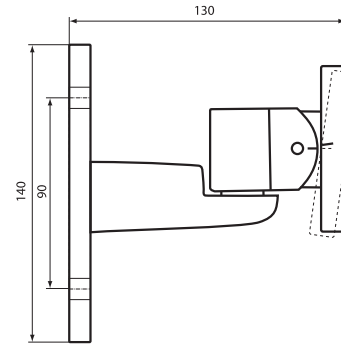
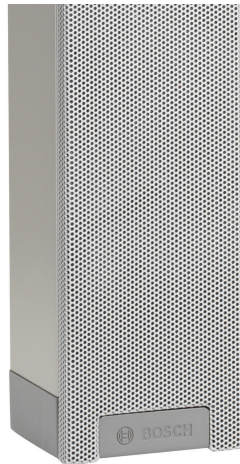


LBC 3200/00 Line Array Indoor Loudspeaker



Dimensions in mm of included mounting bracket (with marked angle)

4

Features

- ▶ Extended listening area
- ▶ Excellent intelligibility of speech and music
- ▶ Uniform distribution of natural sound throughout the room
- ▶ Suitable for any small to medium enclosures, from canteens to meeting rooms
- ▶ Extremely slim
- ▶ Voice evacuation compliant as standard
- ▶ Ideal combination of advanced acoustics and easy application
- ▶ Unrivalled sound quality for its size
- ▶ EN 54-24 and EN 60849 compliant

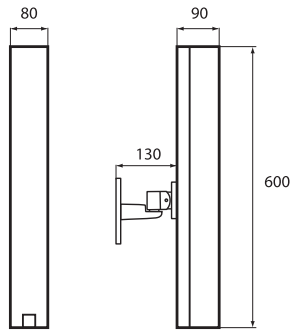
This loudspeaker, with its good directivity, can handle small and medium indoor environments such as congress venues, meeting rooms, showrooms and canteens. The full frequency range of the LBC 3200/00 makes it ideal for speech as well as music reproduction. Its exceptionally narrow housing (only 8 cm wide) makes it extremely unobtrusive.

System Overview

A wall bracket for mounting the line array onto walls and pillars is included with the loudspeaker. It is fully adjustable in two perpendicular planes for accurate positioning. For temporary installations, the LBC 3200/00 can be mounted on an LBC 1259/01 floor stand with an M10 threaded bolt without additional accessories.



Detail mounting bracket



Dimensions in mm



Mounted on optional loudspeaker stand (LBC 1259/01)

A three-way, ceramic terminal block with screw connections suitable for loop-through wiring is located in a compartment at the base of the loudspeaker. There is also a switch, which allows the selection of nominal full power (30 W), half power (15 W), or quarter power (7.5 W). The compartment has knockout slots for cables.

Functions

Range of Application

The LBC 3200/00 is part of the XLA 3200 (eXtended Listening Area) range of line array loudspeakers. The positioning of the loudspeaker drivers* has resulted in greatly improved audio directivity. The specially developed high quality drivers enable reproduction of remarkably clear, natural sound, giving excellent intelligibility of both speech and music. Greater coverage is achieved, so more people can be reached with perceptually perfect sound. All this makes this small line array loudspeaker very suitable for use in small to medium sized applications.

*patent pending

Easy Installation

The positioning of the drivers in the array generates larger vertical opening angles for high frequencies, reducing the narrow 'beaming' of higher tones. As an example, the vertical opening angle is still 18° at 4 kHz. Having larger vertical opening angles makes installation easier, as the positioning of the loudspeakers is easier because they cover a wider area. An extremely wide horizontal opening angle of 130° at 4 kHz means that a single loudspeaker can provide natural sound reproduction over an extensive listening area.

Suppressed Side Lobes

All conventional column loudspeakers produce a main lobe of sound, which is directed at listeners, and a number of unwanted side lobes. The LBC 3200/00 has highly suppressed side lobes in the vertical plane, typically at least 8 dB of suppression from the 500 Hz octave band at 90°. This provides a much clearer, less colored sound, and greatly reduces the possibilities for acoustic feedback.

Sound Reproduction

The positioning and very high quality of the 2 inch drivers contribute significantly in making the LBC 3200/00 a very efficient line array. With a sound pressure level of 106 dB at 1 m, at 30 W, loud and clear sound reproduction is possible even at a significant distance from the loudspeaker.

The high-quality loudspeaker drivers used in the LBC 3200/00 give excellent, natural sound reproduction of frequencies ranging from 190 Hz to 18 kHz. This ensures that all important frequencies for superb speech intelligibility are heard in the listening area.

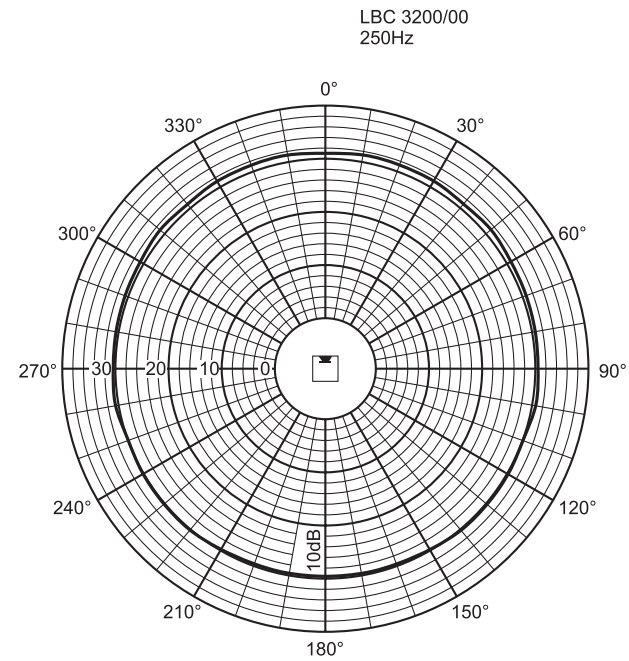
Emergency Compliant

The loudspeakers ceramic terminal block, thermal fuse and heat-resistant, high-temperature wiring ensures that, in the event of a fire, damage to the loudspeaker does not result in failure of the circuit to which it is connected. This maintains system integrity, ensuring that loudspeakers within the same loudspeaker zone in other areas can still be used to inform people of the situation.

Certifications and Approvals

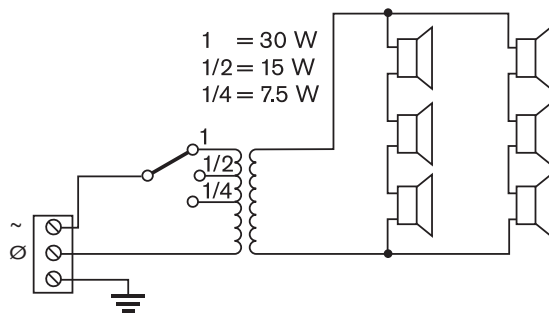
All Bosch loudspeakers are designed to withstand operation at their rated power for 100 hours in accordance with IEC 268-5 Power Handling Capacity (PHC) standards. These loudspeakers also comply with the Simulated Acoustical Feedback Exposure (SAFE) test, which demonstrates that they can withstand acoustical feedback at full power for short durations. This ensures extra reliability under extreme conditions, leading to higher customer satisfaction, longer operating life, and much less chance of failure or performance deterioration.

Region	Certification
Europe	CE
Poland	CNBOP
Safety	acc. to EN 60065 and CE
Emergency	acc. to EN 54-24 / EN 60849
Impact	acc. to EN 50102, IK 07
Water and dust protection	acc. to IEC 60529, IP 32

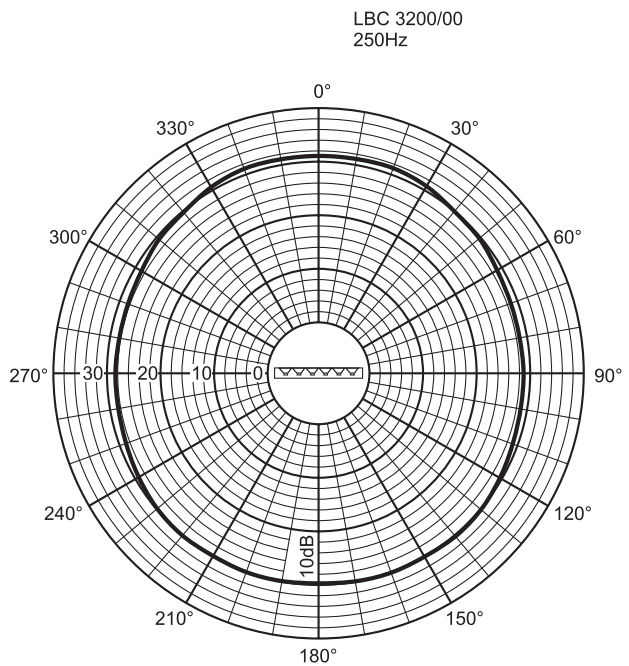


Polar diagram horizontal

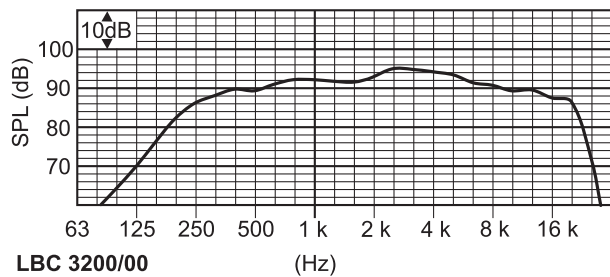
Installation/Configuration Notes



Circuit diagram



Polar diagram vertical



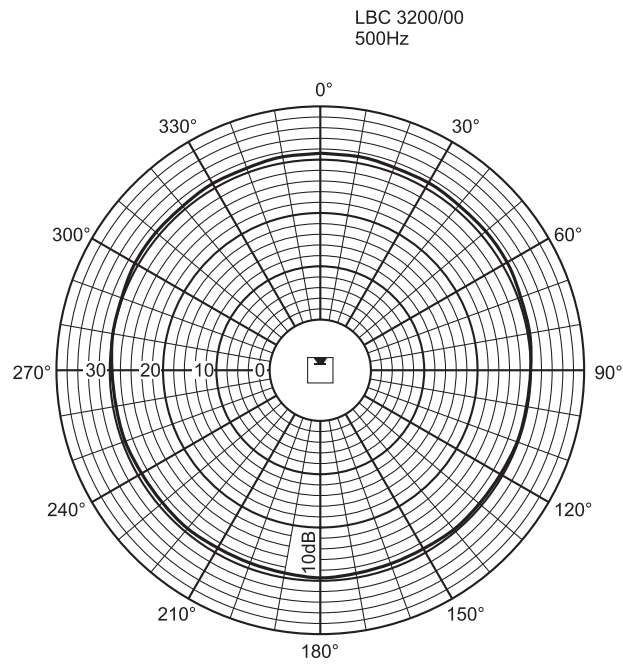
Frequency response

	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
SPL 1.1	87	89	91	93	93	89
SPL max.	102	104	106	108	108	104
Q-factor	1.3	2.2	4.5	11.6	25.7	58.9
H. angle (deg)	360	360	220	190	130	100
V. angle (deg)	360	120	70	32	18	10

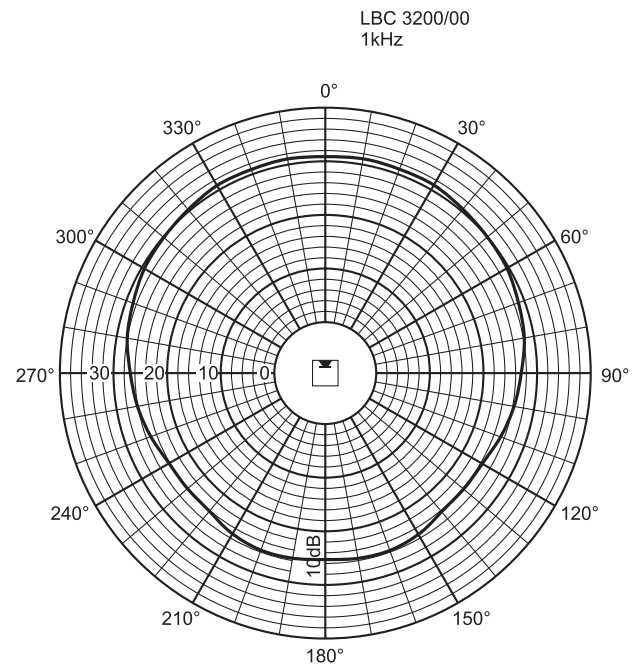
Acoustical performance specified per octave

238 | Loudspeakers | XLA 3200 Line Array

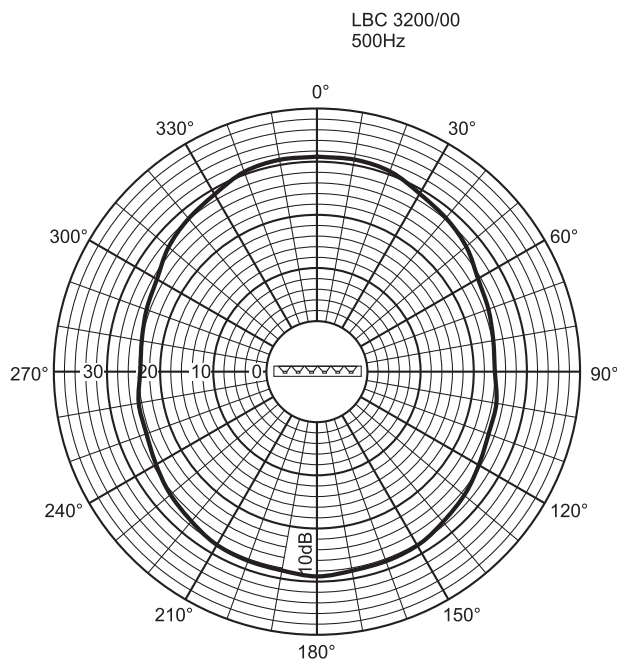
4



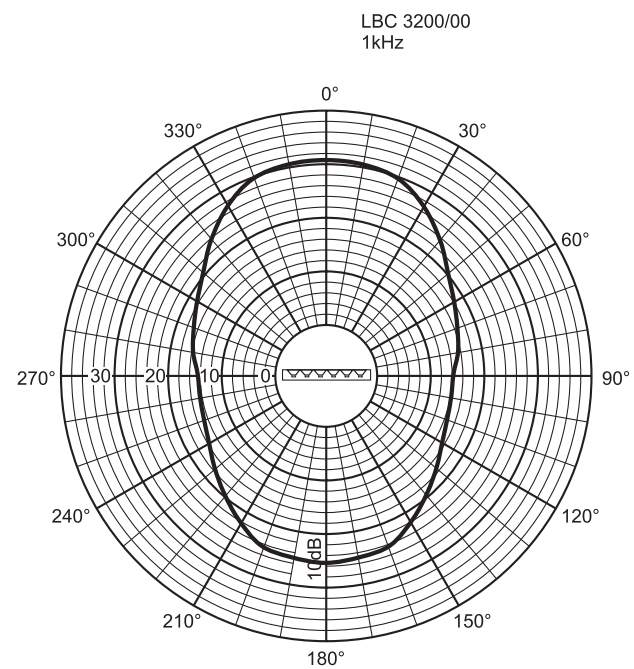
Polar diagram (horizontal)



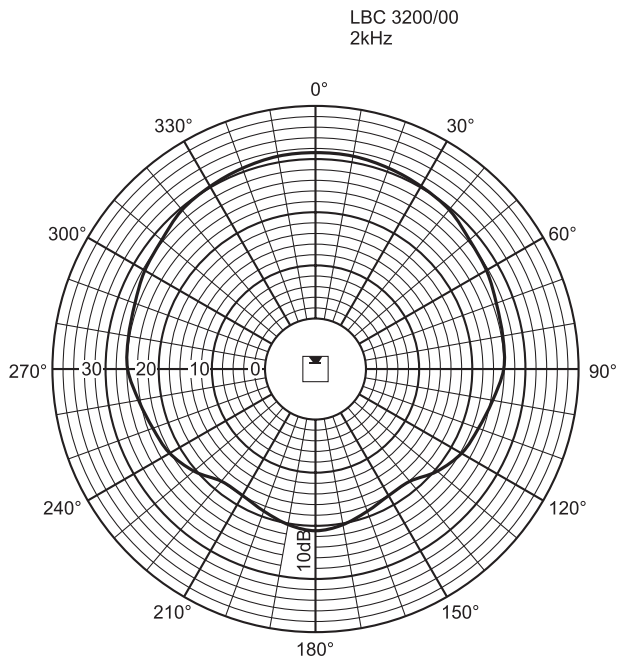
Polar diagram (horizontal)



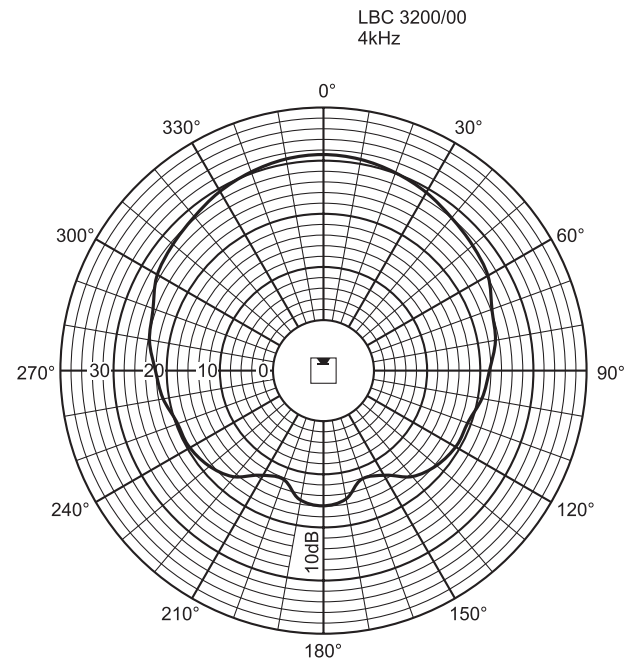
Polar diagram (vertical)



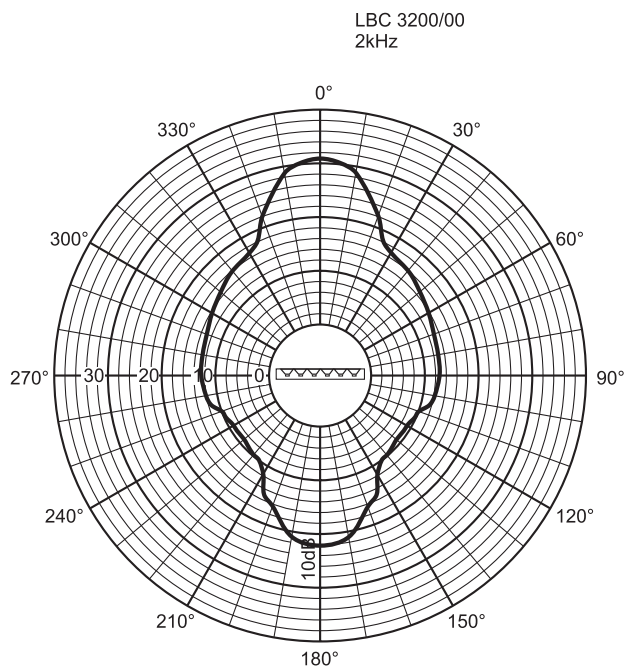
Polar diagram (vertical)



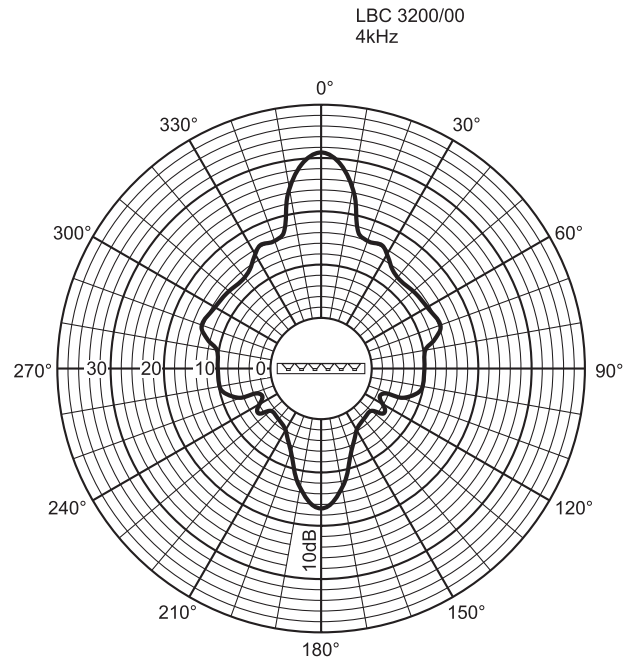
Polar diagram (horizontal)



Polar diagram (horizontal)



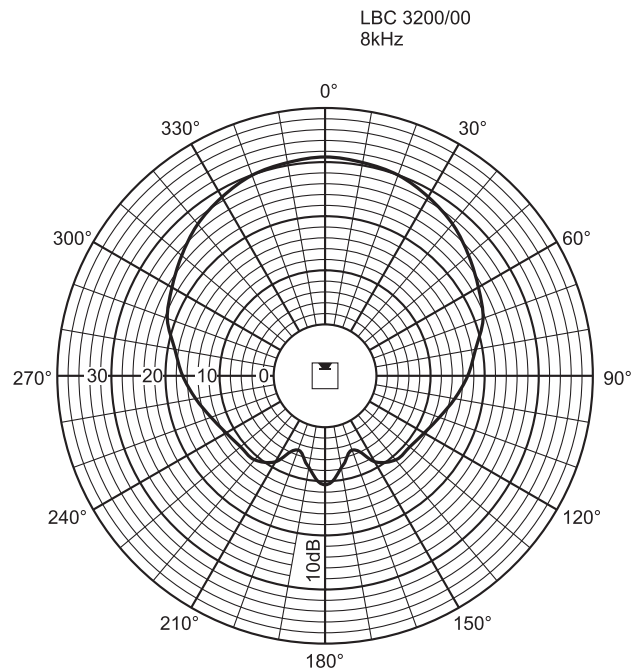
Polar diagram (vertical)



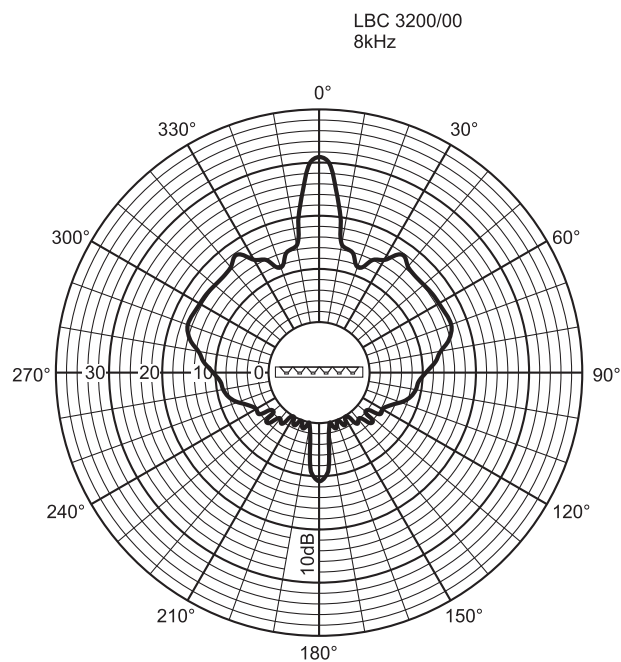
Polar diagram (vertical)

240 | Loudspeakers | XLA 3200 Line Array

4



Polar diagram (horizontal)



Polar diagram (vertical)

Technical Specifications

Electrical*

Maximum power	45 W
Rated power	30 / 15 / 7.5 W
Sound pressure level at 30 W / 1 W (1 kHz, 1 m)	106 / 91 dB (SPL)
Sound pressure level at 30 W / 1 W (2 kHz, 1 m)	108 / 93 dB (SPL)
Effective frequency range (-10 dB)	190 Hz to 18 kHz
Opening angle	1 kHz / 4 kHz (-6 dB)
horizontal	220° / 130°
vertical	70° / 18°
Rated input voltage	100 V
Rated impedance	333 ohm
Connector	Screw terminal block

* Technical performance data acc. to IEC 60268-5

Mechanical

Dimensions (H x W x D)	600 x 80 x 90 mm (23.62 x 3.15 x 3.54 in)
Weight	3 kg (6.6 lb)
Color	Light gray (matches RAL 9022)

Environmental

Operating temperature	-25 °C to +55°C (-13 °F to +131 °F)
Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Relative humidity	<95%

Ordering Information

LBC 3200/00 Line Array Indoor Loudspeaker for small and medium indoor environments, 30 W	LBC3200/00
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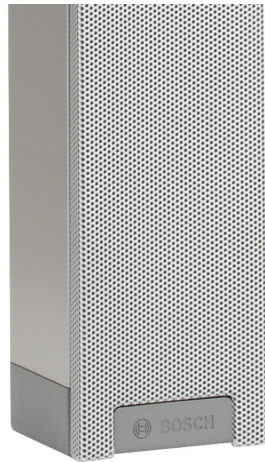
Accessories

LBC 1259/01 Universal Floorstand Lightweight aluminum construction, foldable, M10 x 12 reducer flange.	LBC1259/01
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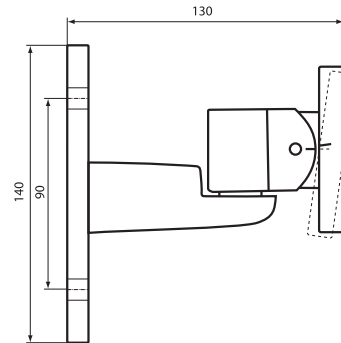
Parts Included

Quantity	Component
1	LBC 3200/00 Line Array Loudspeaker
1	Wall mounting bracket

LBC 3201/00 Line Array Indoor Loudspeaker



methods. The LBC 3201/00 can be mounted on a wall or directly onto a floor stand LBC 1259/01 with an M10 threaded bolt without additional accessories.



Dimensions in mm of included mounting bracket (with marked angle)

4

Features

- ▶ **Extended listening area**
- ▶ **Excellent intelligibility of speech and music**
- ▶ **Uniform distribution of natural sound throughout the room**
- ▶ **Excellent directivity for use in acoustically difficult, reverberant applications**
- ▶ **Suitable for larger enclosures, such as meeting halls and places of worship**
- ▶ **Extremely slim**
- ▶ **Voice evacuation compliant as standard**
- ▶ **EN 54-24 and EN 60849 compliant**

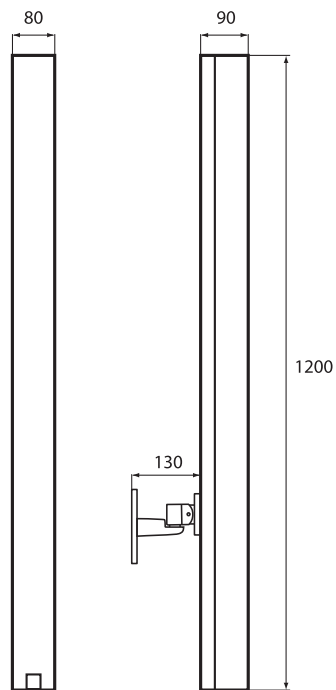
This loudspeaker, with its excellent directivity and high power output, can handle medium and large (reverberant) indoor environments, especially the more acoustically challenging ones. It is typically used in congress venues, meeting halls and places of worship. The full frequency range of the LBC 3201/00 makes it ideal for speech as well as music reproduction. Its exceptionally narrow housing (only 8 cm wide) makes it extremely unobtrusive.

System Overview

A time and labor-saving mounting method has been developed for the LBC 3201/00. The loudspeaker comes with a chart, which shows the ideal installation height for the area that the loudspeaker has to cover. Once the appropriate height has been determined for a given area, the loudspeaker is mounted at an angle marked on the mounting bracket. This procedure is much simpler and more accurate than traditional trial and error installation



Detail mounting bracket



Dimensions in mm



Mounted on optional loudspeaker stand (LBC 1259/01)

Functions

Range of application

The LBC 3201/00 is part of the XLA 3200 (eXtended Listening Area) range of line array loudspeakers. Advanced filtering and positioning of the loudspeaker drivers* has resulted in greatly improved audio directivity. Each speaker driver produces a dedicated frequency range. The specially developed high quality drivers enable reproduction of remarkably clear, natural sound, which gives excellent intelligibility of both speech and music.

The difference between a conventional column loudspeaker and this line array is noticeable in several ways. There is uniform sound distribution throughout the whole listening area: not too loud at the front, not too quiet at the back. All relevant frequencies are present everywhere in the listening area. Greater coverage is achieved, so more people can be reached with speech and music with a higher intelligibility level. All these important features give the experience of a very natural sound quality in the whole listening area.

*patent pending

Easy installation

The advanced filtering generates larger vertical opening angles for high frequencies, so there is less narrow 'beaming' of higher tones in the vertical plane. As an example, at 4 kHz the vertical opening angle is still 22°. Having more constant vertical opening angles makes installation easier, as the positioning of the loudspeakers is less critical because they cover a wider area. An extremely wide horizontal opening angle of 132° at 4 kHz means that a single loudspeaker can provide natural sound reproduction over an extensive listening area.

Suppressed Side Lobes

All conventional column loudspeakers produce a main lobe of sound, which is directed at listeners, as well as a number of unwanted side lobes. The LBC 3201/00 has highly suppressed side lobes in the vertical plane, typically at least 10 dB suppression of the 250 Hz octave band at 90°, resulting in a much clearer, less 'colored' sound, even when close to the loudspeakers. This gives the line array superb speech intelligibility.

Sound Reproduction

The positioning and very high quality of the 2-inch drivers contribute significantly towards making the LBC 3201/00 a very efficient line array. With a sound pressure level of 110 dB at 1 m, and at 60 W, loud and clear sound reproduction is possible even at considerable distances from the loudspeaker.

The high-quality loudspeaker drivers used in the LBC 3201/00 give excellent, natural sound reproduction of frequencies ranging from 190 Hz to 18 kHz. Together with the constant directivity, this ensures that all important frequencies are heard in the listening area.

Emergency Compliant

The loudspeaker has a ceramic terminal block, a thermal fuse, and heat-resistant, high-temperature wiring. These ensure that, in the event of a fire, damage to the loudspeaker does not result in failure of the circuit to which it is connected. Thus, system integrity is maintained, and loudspeakers within the same loudspeaker zone in other areas can still be used to inform people of the situation.

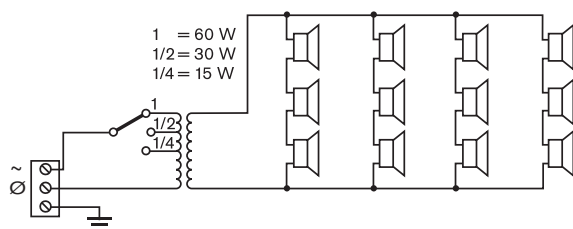
The three-way ceramic terminal block with screw connections is suitable for loop-through wiring, and is located in a compartment at the base of the loudspeaker column. There is also a switch, which allows the selection of nominal full power (60 W), half power (30 W) or quarter power (15 W). The compartment has knockout slots for accommodating cables.

Certifications and Approvals

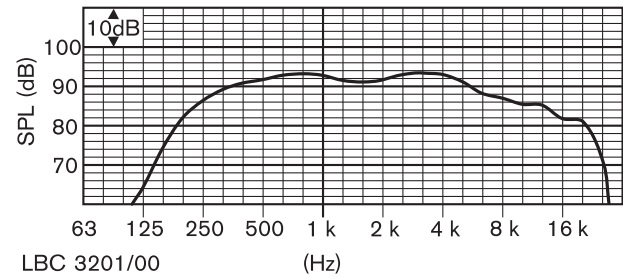
All Bosch loudspeakers are designed to withstand operation at their rated power for 100 hours in accordance with IEC 268-5 Power Handling Capacity (PHC) standards. These loudspeakers also comply with the Simulated Acoustical Feedback Exposure (SAFE) test, which demonstrates that they can withstand acoustical feedback at full power for short durations. This ensures extra reliability under extreme conditions, leading to higher customer satisfaction, longer operating life, and much less chance of failure or performance deterioration.

Region	Certification
Europe	CE
Poland	CNBOP
Safety	acc. to EN 60065 and CE
Emergency	acc. to EN 54-24 / EN 60849
Water and dust protection	acc. to IEC 60529, IP 32
Impact	acc. to EN 50102, IK 07

Installation/Configuration Notes



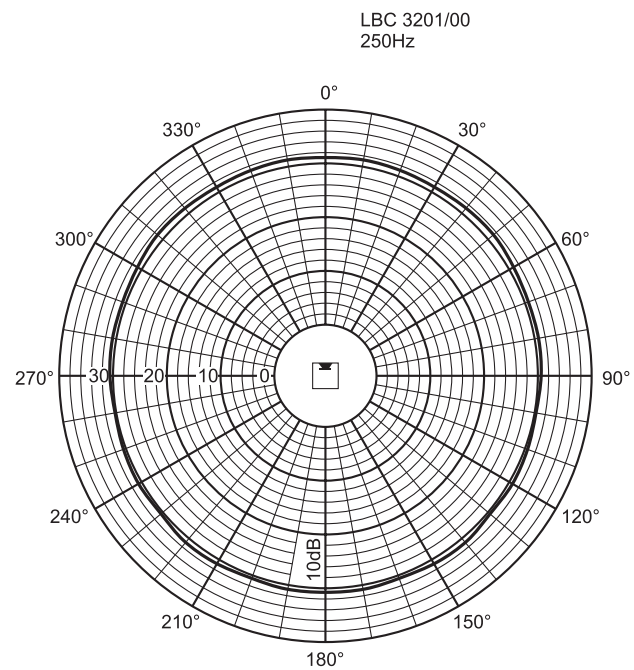
Circuit diagram



Frequency response

	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
SPL 1.1	88	92	92	91	91	86
SPL max.	106	110	110	109	109	104
Q-factor	2.2	3.2	6.5	12.6	23.4	53.3
H. angle (deg)	360	360	210	192	132	100
V. angle (deg)	107	67	50	33	22	12

Acoustical performance specified per octave

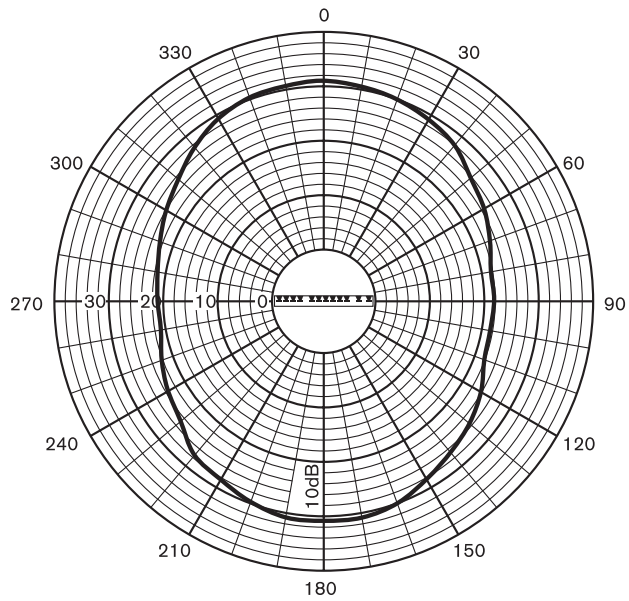


Polar diagram (horizontal)

244 | Loudspeakers | XLA 3200 Line Array

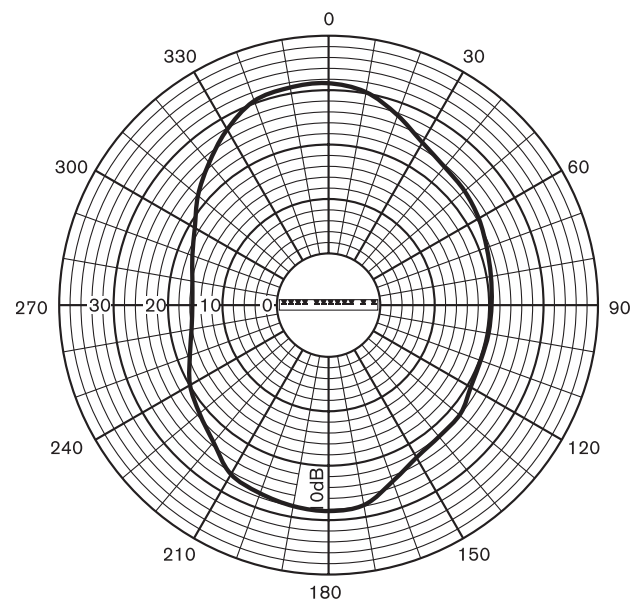
4

LBC 3201/00
250Hz



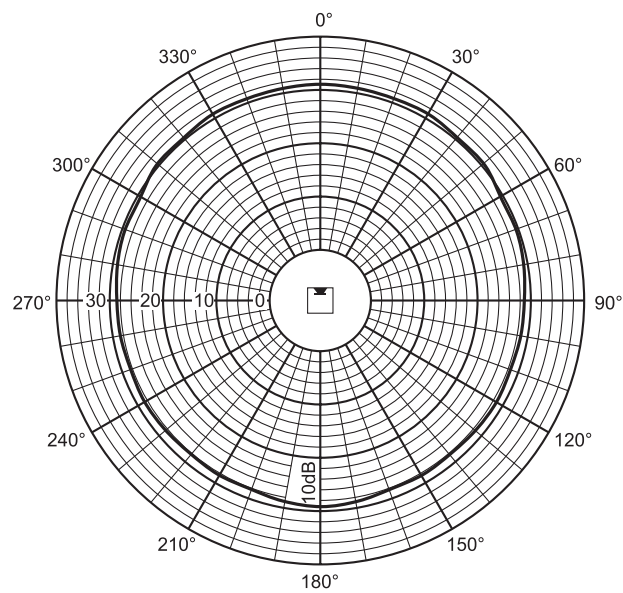
Polar diagram (vertical)

LBC 3201/00
500Hz



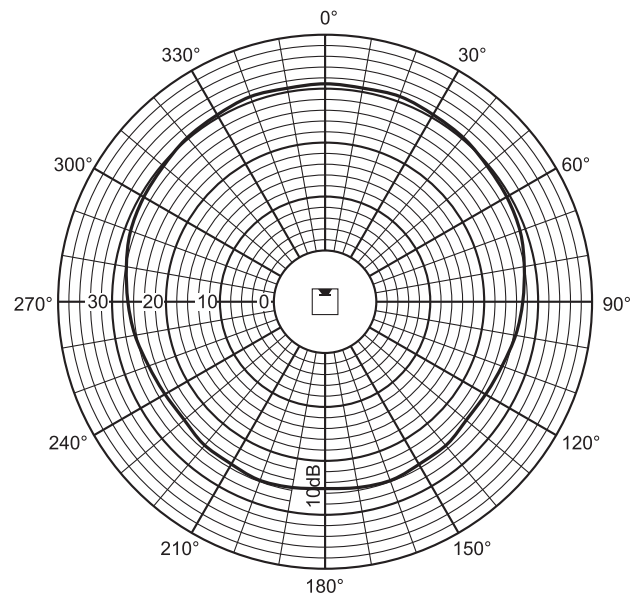
Polar diagram (vertical)

LBC 3201/00
500Hz



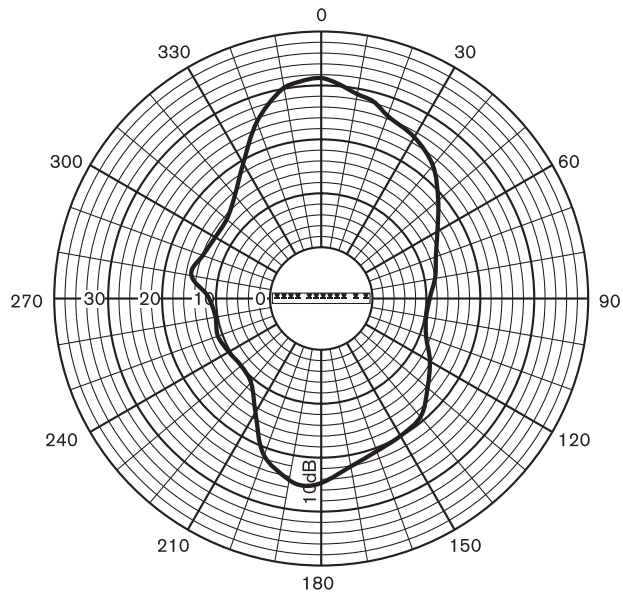
Polar diagram (horizontal)

LBC 3201/00
1kHz



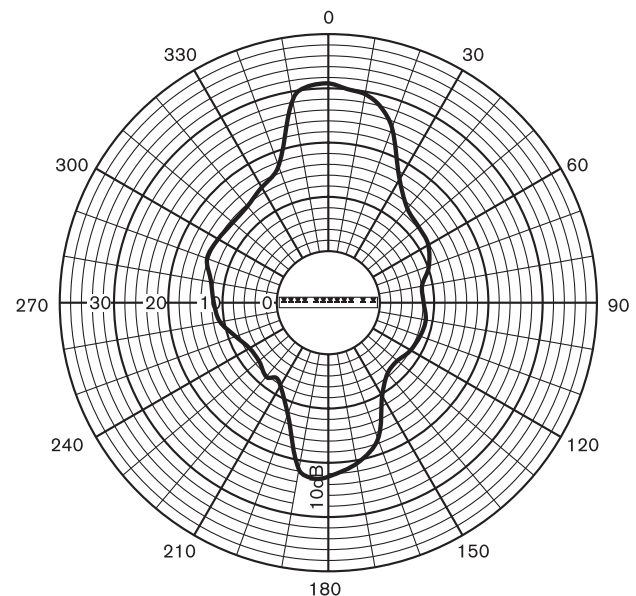
Polar diagram (horizontal)

LBC 3201/00
1kHz



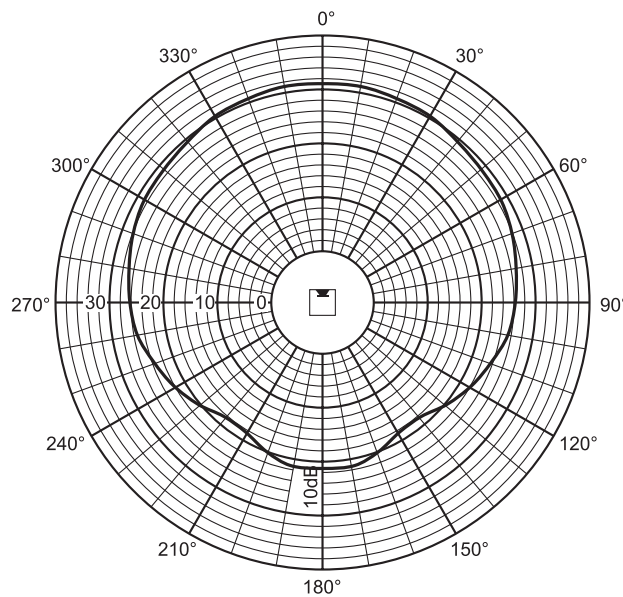
Polar diagram (vertical)

LBC 3201/00
2kHz



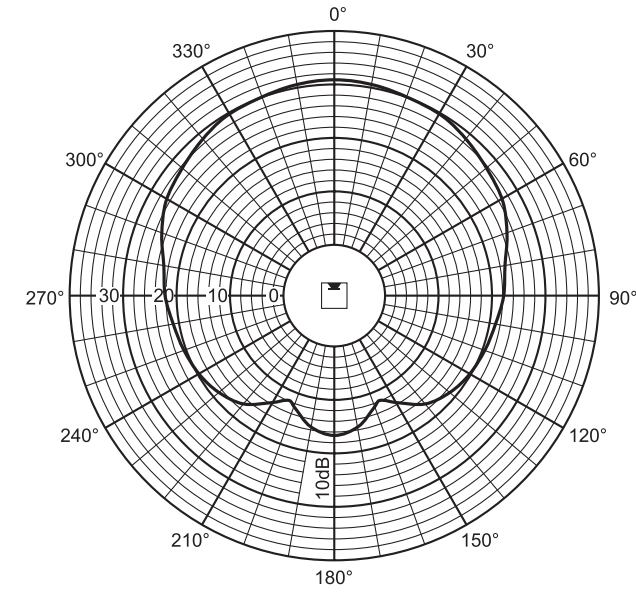
Polar diagram (vertical)

LBC 3201/00
2kHz



Polar diagram (horizontal)

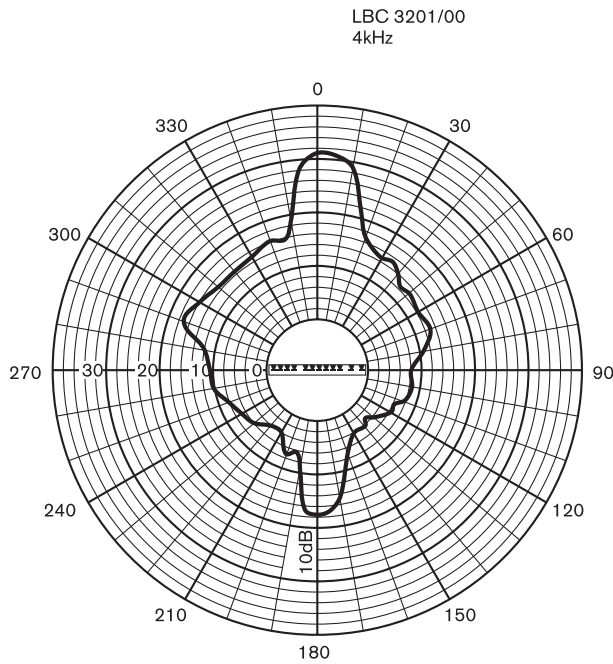
LBC 3201/00
4kHz



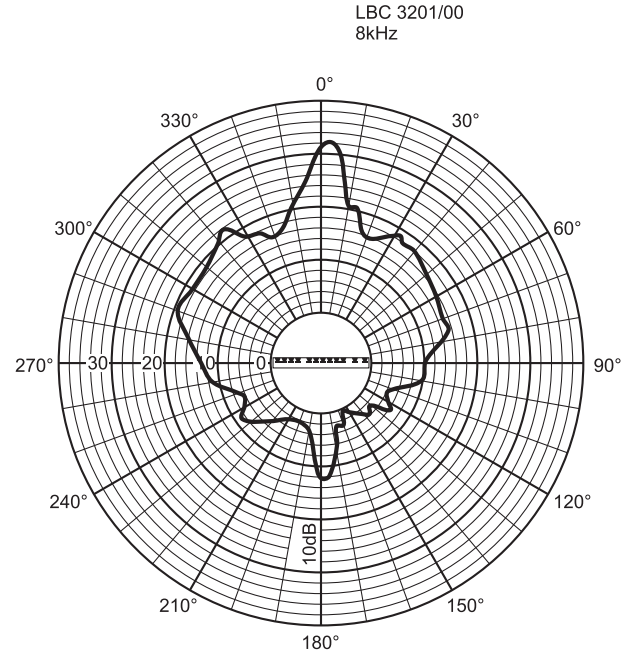
Polar diagram (horizontal)

246 | Loudspeakers | XLA 3200 Line Array

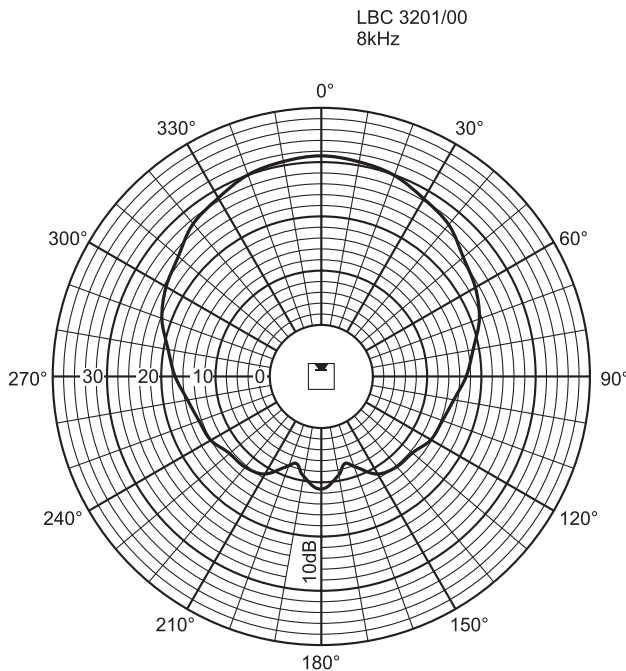
4



Polar diagram (vertical)



Polar diagram (vertical)



Polar diagram (horizontal)

Parts Included

Quantity	Components
1	LBC 3201/00 Line Array Loudspeaker
1	Wall mounting bracket
1	Attachment piece
1	Installation chart

Technical Specifications

Electrical*

Maximum power	90 W
Rated power	60 / 30 / 15 W
Sound pressure level at 60 W / 1 W (1 kHz, 1 m)	110 dB / 92 dB (SPL)
Effective frequency range (-10 dB)	190 Hz to 18 kHz
Opening angle	1 kHz / 4 kHz (-6 dB)
horizontal	210° / 132°
vertical	50° / 22°
Rated input voltage	100 V
Rated impedance	167 ohm
Connector	Screw terminal block

*) Technical performance data acc. to IEC 60268-5

Mechanical

Dimensions (H x W x D)	1200 x 80 x 90 mm (47.24 x 3.15 x 3.54 in)
Weight	6,4 kg (14,1 lb)
Color	Light gray (matches RAL 9022)

Environmental

Operating temperature	-25 °C to +55°C (-13 °F to +131 °F)
Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Relative humidity	<95%

Ordering Information

LBC 3201/00 Line Array Indoor Loudspeaker	LBC3201/00
for medium and large (reverberant) indoor environments, 60 W	

Accessories

LBC 1259/01 Universal Floorstand	LBC1259/01
Lightweight aluminum construction, foldable, M10 x 12 reducer flange.	

LBC 3210/00 Line Array Indoor/Outdoor Loud- speaker

4



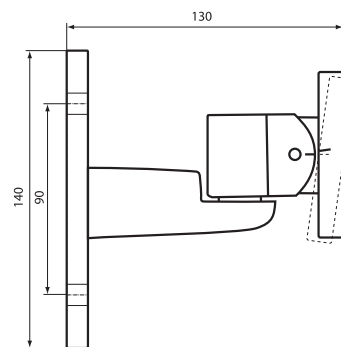
Features

- ▶ **Extended listening area**
- ▶ **Excellent intelligibility of speech and music**
- ▶ **Uniform distribution of natural sound throughout the room**
- ▶ **Suitable for both indoor and outdoor use, ranging from sport stadiums to passenger terminals**
- ▶ **Ideal combination of advanced acoustics and easy application**
- ▶ **Powerful with high efficiency**
- ▶ **Voice evacuation compliant as standard**
- ▶ **Provision for inside mounting the optional line/loudspeaker supervision board**
- ▶ **EN 54-24 and EN 60849 compliant**

This loudspeaker, with its excellent directivity and high power output, can handle large (reverberant) indoor environments like airport departure lounges, train stations and congress venues. It is also suitable for outdoor use, for instance in railway stations or sports stadiums. Its full frequency range makes it ideal for speech as well as music reproduction.

System Overview

A time- and labor-saving mounting method has been developed for the LBC 3210/00. A chart is supplied with the loudspeaker, which shows the ideal installation height for the area the loudspeaker has to cover. Once the appropriate height has been determined for a given area, the loudspeaker is mounted at an angle marked on the mounting bracket. This simple procedure is very much simpler and more accurate than traditional trial and error installation methods. The LBC 3210/00 can be mounted on a wall or directly onto a floor stand LBC 1259/01 with an M10 threaded bolt without additional accessories.



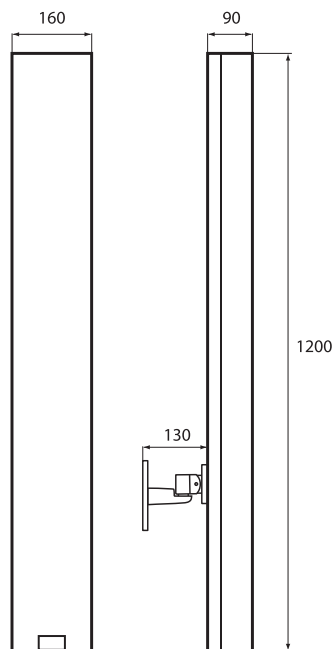
*Mounting bracket (included) with marked angle.
Dimensions in mm*



Detail mounting bracket



Mounted on optional loudspeaker stand (LBC 1259/01)



Dimensions in mm

Functions

Range of Application

The LBC 3210/00 is part of the XLA 3200 (eXtended Listening Area) range of line array loudspeakers. Advanced filtering and positioning of the loudspeaker drivers* has resulted in greatly improved audio directivity. Each speaker driver produces a dedicated frequency range. The difference between a conventional column loudspeaker and this line array is noticeable in several ways. There is uniform sound distribution throughout the whole listening area: not too loud at the front, not too quiet at the back. All relevant frequencies are present everywhere in the listening area. Greater coverage is achieved, so more people can be reached with speech and music with a higher intelligibility level. All these important features will give the experience of a very natural sound quality in the whole listening area.

*patent pending

250 | Loudspeakers | XLA 3200 Line Array

4

Easy Installation

The advanced filtering generates larger vertical opening angles for high frequencies, so there is less narrow 'beaming' of higher tones. Compared to conventional column loudspeakers, this line array has a more constant opening angle for all relevant frequencies. As an example, at 4 kHz the vertical opening angle is still 18°. Having more constant vertical opening angles makes installation easier, as the positioning of the loudspeakers is less critical because they cover a wider area. An excellent horizontal opening angle of 90° at 4 kHz means that a single loudspeaker can provide natural sound reproduction over an extensive listening area.

Suppressed Side Lobes

All conventional column loudspeakers produce a main lobe of sound, which is directed at listeners, and a number of unwanted side lobes. The LBC 3210/00 has highly suppressed side lobes in the vertical plane, typically at least 10 dB from the 250 Hz octave band at 90°, resulting in a much clearer, less 'colored' sound, even when close to the loudspeakers. This gives the line array loudspeaker superb intelligibility of both speech and music.

Sound Reproduction

The positioning and very high quality of the 4-inch drivers contribute significantly in making the LBC 3210/00 a very efficient line array. With a sound pressure level of 115 dB at 1 m at 60 W, loud and clear sound reproduction is possible even at considerable distances from the loudspeaker.

The high-quality loudspeaker drivers used in the LBC 3210/00 give excellent, natural sound reproduction of frequencies ranging from 190 Hz to 20 kHz. Together with the constant directivity this ensures that all important frequencies are heard in the listening area.

Emergency Compliant

The loudspeakers ceramic terminal block, thermal fuse and heat-resistant, high-temperature wiring, ensure that, in the event of a fire, damage to the loudspeaker does not result in failure of the circuit to which it is connected. In this way, system integrity is maintained, ensuring loudspeakers in other areas within the same loudspeaker zone can still be used to inform people of the situation. The line arrays have provision for mounting the optional line/loudspeaker supervision board.

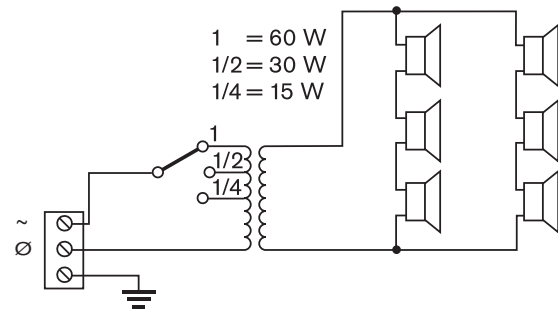
A three-way ceramic terminal block with screw connections suitable for loop-through wiring is located in a compartment at the base of the loudspeaker column. There is also a switch which allows the selection of nominal full power (60 W), half power (30 W) or quarter power (15 W). The compartment has knock-out slots for accommodating cables.

Certifications and Approvals

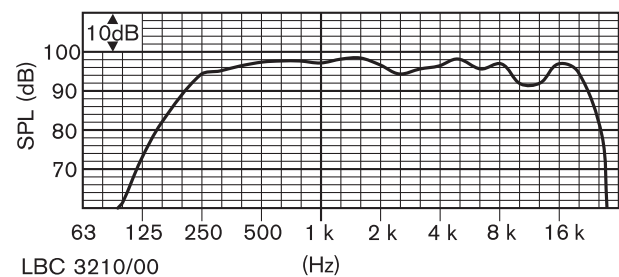
All Bosch loudspeakers are designed to withstand operation at their rated power for 100 hours in accordance with IEC 268-5 Power Handling Capacity (PHC) standards. These loudspeakers also comply with the Simulated Acoustical Feedback Exposure (SAFE) test, which demonstrates that they can withstand acoustical feedback at full power for short durations. This ensures extra reliability under extreme conditions, leading to higher customer satisfaction, longer operating life and much less chance of failure or performance deterioration.

Region	Certification
Europe	CE
Poland	CNBOP
Safety	acc. to EN 60065 and CE
Emergency	acc. to EN 54-24 / EN 60849
Water and dust protection	acc. to IEC 60529, IP 66
Impact	acc. to EN 50102, IK 07
Wind-force	acc. to NEN 6702 :2007 + A1 :2008, Bft 11

Installation/Configuration Notes



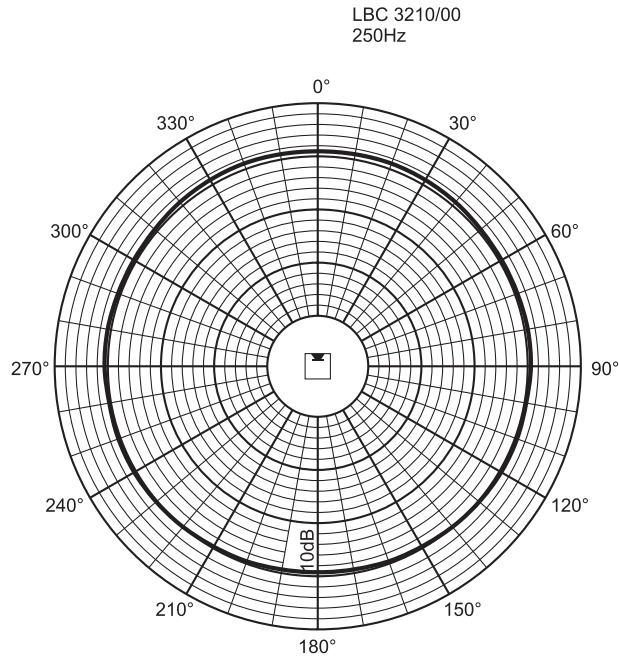
Circuit diagram



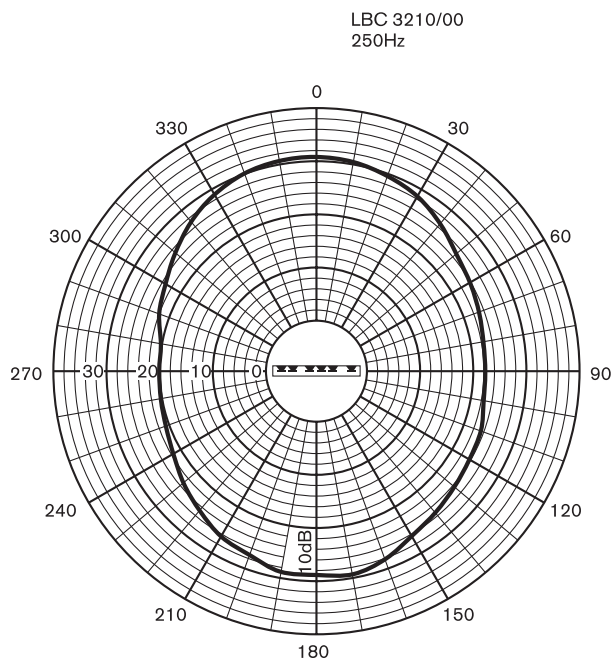
Frequency response

	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
SPL 1.1	94	97	97	95	96	93
SPL max.	112	115	115	113	114	111
Q-factor	2.2	2.7	6.3	10.8	22.6	32.3
H. angle (deg)	360	180	170	160	90	60
V. angle (deg)	100	60	55	34	18	10

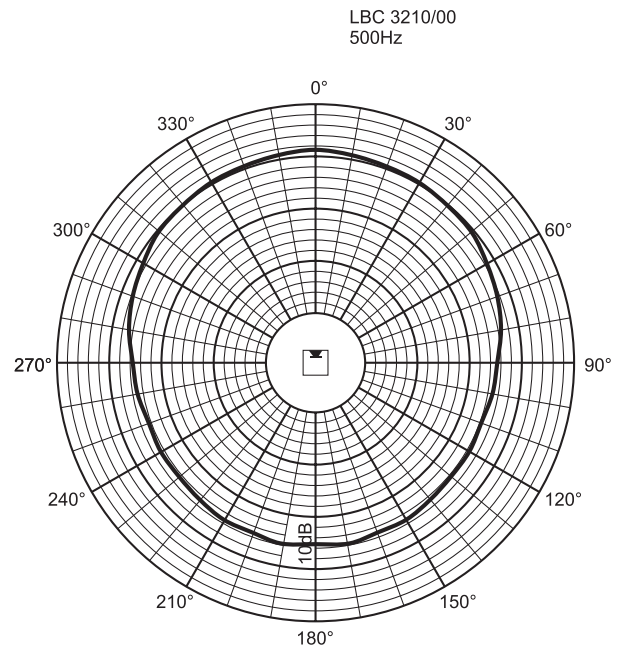
Acoustical performance specified per octave



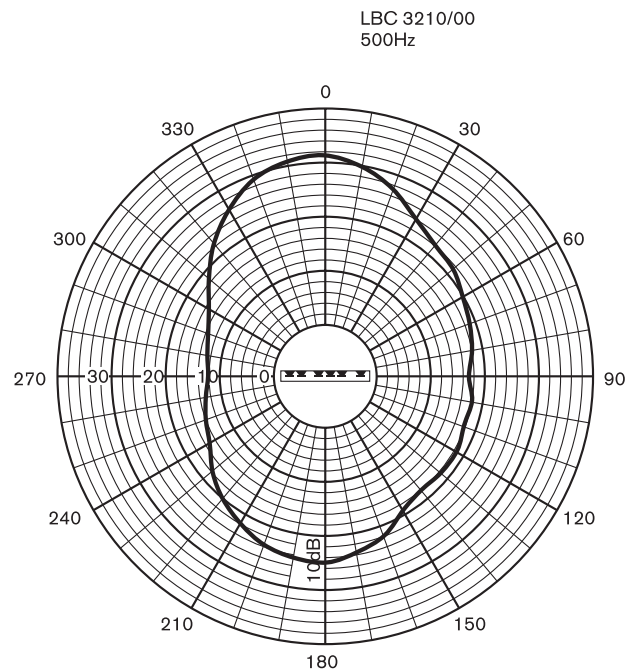
Polar diagram (horizontal)



Polar diagram (vertical)



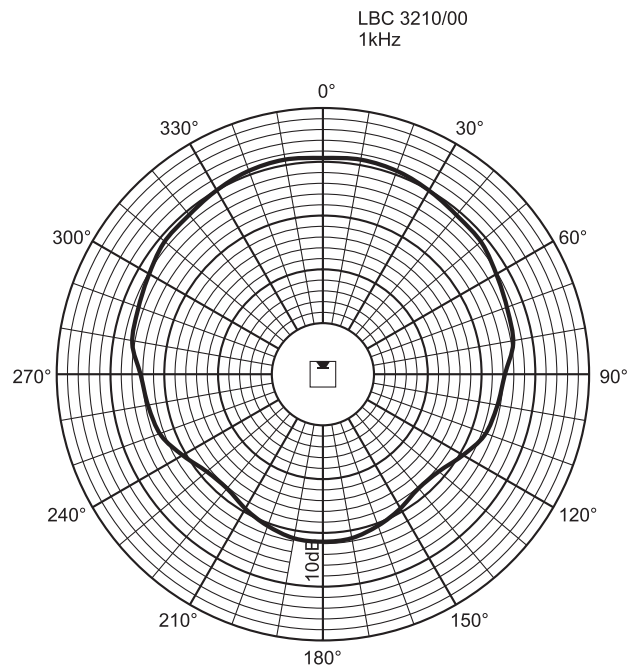
Polar diagram (horizontal)



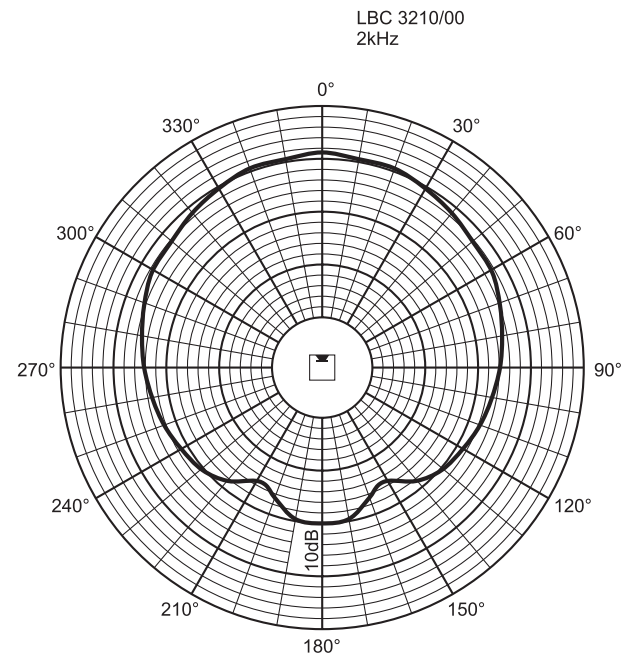
Polar diagram (vertical)

252 | Loudspeakers | XLA 3200 Line Array

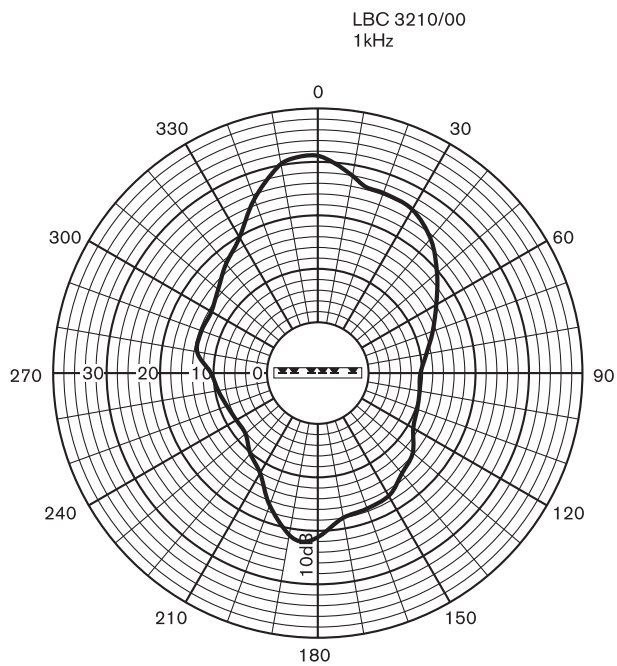
4



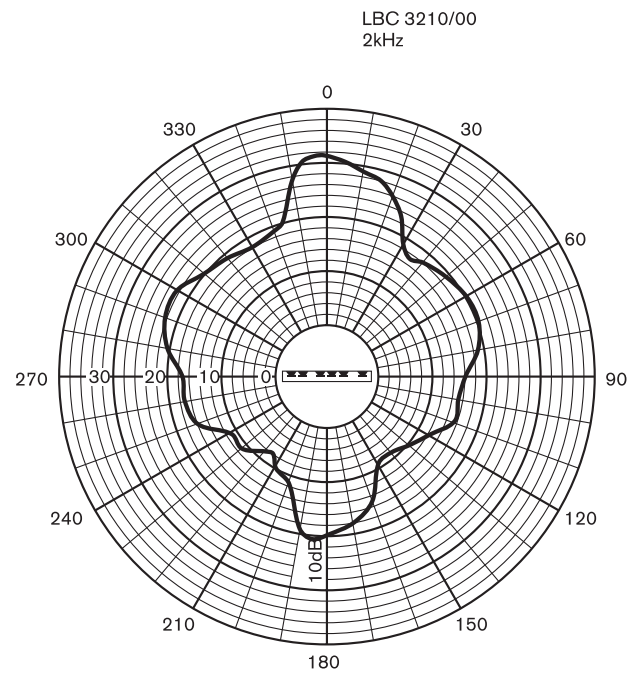
Polar diagram (horizontal)



Polar diagram (horizontal)

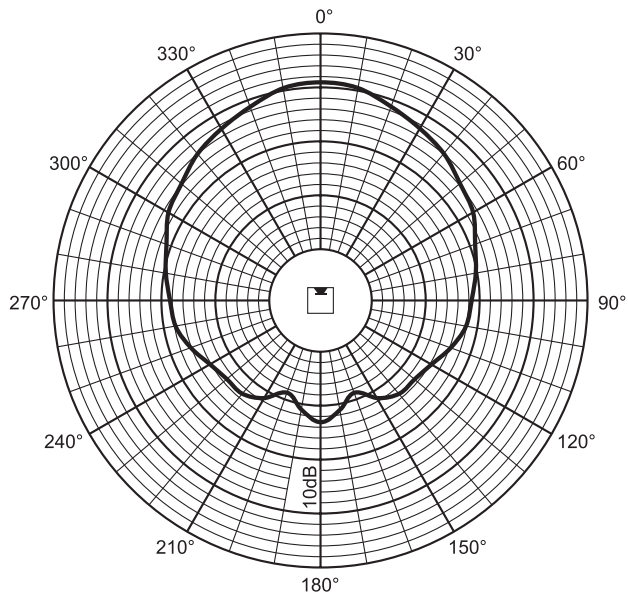


Polar diagram (vertical)



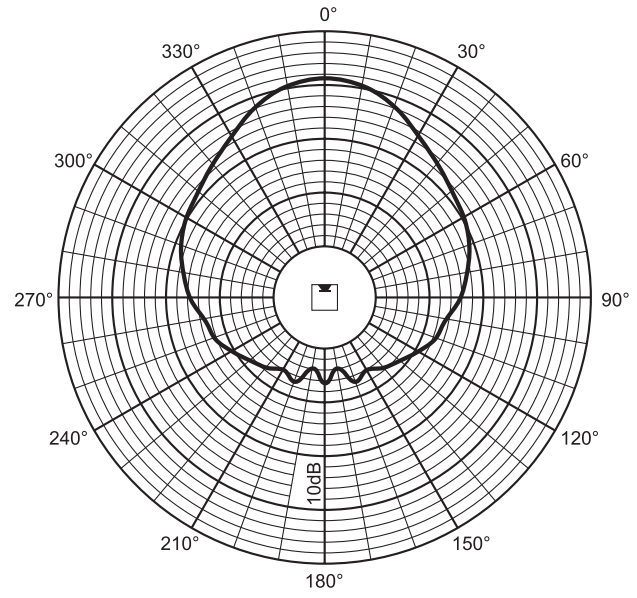
Polar diagram (vertical)

LBC 3210/00
4kHz



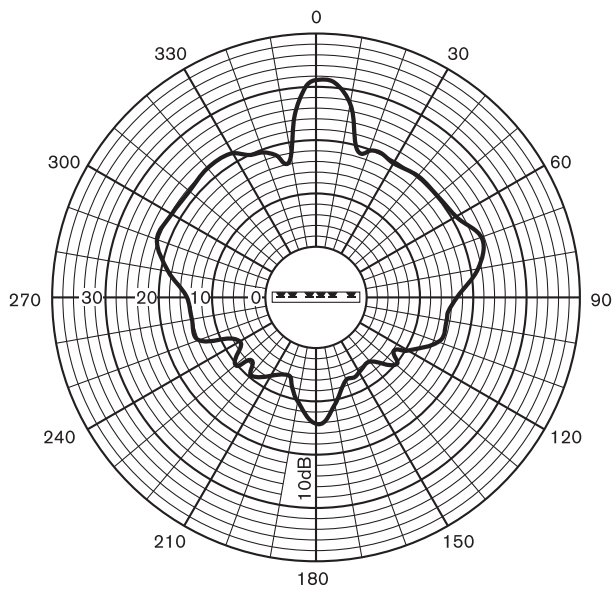
Polar diagram (horizontal)

LBC 3210/00
8kHz



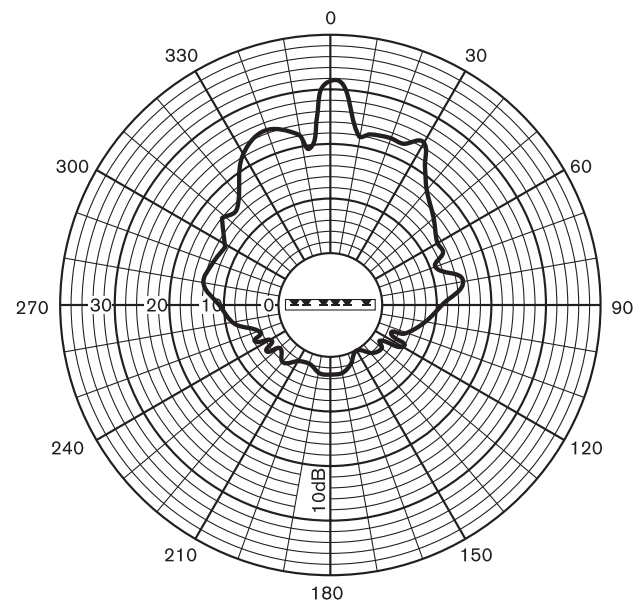
Polar diagram (horizontal)

LBC 3210/00
4kHz



Polar diagram (vertical)

LBC 3210/00
8kHz



Polar diagram (vertical)

Parts Included

Quantity	Components
1	LBC 3210/00 Line Array Loudspeaker
1	Wall mounting bracket
1	Attachment piece
1	Installation chart

254 | Loudspeakers | XLA 3200 Line Array

Technical Specifications**Electrical***

Maximum Power	90 W
Rated Power	60 / 30 / 15 W
Sound pressure level at 60 W / 1 W (1 kHz, 1 m)	115 dB / 97 dB (SPL)
Effective frequency range (-10 dB)	190 Hz to 20 kHz
Opening angle	1 kHz / 4 kHz (-6 dB)
horizontal	170° / 90°
vertical	55° / 18°
Rated input voltage	100 V
Rated impedance	167 ohm
Connector	Screw terminal block

* Technical performance data acc. to IEC 60268-5

Mechanical

Dimensions (H x W x D)	1200 x 160 x 90 mm (47.24 x 6.3 x 3.54 in)
Weight	9 kg (19,8 lb)
Color	Light gray (matches RAL 9022)

Environmental

Operating temperature	-25 °C to +55°C (-13 °F to +131 °F)
Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Relative humidity	<95%

Ordering Information

LBC 3210/00 Line Array Indoor/Outdoor **LBC3210/00**

Loudspeaker

for large (reverberant) indoor/outdoor environments, 60 W

Accessories

LBC 1259/01 Universal Floorstand **LBC1259/01**

Lightweight aluminum construction, foldable, M10 x 12 reducer flange.

Vari-directional Array



Features

- ▶ **Unmatched sound quality and speech intelligibility**
- ▶ **Fast solution for challenging environments**
- ▶ **Smart modular design, flush mountable**
- ▶ **Sophisticated beam configuration with EASE support**
- ▶ **Integrated ambient noise level sensor for AVC**
- ▶ **Suited for emergency sound systems**
- ▶ **Optional CobraNet networking**

Many large modern and classical buildings, like passenger terminals and cathedrals, use hard reflective materials for floors, walls and ceilings. Due to their size and absence of absorbing materials the reverberation time is long and the amount of indirect reverberant sound compared to direct sound is high. This is disastrous for good speech intelligibility. Still it is very important to hear and understand the spoken message, whether it is a gate change announcement on an airport, a prayer in a house of worship or an evacuation message in case of an emergency. Here the Bosch Vari-directional Array offers a really smart and easy solution.

System Overview

The Bosch Vari-directional Array series is a comprehensive set of array loudspeakers to address people with clear intelligible messages in large reverberant spaces. These active units utilize integrated digital signal processing and high efficiency class-D amplifiers. Using a PC configuration program the array can be adapted to the venue where it is used and its sound output optimally aimed at the audience, creating a maximum direct to ambient sound ratio, for best intelligibility given the circumstances.

The modular concept allows for three different array lengths for small to large areas. Using separate array elements makes transport easy and upgrading to a longer array possible. An optional CobraNet module allows the array to be networked and to receive digital audio data via CobraNet and to monitor the operational status of the loudspeakers. Special built-in provisions make these arrays compliant to the world's emergency sound system standards. The units are suited for both background music and speech.

Although these loudspeaker arrays are very sophisticated and offer unrivalled sound in difficult acoustical environments, the advanced configuration software makes setup quick and easy.

4

Functions

Advanced beam steering

The Bosch Vari-directional Array provides a very good direct to reverberant sound ratio. Firstly, it radiates more direct sound to the audience and secondly, it induces less ceiling reflections. The increased direct sound is also due to a lower rate of decay of the sound level with distance compared to a traditional loudspeaker acting as a point source.

Instead of mechanically aiming the complete loudspeaker column to the listeners, the Bosch Vari-directional Array is capable of virtually aiming the loudspeaker array by electronic means. It drives the loudspeakers of the array individually with differently delayed signals, virtually moving the loudspeakers. Now the array can be positioned vertically against a wall or even recessed into the wall. This is esthetically more pleasing and as a bonus also reduces disturbing incoherent reflections from the wall. Furthermore, the Bosch Vari-directional Array uses very advanced beam steering techniques to achieve a beam shape that provides an equal level for all frequencies in the range of interest at all listening positions. Only then, listeners will get a balanced sound.

Another important factor is the loudness of the signal, which should be almost the same for all listening positions, avoiding hot spots. To create an even sound level in a large area, the shape of the beam should be optimized to the listening plane (ear level). Solving these challenges requires that for every audio frequency in the range of interest the level of each individual loudspeaker should be carefully controlled. The Bosch Vari-directional Array performs this combination of frequency response and delay tailoring in the digital domain using a DSP and subsequent multi-channel amplification. Then a very consistent SPL from front to rear can be attained in the listening plane, with a minimum of side lobes.

But the Bosch arrays excel in two additional ways. In the first place it is able to deal with non-flat audience planes, for instance theaters and auditoriums. Secondly, it does not solely try to maximize the direct output to the listening plane, but also to minimize the output to unwanted areas. Due to physical limitations of a loudspeaker array every practical array will have side lobes. The configuration of the Vari-directional Array uses an advanced optimization algorithm that allows for minimization of the most harmful side-lobes, to achieve the best possible coverage combined with a maximum direct to reverberant ratio.

Easy installation and setup

The Bosch Vari-directional Array makes installation and configuration fairly easy for the installer and sound engineer.

The majority of the applications can be described in a rather straightforward way, where the configuration can be selected from a database of pre-optimized setups. Selection is quick and interactively by entering some key parameters of the room, the position of the array and the listening plane. The configuration program then shows graphically the realized direct SPL coverage.

The Vari Configuration Set includes the configuration software and a USB to RS485 converter to connect a PC's USB port to one or more (networked) Vari units, even across longer distances. Using the optional CobraNet module it is even possible to configure and monitor multiple units across an Ethernet network.

Modular approach

One-key design factor for a line array is its length. To enable a long throw, the array should be long. If the audience is closer to the array, it can be shorter. Because the array is modular, arrays of three different lengths are possible: 1.20, 2.40 or 3.60 m. It consists of a base unit as a minimum and one or two extension units. Each unit is only 1.20 m in length for easy transport. The base unit contains the controller, the DSP, the power supply and 8 power amplifiers and loudspeakers. The extension unit contains 8 loudspeakers with supporting power amplifiers. All necessary interconnections between base and extension units are established automatically when the units are invisibly bolted together. Signal and power cables enter the base unit through a hole on the rear side of the unit to the internal tamper resistant connection compartment, which is only accessible during installation.

The Bosch Vari-directional Array, with its full steel cabinet and grill, powder coated silver gray, blends easily with contemporary and traditional interiors and exteriors. Since front-cooling is applied, even flush mounting is possible.

Swivel-wall mounting brackets come with the units as standard.

CobraNet connectivity

The Bosch Vari-directional Array offers the possibility to equip the base unit with a small CobraNet module that allows the array to be connected to an Ethernet network via a CAT-5 cable connection. This way the audio signal to the array is delivered in a digital format to the array with low latency and a high degree of routing flexibility. Furthermore the array can be configured via Ethernet, its operation can be supervised and logged.

Use of standard Ethernet wiring reduces costs. CobraNet technology allows for the co-existence of audio and data traffic over existing standard Ethernet infrastructure resulting in substantial savings in design and installation. CobraNet is a technology that is owned by Cirrus Logic and is used by many professional audio manufacturers as the technology of choice in digital audio networking.

Emergency sound

Emergency warning and information systems are very much a part of life these days. They are mandatory for most commercial buildings and public spaces and must comply with very specific standards, such as IEC60849, BS5839-8 and EN54-16. The system elements of the Bosch Vari-directional Array have been designed for compliance to these standards, right from the start. Therefore the array cannot only be used for business announcements and background music, but also as part of an emergency sound system, e.g. in combination with the Bosch Praesideo system, one of the most sophisticated emergency sound systems available, with thousands of installations worldwide. For instance, the Vari-directional Array provides a pilot tone detection circuit at the input for surveillance of the audio connection, internal supervision of operation, connection for a 24 V (battery) backup power supply, a fault output relay and a fault log with network access.

The Bosch Vari-directional Array is a perfect loudspeaker system for making voice alarms in case of emergencies, when clear, intelligible and unambiguous announcements are needed most.

Automatic Volume Control (AVC)

In certain environments, such as sports stadiums and passenger terminals, the background noise level fluctuates constantly. This may seriously affect the intelligibility of spoken messages. The Bosch Vari-directional Array has a built-in noise level sensor that can be configured to control the gain of the amplifiers to constantly adjust the sound level. This automatic volume control (AVC) keeps the audio level comfortably above the background noise level for improved intelligibility without becoming unnecessarily loud.

Sound-processing

Large halls or platforms may need multiple arrays at different locations. The audio output of these arrays should be time-aligned to avoid echoes at the audience position. The Bosch Vari-directional Array provides a built-in high resolution delay adjustment.

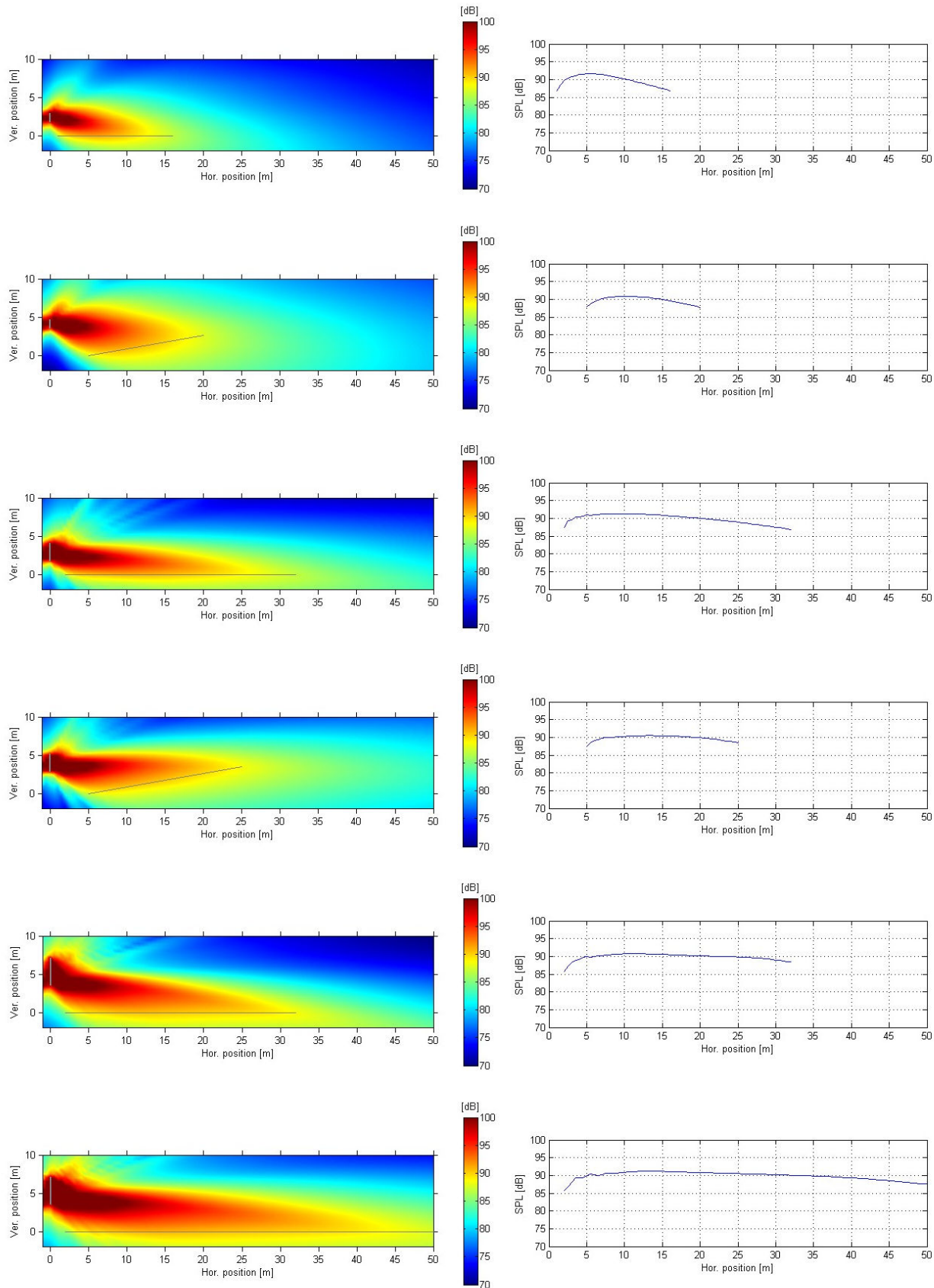
An 8-section parametric equalizer is present for adjustment of the array to the acoustical environment, e.g. to increase the margin before acoustic feedback occurs. Separate 4-section equalizers at the inputs enable separate frequency responses for e.g. background music and announcements.

Certifications and Approvals

Region	Certification
Europe	CE
Safety	according to IEC 60065: 2001 + A1: 2005
Immunity	according to EN 55103-2: 2009 according to FCC-47 part 15B
Emissions	according to EN 55103-1: 2009 according to EN 50130-4: 2006 according to EN 50121-4: 2006 according to EN 61000-3-2: 2006 + A1: 2009 + A2: 2009
Wind-force	according to NEN 6702: 2007 + A1: 2008, Bft 11
Water and dust protection	according to EN60529 IP54
Approval	CE

Installation/Configuration Notes

Array moniker	Array composition	Elements used		
		LA3-VARI-B	LA3-VARI-BH	LA3-VARI-E
Vari-array-B1	VARI-B	1		
Vari-array-B2	VARI-B+E	1		1
Vari-array-B3	VARI-B+E+E	1		2
Vari-array-H1	VARI-BH		1	
Vari-array_H2	VARI-BH+E		1	1
Vari-array-H3	VARI-BH+E+E		1	2



Examples of vertical beam cross sections and SPL at ear level (2 x VARI-B, 2 x VARI-B+E, 2 x VARI-B+E+E)

260 | Loudspeakers | Vari-directional Array

Parts Included

Quantity	Components
LA3-VARI-B	
1	Vari Base Unit
2	Wall bracket
1	Right angle IEC mains connector C13
1	Cover plate
1	Connection set (Phoenix)
1	Grille removal tool
1	Installation Manual
LA3-VARI-BH	
1	Vari Base Unit HF
2	Wall bracket
1	Right angle IEC mains connector C13
1	Cover plate
1	Connection set (Phoenix)
1	Grille removal tool
1	Installation Manual
LA3-VARI-E	
1	Vari Extension Unit
1	Wall bracket
2	Fixing bolts
LA3-VARI-CS	
1	CD (software and documentation)
1	USB to RS485 converter
1	USB cable
1	RS485 cable
LA3-VARI-CM	
1	CobraNet module
2	Fixing screws
1	CAT-5 cable

Technical Specifications

Acoustical¹Frequency range²

VARI-B	130 Hz to 10 kHz (± 3 dB)
VARI-BH	130 Hz to 18 kHz (± 3 dB)
Max SPL³	
	Continuous / peak
VARI-B	90 / 93 dB SPL (A-weighted at 20 m)
VARI-B+E	90 / 93 dB SPL (A-weighted at 32 m)
VARI-B+E+E	88 / 91 dB SPL (A-weighted at 50 m)
VARI-BH	89 / 92 dB SPL (A-weighted at 20 m)
VARI-BH+E	89 / 92 dB SPL (A-weighted at 32 m)
VARI-BH+E+E	87 / 90 dB SPL (A-weighted at 50 m)

Coverage

Horizontal (fixed) ⁴	130° (-6 dB, avg. 1 to 4 kHz)
Vertical (adjustable) ⁵	Software configurable
Maximum throw:	
VARI-B(H)	20 m
VARI-B(H)+E	32 m
VARI-B(H)+E+E	50 m
Dynamic range⁴	>105 dB

Transducers

VARI-B	4" Full Range (8 x 1 driver)
VARI-BH	4" Coaxial (8 x 1 driver)
VARI-E	4" Full Range (4 x 2 drivers)

Electrical

Input Line (2x)

Input level nominal	0 dBV rms
Input level maximum	+20 dBV peak
Type	Transformer balanced
Impedance (balanced)	7.8 kohm at 1 kHz

Input 100 V (2x)

Input level nominal	+40 dBV rms
Type	Transformer balanced (floating input)
Impedance (balanced)	1 Mohm at 1 kHz

Power Amplifiers

Power	
VARI-B(H)	8 x 15 W (class-D full bridge)
VARI-E	4 x 25 W (class-D full bridge)
Protection	
	Thermal shutdown
	Current limiting

PSU

Mains voltage	100 to 120 V / 200 to 240 V (auto switching)
Power consumption	@ Mains / 24 Vdc
Power save	
VARI-B(H)	13 / 4.5 W
VARI-B(H)+E	17 / 7 W
VARI-B(H)+E+E	19 / 9 W
Idle	
VARI-B(H)	18 / 8.5 W
VARI-B(H)+E	23 / 13 W
VARI-B(H)+E+E	28 / 17 W
Max. (Noise, CF 6 dB)	
VARI-B(H)	60 / 36 W
VARI-B(H)+E	97 / 75 W
VARI-B(H)+E+E	124 / 100 W
Power factor	According to EN61000-3-2, class A
Mains inrush current	<70 A (at 230 V)
Protection	Thermal shutdown

PSU	
	Current limiting
	Under voltage lock-out
Signal processing⁵	
DSP	32-bit floating point, 900 Mflops
ADC / DAC	24-bits S-D, 128 x oversampling
Sample rate	48 kHz
Functions	Pre-delay (max. 21 s)
	Input-delay (max. 2 x 10 s / 4 x 5 s)
	Equalizer and compensation filtering
	Compressor
	Volume
	AVC
Control	
Network interface	RS-485 full duplex, auto-switching 115k2, 57k6, 38k4, 19k2 baud, optically isolated
Max. number of units ⁶	126
Surveillance	General status
	Amplifier and load monitoring
	External pilot-tone detection (20 kHz to 30 kHz, min. level -22 dBV)
	Built-in ambient noise sensing microphone
	Thermal overload protection
Failure relay	Maskable conditions
Contact 1	No failure = closed / Failure = open
Rating	Max. 24 V, 100 mA
Contact 2	No failure = 10 k ohm / Failure = 20 k ohm
Control voltage input	5 to 24 Vdc, optically isolated
CobraNet	
Interface	RJ-45, Ethernet 100 Mbps
Word length	16-/20-/24-bit (set by transmitter)
Sample rate	48 kHz
Additional latency	1.33/2.67/5.33 ms (set by transmitter)
Mechanical	
Dimensions (H x W x D)	
VARI-B(H)	1200 x 130 x 98 mm (47.2 x 5.1 x 3.8 in)
VARI-B(H)+E	2400 x 130 x 98 mm (94.5 x 5.1 x 3.8 in)
VARI-B(H)+E+E	3600 x 130 x 98 mm (141.7 x 5.1 x 3.8 in)
Bracket	27 mm (1.1 in) additional depth, flat mounted
VARI-CM	100 x 50 x 23 mm (3.9 x 2.0 x 0.9 in)
Weight	
VARI-B(H)	13.0 kg (28.7 lbs)
VARI-B(H)+E	24.7 kg (54.5 lbs)
VARI-B(H)+E+E	36.4 kg (80.3 lbs)
Color	

Enclosure	RAL9007 (gray aluminum)
Grill	RAL9006 (white aluminum)
Environmental	
Operating temperature	-25 °C to 55 °C (-13 °F to 131 °F)
Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Relative humidity	<95 %

Notes:

1. Measured outside under semi-anechoic 'full-space' conditions with typical filter and delay settings unless stated otherwise.
2. Measured on-axis. The frequency response of the complete array is depending on the actual signal processing parameters and air absorption (at larger distances). A typical bandwidth is specified for the complete array under 'full-space' radiation conditions.
3. Levels are valid for pink noise (100 Hz to 20 kHz bandwidth) with a crest factor of 3 dB, default EQ and minimum opening angle setting. 'Continuous' is the RMS level, 'Peak' is the absolute peak level, both determined at the onset of the output limiter. SPL values will vary depending upon opening angle.
4. For this measurement the signals at all power amplifier outputs are summed together. Measured as the A-weighted difference (in dB) between the maximum rms level (with pink noise input signal) and the noise output (with no input signal present).
5. Additional processing capabilities available.
6. Maximum number that can be connected to one RS-485 subnet, multiple subnets can be controlled by one host PC.

Ordering Information

LA3-VARI-B Vari Base Unit Active Vari-directional Array loudspeaker	LA3-VARI-B
LA3-VARI-BH Vari Base Unit HF Active Vari-directional Array loudspeaker with coaxial drivers for improved high frequency response.	LA3-VARI-BH
LA3-VARI-E Vari Extension Unit Active Vari-directional Array Extension, to be used with a base unit to increase the coverage distance. Up to two extension units can be used with a base unit.	LA3-VARI-E
Accessories	
LA3-VARI-CM Vari CobraNet Module CobraNet module for connection of the Vari-directional Array to a CobraNet network. The module must be mounted inside the base unit.	LA3-VARI-CM
LA3-VARI-CS Vari Configuration set Configuration software for the Vari-directional Array, with USB to RS485 converter for connection to the PC USB port.	LA3-VARI-CS