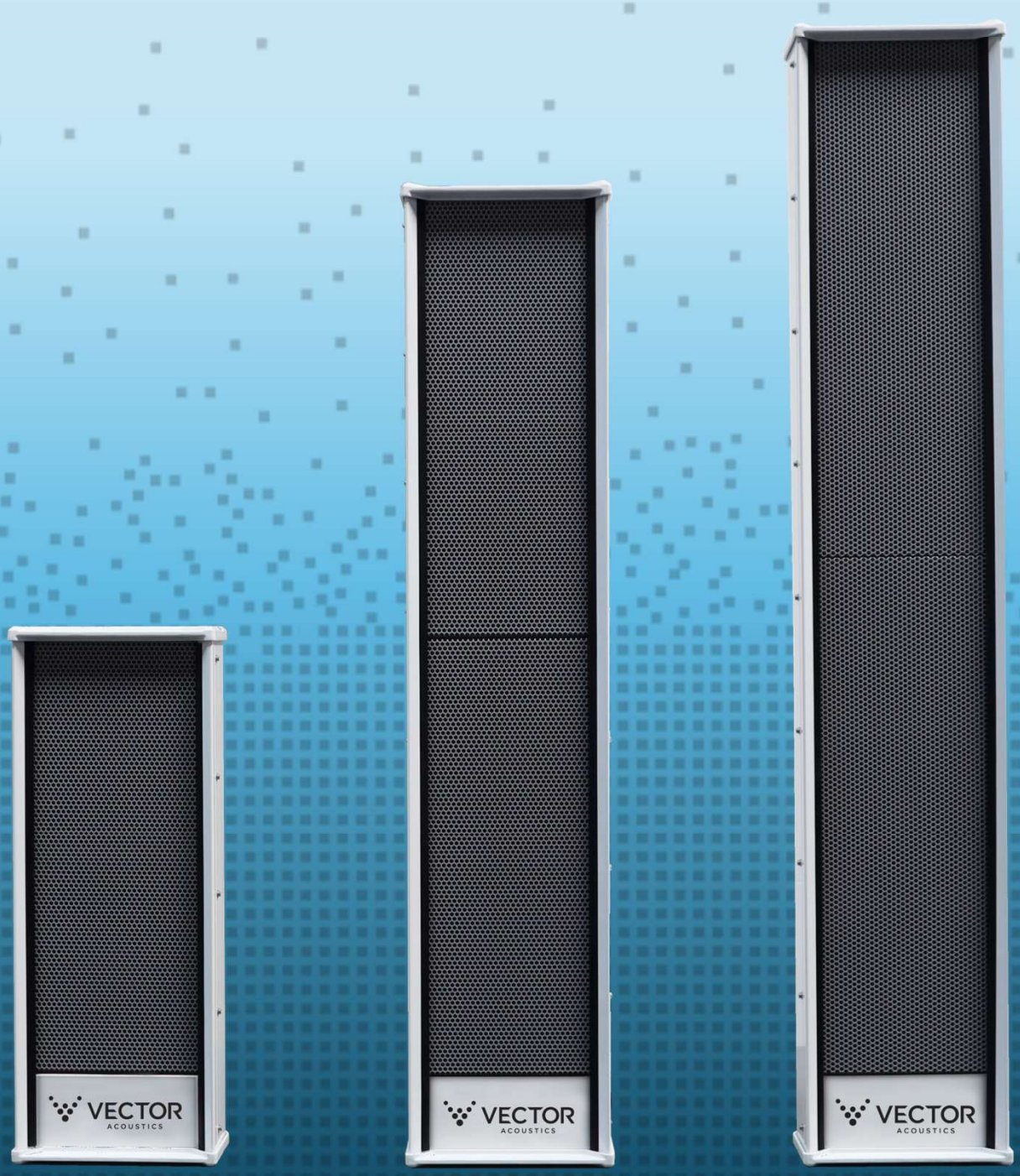
VECTOR
ACOUSTICS



High Intelligibility Loudspeakers
for Public Alerting Life Safety Systems

The Vector Acoustics family of Line Source Loudspeakers

The LS family of loudspeakers is the latest development in high intelligibility warning systems for public alerting and notification. The LS loudspeaker family's acoustic signature is precisely tuned to produce crystal clear and intelligible voice broadcasts that can be heard and understood across large distances in a wide variety environments. The LS Line-Source loudspeakers deliver powerful, audible and intelligible broadcasts with unprecedented clarity. The versatile LS family is available in three distinct sizes:

- LS-30 (30 Watts): Audio range of 300 meters or more (920 feet). Ideal for parks, town centers, boardwalks, stadiums, and urban areas.
- LS-60 (60 Watts): Audio range of 500 meters or more (1600 feet).
- LS-120S (120 Watts): Audio range of 800 meters or more (2600 feet). Wide area coverage for military bases, industrial facilities, rural cities.

This product range offers the right systems for optimal acoustic coverage in a broad range of environments, from expansive rural terrain to dense urban areas. The slim and light weight Line Source form factor of the LS family allows for these loudspeakers to be installed individually or in clusters in order to tailor acoustic coverage footprints for precise results.

Safety-Critical Notification

Effective public warning systems must deliver life-saving information and warnings with clear, spoken informational broadcasts as well as attention-grabbing siren sounds. A mere siren can lead to confusion and doubt, which, in emergency situations means time is lost and order can turn into chaos. Actionable information from a public warning system saves time, reduces confusion and enables emergency managers to more precisely manage their emergency response plans.

Modern Engineering and Know-How

Existing electronic, loudspeaker-based outdoor warning systems are designed to recreate the loud siren and tone warning sounds that were traditionally made by older air-powered mechanical sirens and horns. This limited design approach ignores a great portion of the audio spectrum needed for clear voice broadcasts and as a result, voice broadcasts from these systems sound distorted, muffled, and unintelligible, particularly as the listeners' distance from the siren increases.

In 2020, Vector Acoustics designed and developed its new generation of LS loudspeakers for emergency warning systems to attack this voice intelligibility problem. Vector collaborated with the industry's top acoustic driver manufacturer to develop the clearest and most power-efficient compression driver with a form factor small enough to be able to produce a slim and attractive loudspeaker. We engineered precision waveguides to tailor the audio signal for optimal voice intelligibility that holds up over the longest distances. We built and tested a rugged loudspeaker able to withstand the unforgiving elements found in all outdoor environments. The result is a rugged, reliable loudspeaker that can be depended on to help save lives and maintain order in chaotic situations.

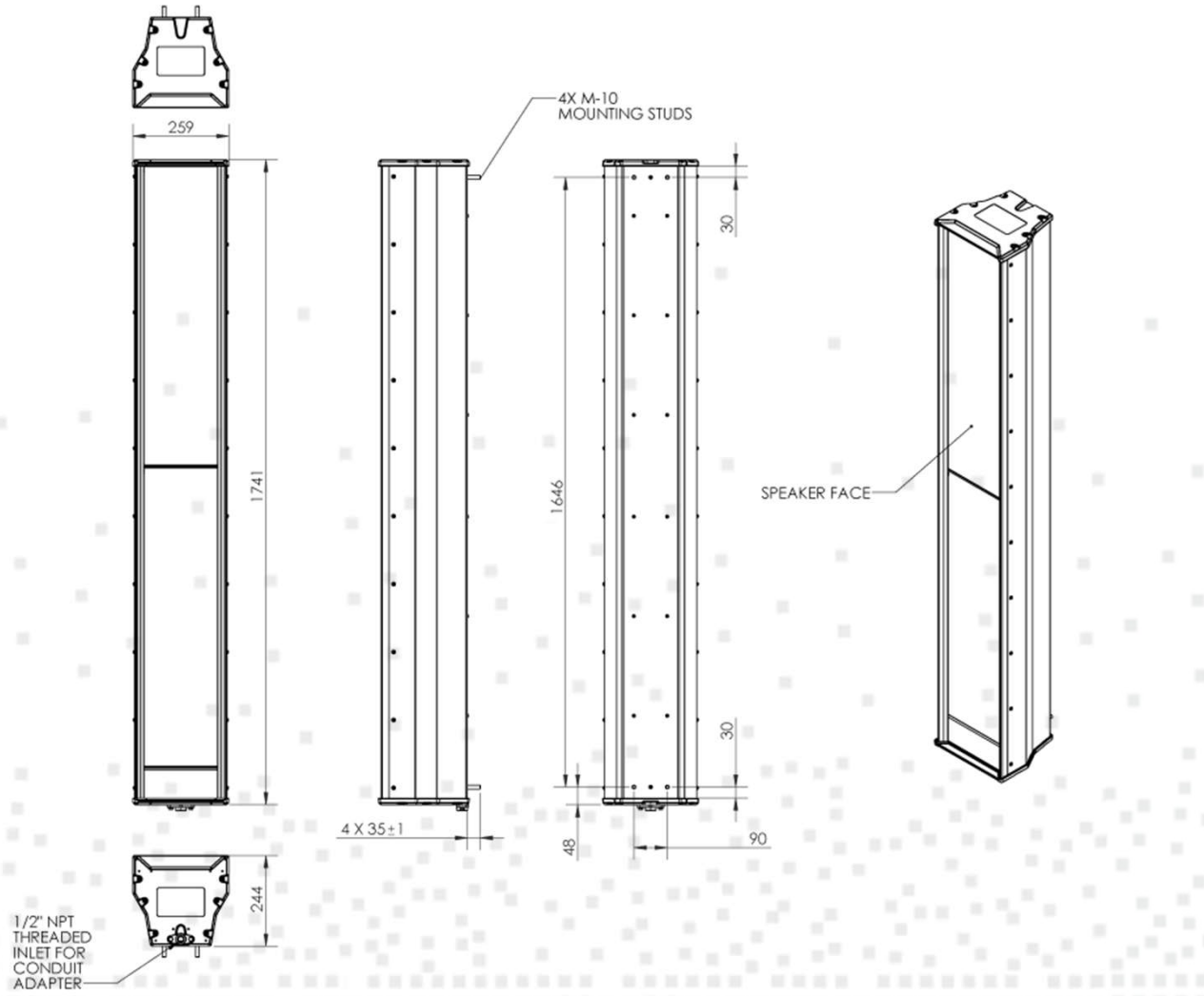
Installation Successes

Since its launch in 2020, the LS loudspeaker family has successfully been installed in hundreds of tsunami warning systems in Japan. It also protects populations in the United States from the dangers of rapidly spreading fires or sudden severe weather events such as lightning strikes or tornados. The LS loudspeaker provides base-wide emergency notifications and daily announcements on US Marine Corps bases. The range of applications is vast, and the LS family has proven itself to be capable of producing results.

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Model Number LS-120S Technical Specifications

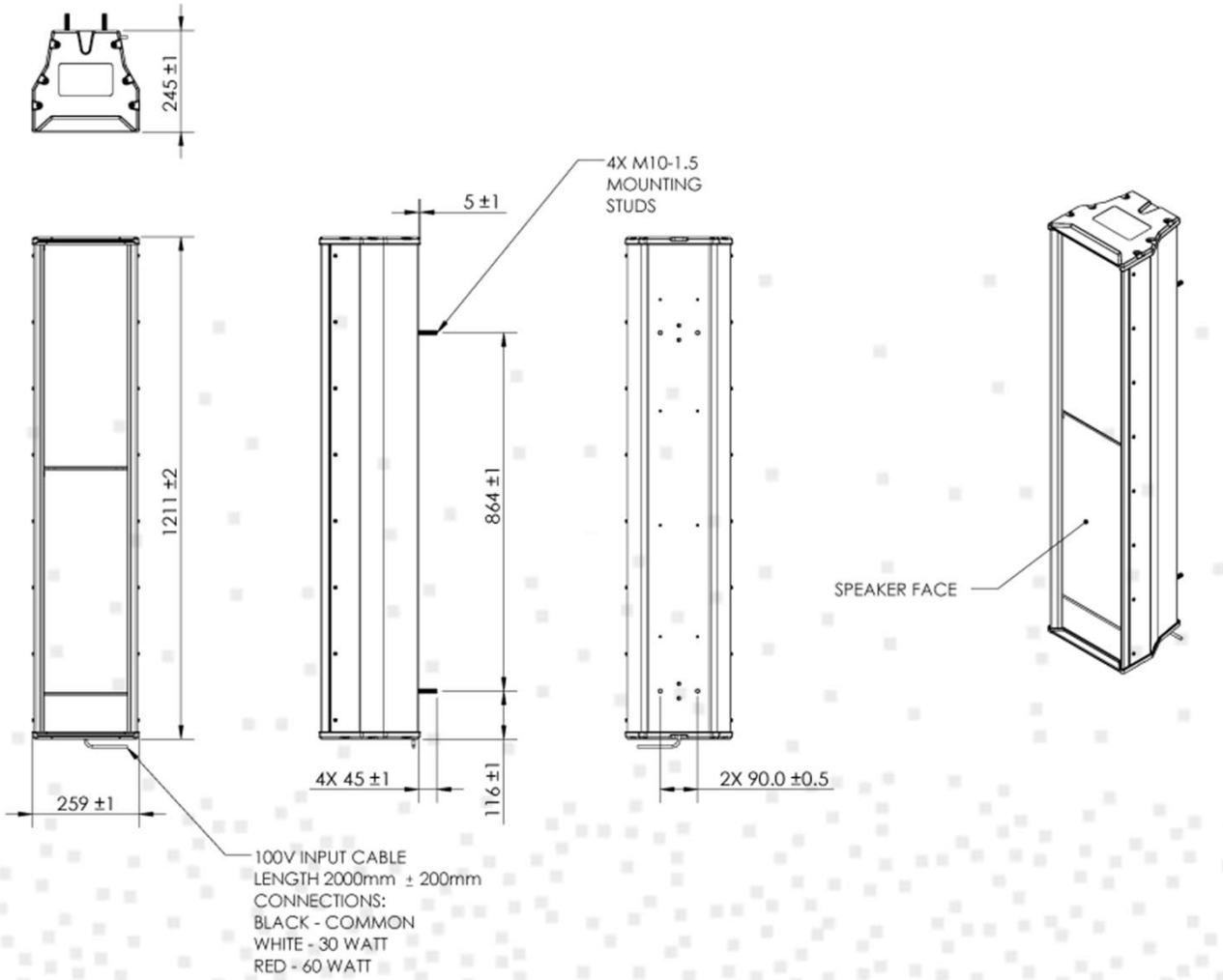


Weight:	**22 kg (48.5 lb)**
Construction:	**5052-H32 aluminum**
	chemical conversion coating (RoHS compliant)
	architectural grade powdercoat (white)
	316 stainless steel hardware
Input Connection:	**Includes pre-installed 2 meter unterminated input cable**
Operating Temp:	**-30 to +60 C (-22 to 140 F)**
Wind:	**75 meters/second (168 mph)**
Ingress Protection:	**IPX6**
Insects:	**preinstalled insect screen**
Frequency Response:	**400 Hz ~ 10kHz (+/- 8dB)**
Power Rating:	**120 Watts Max**
Acoustic Sensitivity:	**123 dB at 1W, 1m**
SPL at 30 meters:	**117 dB**
70 dB Range:	**800 meters (2600 feet)**
Beam Width:	**110 degrees horizontal, 15 degrees vertical (-6dB at 1kHz)**
100V Input Impedance:	**83 Ohms on 120 Watt tap**
	165 Ohms on 60 Watt tap
	330 Ohms on 30 Watt tap

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Model Number LS-60 Technical Specifications

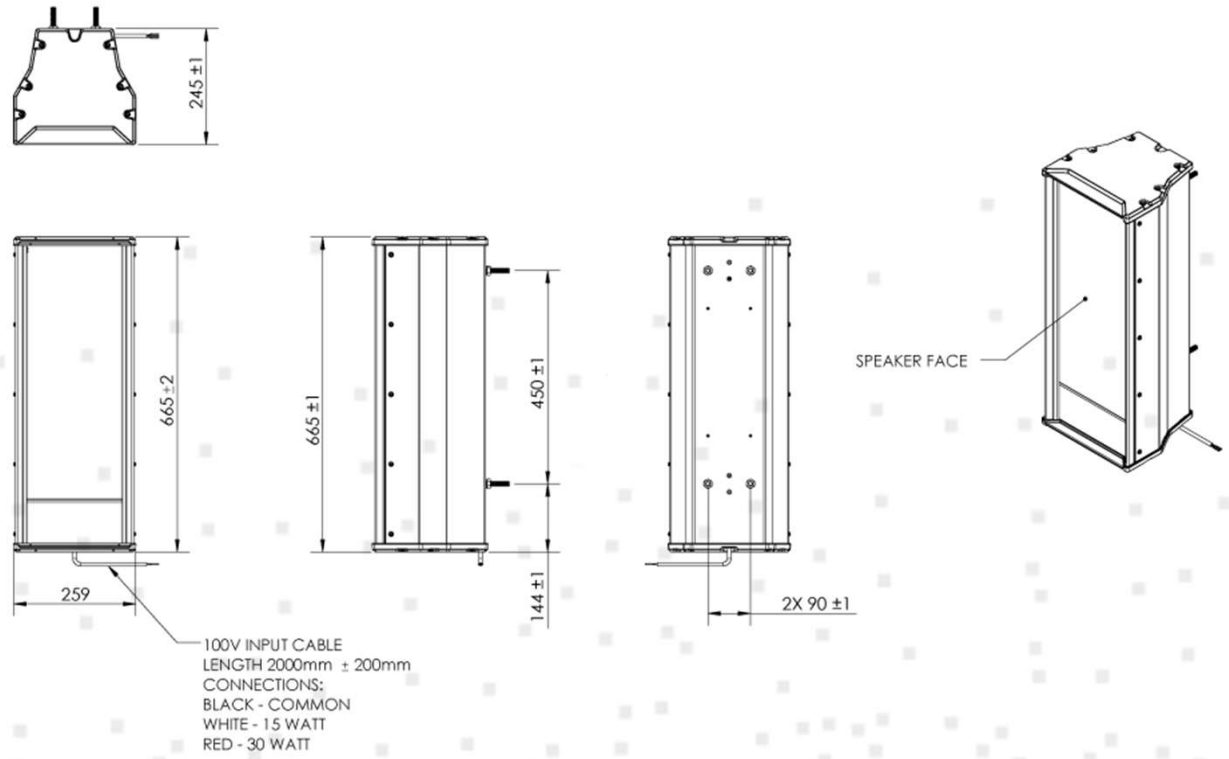


Weight:	**15 kg (33 lb)**
Construction:	**5052-H32 aluminum**
	chemical conversion coating (RoHS compliant)
	architectural grade powdercoat (white)
	316 stainless steel hardware
Input Connection:	**Includes pre-installed 2 meter unterminated input cable**
Operating Temp:	**-30 to +60 C (-22 to 140 F)**
Wind:	**75 meters/second (168 mph)**
Ingress Protection:	**IPX6**
Insects:	**preinstalled insect screen**
Frequency Response:	**400 Hz ~ 7kHz (+/- 8dB)**
Power Rating:	**60 Watts Max**
Acoustic Sensitivity:	**120 dB at 1W, 1m**
SPL at 30 meters:	**110 dB**
70 dB Range:	**490 meters (1600 feet)**
Beam Width:	**110 degrees horizontal, 20 degrees vertical (-6dB at 1kHz)**
100V Input Impedance:	**166 Ohms on 60 Watt tap**
	333 Ohms on 30 Watt tap

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Model Number LS-30 Technical Specifications



Weight:	**10 kg (22 lb)**
Construction:	**5052-H32 aluminum**
	chemical conversion coating (RoHS compliant)
	architectural grade powdercoat (white)
	316 stainless steel hardware
Input Connection:	**Includes pre-installed 2 meter unterminated input cable**
Operating Temp:	**-30 to +60 C (-22 to 140 F)**
Wind:	**75 meters/second (168 mph)**
Ingress Protection:	**IPX6**
Insects:	**preinstalled insect screen**
Frequency Response:	**400 Hz ~ 7kHz (+/- 8dB)**
Power Rating:	**30 Watts Max**
Acoustic Sensitivity:	**118 dB at 1W, 1m**
SPL at 30 meters:	**102 dB**
70 dB Range:	**280 meters (920 feet)**
Beam Width:	**110 degrees horizontal, 40 degrees vertical (-6dB at 1kHz)**
100V Input Impedance:	**333 Ohms on 30 Watt tap**
	650 Ohms on 15 Watt tap

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Product Range and Configurations

Each LS loudspeaker accepts audio from any 100V constant Voltage audio distribution amplifier. Multiple input power taps are available on each model in order to fine tune the power levels and acoustic coverages. As with all constant Voltage systems, wiring is made simpler and less expensive, as loudspeakers can be daisy-chained in parallel and can be driven with lighter gauge wire diameters without suffering power losses over long cable runs. Built in frequency filters protect the loudspeakers from frequencies that may damage the drivers and produce the most desirable frequency spectrum for clear voice transmission and powerful siren sounds. Custom solutions with 70V or standard 8 Ohm inputs are also available.

SPL and Range at Each Input Power Tap by Product

Model:	LS-120S			LS-60		LS-30	
Input Taps (Watts):	120	60	30	60	30	30	15
Efficiency (dB/1W/1m):	123	123	123	120	120	118	118
SPL at 100ft/30m (dBSPL):	117	114	111	110	107	102	99
70dB range (feet):	2600	2115	1720	1600	1300	920	750
70dB range (meters):	800	645	525	490	400	280	230

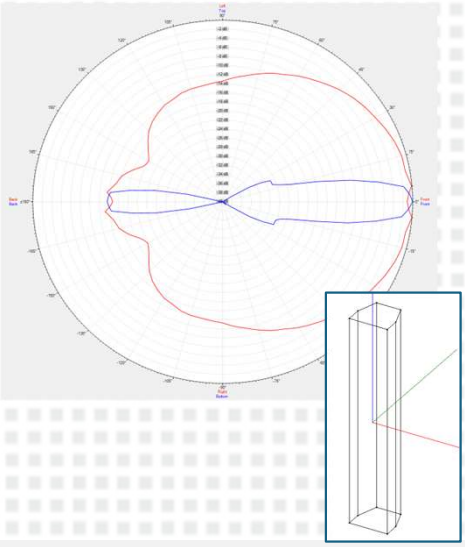
The LS loudspeakers can be stacked in phased linear arrays to achieve increased ranges and volume levels. Doubling the number of speakers in a cluster can increase the acoustic output by 6dB.

Power and Range by Array Length

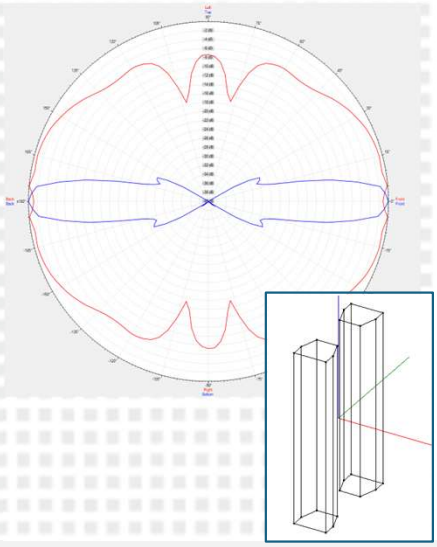
	LS-120S			LS-60			LS-30		
Configuration	Single	Dual	Quad	Single	Dual	Quad	Single	Dual	Quad
Max Power Input (Watts):	120	240	480	60	120	240	30	60	120
Speaker Array Length (inches):	68.5	137	274	48	96	192	26	52	104
SPL at 100ft/30m (dBSPL):	117	123	129	110	116	122	102	108	114
70dB range (feet):	2600	3900	6000	1600	2400	3700	920	1400	2110
70dB range (meters):	800	1200	1800	490	730	1130	280	430	640

LS loudspeakers can also be clustered and oriented to provide varying degrees of horizontal acoustic coverage. A single LS loudspeaker produces a 110 degree acoustic “beam” width. LS units can be arranged to provide up to 360 degrees of acoustic coverage. Vector Acoustics can provide 3D polar plots for these configurations as needed in tabular format or using industry standard .GLL data files.

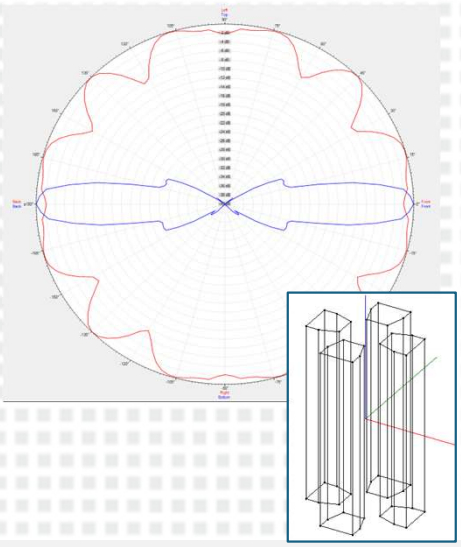
Single Loudspeaker



Double Loudspeaker



Quad Loudspeaker



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Flexibility and Versatility

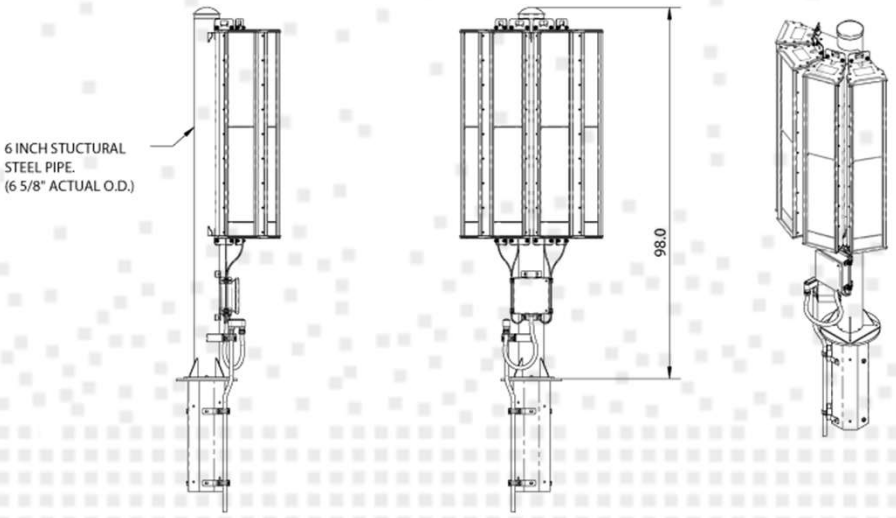


Designing and planning an outdoor warning system can be extremely challenging. Mounting systems for attaching the LS family to existing utility poles and building structures allow a greater range of installation options. This enables installers and integrators to produce designs that precisely distribute acoustic notification areas where they are needed the most.

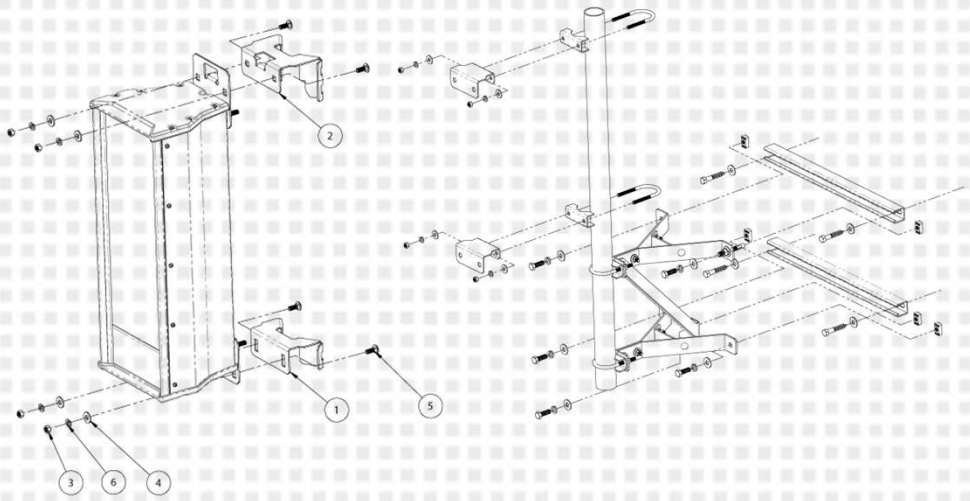
Clustering multiple LS loudspeakers together allows you to place the sound where you need it as well as to reinforce and extend the acoustic coverage ranges by grouping loudspeakers together.

Vector Acoustics offers a variety of mounting system designs and can design and fabricate custom installation components and systems with expert engineering support.









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Rugged Design

The LS loudspeakers are manufactured using weather resistant materials to ensure a long service life. The formed 5052-H32 aluminum housing is coated with a corrosion blocking chemical conversion coating and finished with architectural-grade powder-coat that resists fading in direct sunlight and in all weather conditions. All fasteners and mounting points are made with type 316 marine grade stainless steel for protection against corrosion. The system is rated to IP X6, to withstand heavy rain in high winds. An insect screen protects the acoustic emitters from nesting insects to keep them free of obstructions.



Test Setup, Spraying Unit, Front Face

Contact

For product inquiries or pre-sales support please contact Vector Acoustics and we will gladly assist you.

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