loop-in/loop-out topology.



■ INPUT POWER ■ LINE BUSHING

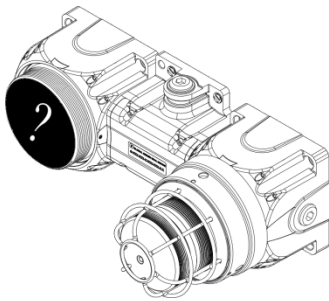
III 5-10
Xenon Strobe Beacon Wiring Locations
(AC or DC)



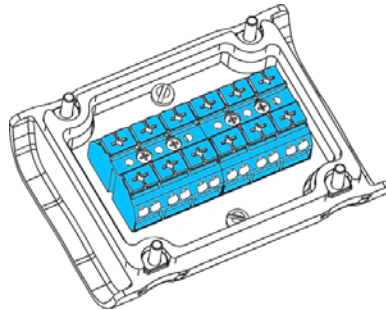
■ INPUT POWER ■ LOOP-OUT POWER
■ LINE BUSHING

III 5-11
Xenon Strobe Beacon with Power Loop-Out
(AC or DC)

d. *Installing and Wiring Dual "de d" Combination Unit Housings*



III 5-12
Xenon Strobe Beacon (SB)
and Unspecified Device (UD)

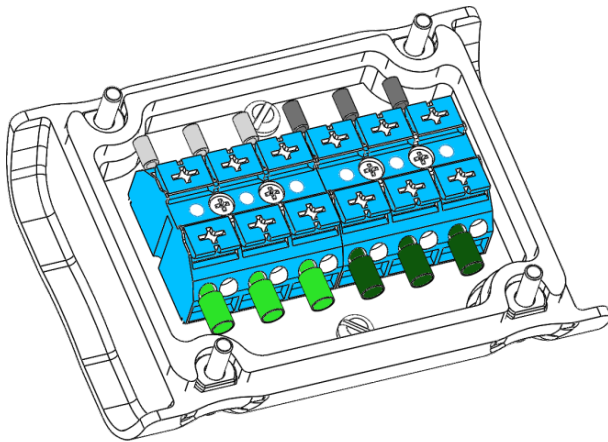


III 5-13
Dual "de d" Terminal Block
(Common Between Devices)

Connection	Locations	Description
1	L1/+	4 Input Power In ("Hot/L1/DC+")
2	L2/-	4 Input Power Return ("Neutral/L2/DC-")
3	Alt1	4 Earth Ground Termination Point
4	Alt2	4 Input Power In ("Hot/L1/DC+")
5	Alt3	4 Input Power Return ("Neutral/L2/DC-")
6	Alt4	4 Earth Ground Termination Point
24		

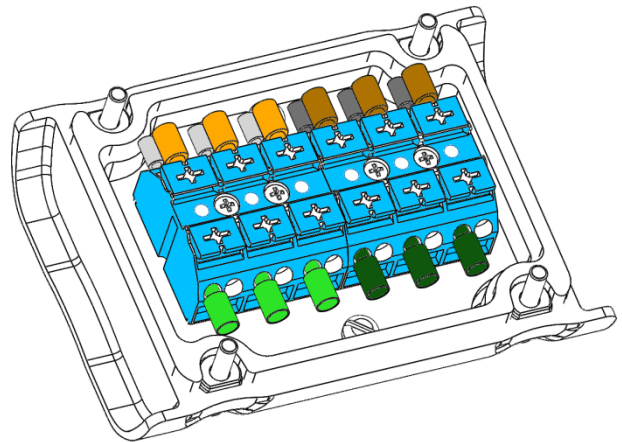
Wiring an AC or DC G-Series combination unit Dual "de d" terminal chamber with a Xenon Strobe Beacon (SB) requires three (3) conductors are required for input power (with an earth conductor), leaving three (3) terminal locations open for the unspecified device (UD). The product setup and wiring within the "Ex d" housing is configured at the factory to-order; the only installation requirement for device operation is field wire termination to the proper terminal block position.

If a nearby product requires AC or DC power loop-through, G-Series combination Dual "de d" terminal chamber supports power loop-out field termination. As the Dual "de d" terminal chamber provides two (2) M20 entries for cable passage, at least one entry must be dedicated for incoming conductors. Federal Signal recommends verifying the application wiring requirements and cable conductor count allow for input cabling to occupy a single entry before architecting a loop-in/loop-out topology.



III 5-14

Dual-Unit (SB) Wiring Locations



III 5-15

Dual-Unit (SB) with Power Loop-Out