Manual Ray-On

For column

R110

Active audio

L'acoustique active

CE

Identification number : 1438

Active Audio
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44340 Bouguenais, France

14
1438-CPR-0337

EN 54-24:2008
Type B

Loudspeaker for voice alarm systems for fire detection systems and fire alarm in buildings

RayOn models
R70TC-w, R70TC-b, R110TC-w,
R110TC-b, R210TC-w, R210TC-b

Details in RayOn Manual available on
www.activeaudio.fr

Contents

1 General Presentation

R110 column exist in 5 versions :

- R110: passive column working in 8Ω modes
- R110T: passive column working in 70V/100V modes
- R110TC: passive column working in 70V/100V modes, with the EN5424 certification
- R110+: active columns with DANTE interface and amplifier
- R110PoE : passive column powered by an Ethernet cable allowing the use of networked devices.

All versions of each column (for instance R110, R110TC, and R110+) same dimensions. For changing the version (for instance from R110 to R110+), send back the product to the distributor.

The Ray-On column loudspeakers are passive and based on the DGRC principle.

This technical manual is for column speaker R110. A specific technical manual is devoted to the Ray-On Mini and R110T. Another specific manual is devoted to active versions R70+, R110+ and R210+ and passive version R70TC, R110TC and R210TC so PoE version (R70PoE, R110PoE and B70PoE).

Using the DGRC principle ensures an optimal sound coverage and intelligibility on the listening zone; it is illustrated in figure 1. For every model, the range depends on the installation height (see section 2).

Figure 1 – DGRC principle illustration

Ray-On loudspeakers are ideal for speech reinforcement in small to large spaces where the listening zone is horizontal (slope < 5°). Made of aluminum, Ray-On loudspeakers can be installed outdoor. They are suited for airports, railway stations, churches, conference rooms, shopping malls, amusement parks, etc.

2 Positioning

The most important parameter for the installation of Ray-On loudspeaker is its mounting height because the range of the column directly depends on it.

Figure 2 on the facing page shows the ±5dB range[1] versus to the mounting height, for the direct field[2] at mid- frequencies (300Hz-3kHz).

1. Range for a standing audience shown. For a seating audience, take off 40cm to the column height.
2. Taking the reverberated field into account minimizes the influence of the floor's material.

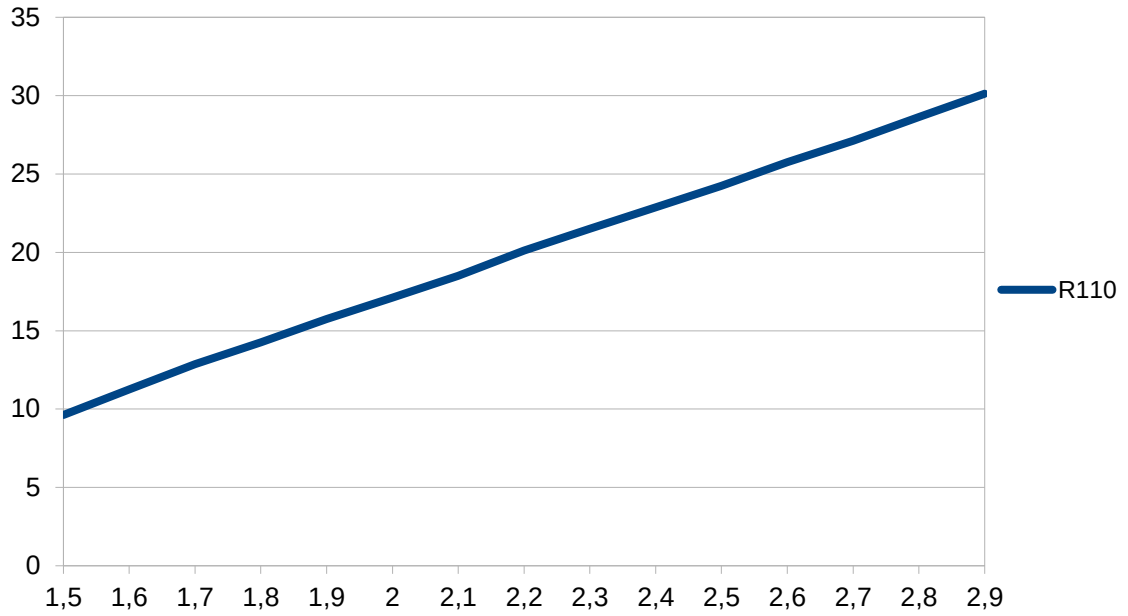


Figure 2 – ±5dB range (m) according to mounting height (from floor to bottom of column, in m).

Table 1 on the next page gives the minimum, maximum, and nominal values for Ray-On mounting height [3].

3. Ears are at 1.15m from floor for a seated audience, 1.55m for a standing audience.

		Mounting height		
		Minimal	Nominal	Maximal
Ray-On 110	Standing audience	1.55m	2.20m	2.70m
	Seated audience	1.15m	1.80m	2.30m

Table 1 – Ray-On mounting height, from floor to bottom of column (meters).

The Ray-On wall-mounting system allows the subsequent adjustment of the columns height. Cf § 5

3 CAD Modeling

There are powerful CAD software tools that can predict the acoustics of a room and accurately model the radiation of loudspeaker arrays. These tools can calculate various acoustic indices, such as reverberation time, sound pressure level, STI, etc.

The sound radiation of the Ray-On loudspeakers can be predicted directly using CATT-Acoustic or EASE softwares.

A simple direct sound simulation tool is directly accessible on www.activeaudio.fr.

Direct sound prediction is also given in the technical characteristics section 6 on page 10.

4 Equalization and tuning

Ray-On loudspeakers may be used without any equalization, but using one is advised. Equalization flattens the column's frequency response and protects the loudspeakers by filtering low frequencies.

The recommended equalization is the same for the 4 different models, which allow many columns to be put together on the same 100V line.

Two equalizations are specified:

- one for speech, which uses 4 cells (n°2-5);
- the other for music, which uses 6 cells (n°1-6).

The table 2 on the next page gives detailed information about these equalizations. The corresponding frequency curves are presented in figure 3 on the facing page.

	Type	Parameters
1	Parametric	Freq = 100 Hz ; Gain = +6dB ; Width = 1.5 oct (Q=0.92)
2	2nd order high-pass	Fcut = 130 Hz ; Gain = -3 dB @ Fcut (Butterworth)
3	Parametric	Freq = 280 Hz ; Gain = -3.0 dB ; Width = 1.0 oct (Q=1.4)
4	Parametric	Freq = 5 000 Hz ; Gain = +6 dB ; Width = 1.0 oct (Q=1.3)
5	Parametric	Freq = 10 700 Hz ; Gain = -7.0 dB ; Width = 0.25 oct (Q=4.0)
6	Parametric	Freq = 15 500 Hz ; Gain = +6.0 dB ; Width = 0.5 oct (Q=1.2)

Table 2 – Recommended equalization

A subwoofer may be used to extend the low-frequency response, especially for diffusion of music. It is advised not to activate the cell 1, frequencies under 180Hz being rendered by the sub. Model SB110 is ideally suited to the Ray-On columns. See the SB110 user manual for the equalization of the system.

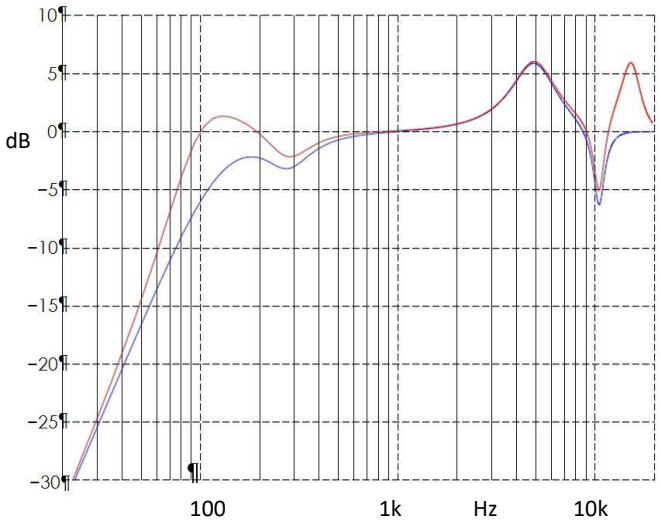


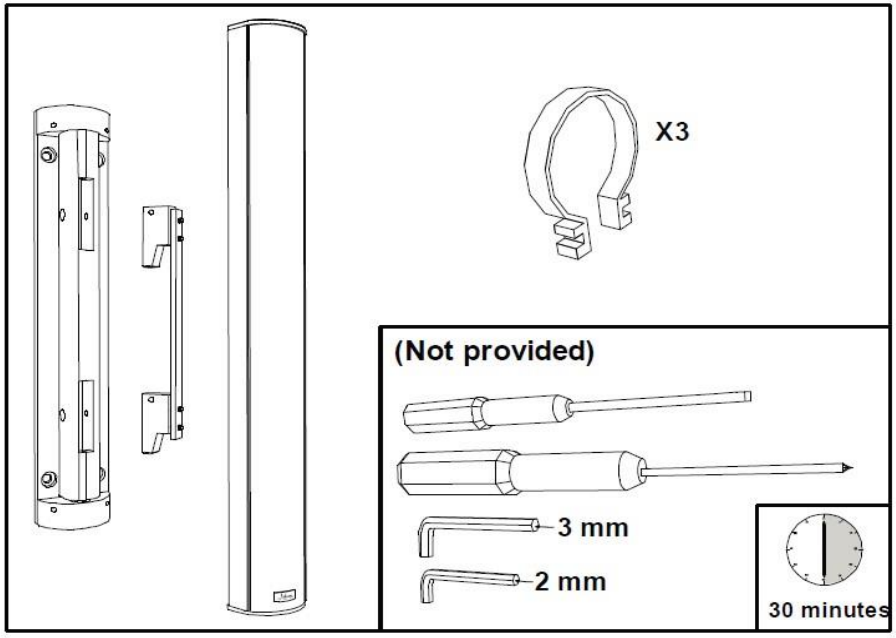
Figure 3 – Recommended equalization curve with (red) and without (blue) cells n°1 and n°6.

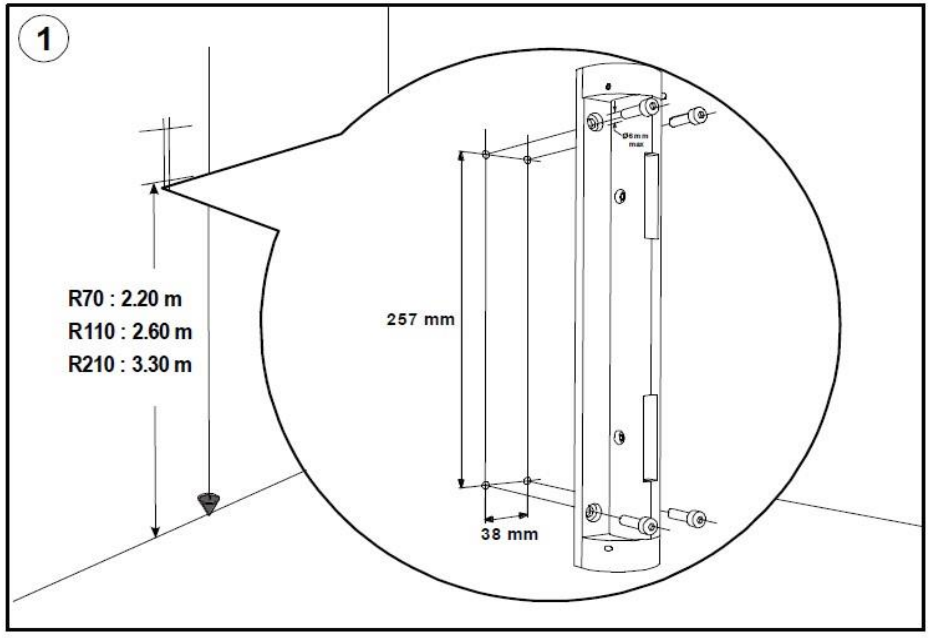
5 Installation and Wiring

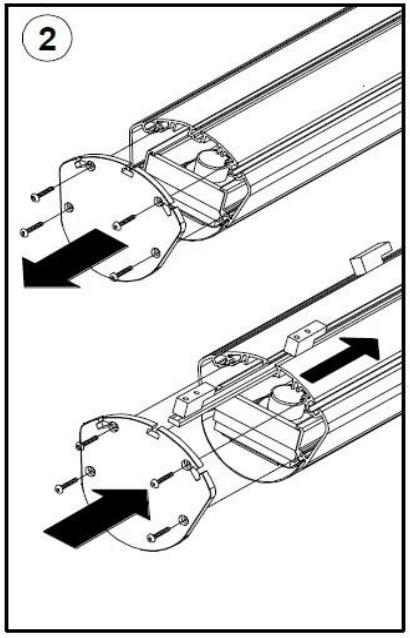
Ray-On loudspeakers are vertically mounted, usually on a wall, using the supplied wall-mounting system. The next two pages illustrate the steps to follow for column mounting.

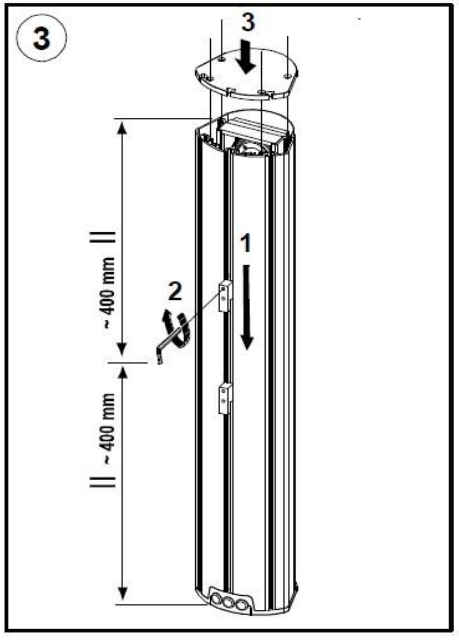
An accessory is available for mast mounting.

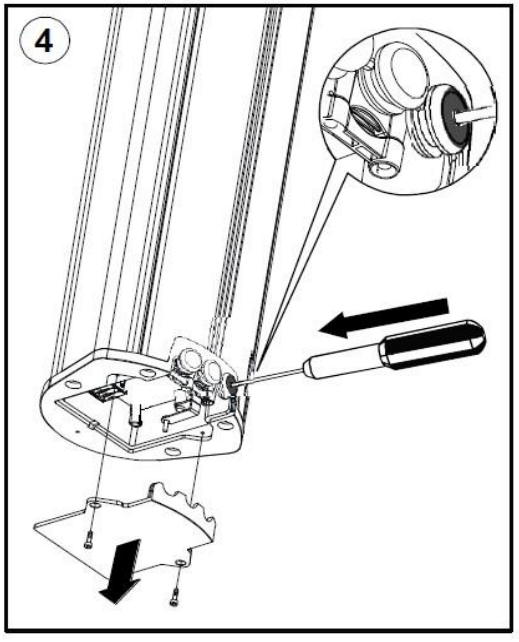
Height adjustment: If changing the column's height is necessary, take the column off its wall-mounting system, move the «hook-slide» along the backside rail, then put the column back on its wall-mounting system.
Safety: An M5 thread is available at the back of the column designed to accommodate a ring for mounting a safety cable.
«Daisy-chain» cabling: Several bushings are available on the back of the Ray-On columns, allowing to connect the column to another Ray-On.
Good to know: The cable diameter must be less than 7.5 mm, the wire's between 0.5 and 2.5 mm²


X3
(Not provided)
3 mm
2 mm
30 minutes


1
R70 : 2.20 m
R110 : 2.60 m
R210 : 3.30 m
257 mm
38 mm


2


3
1
2
~ 400 mm
~ 400 mm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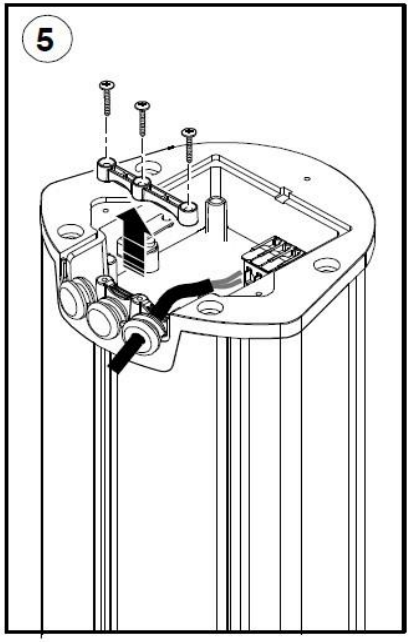
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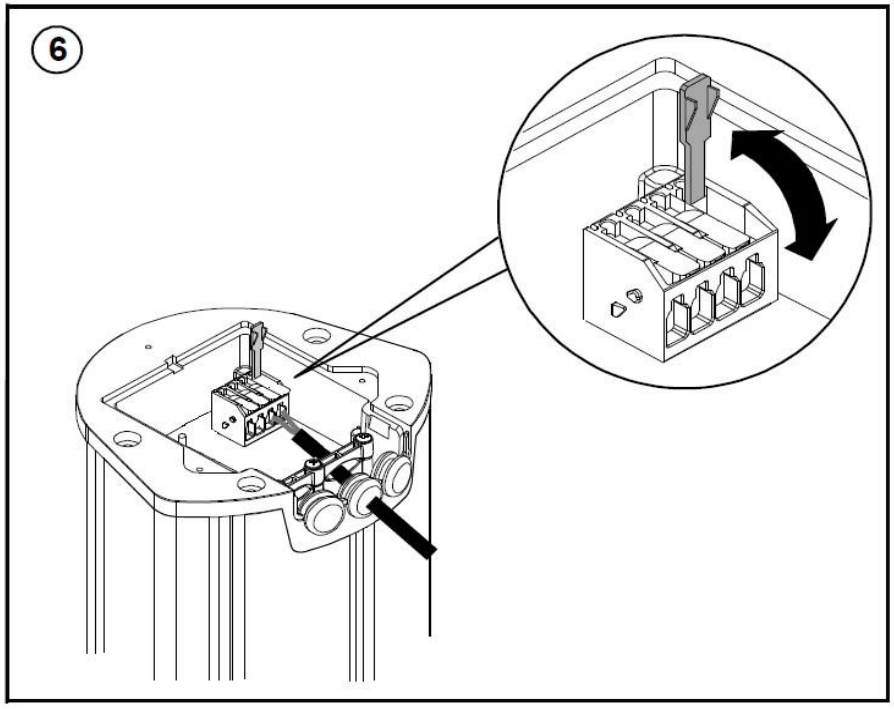
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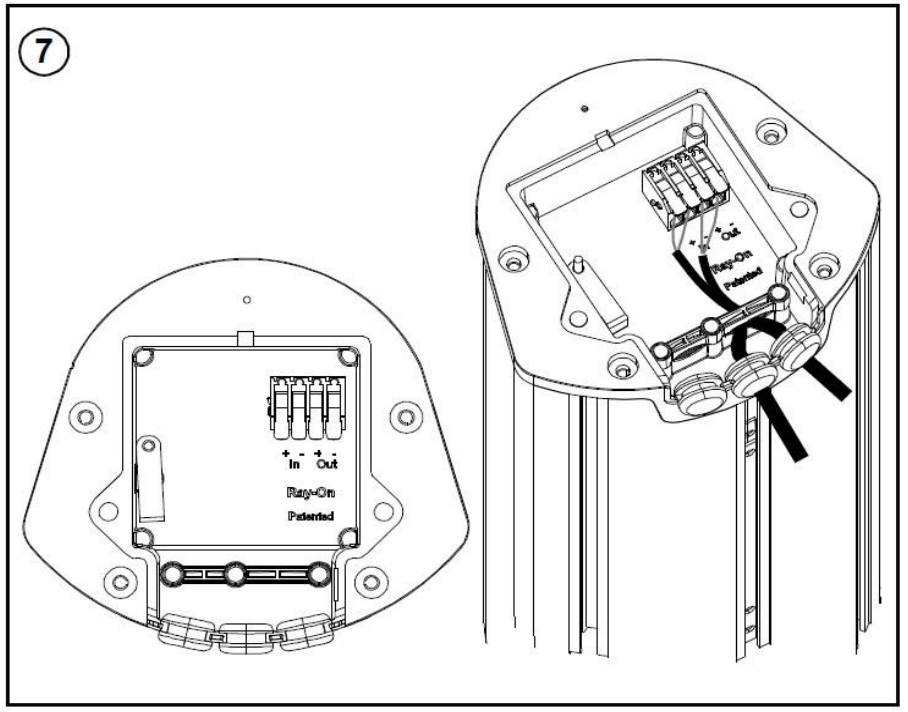
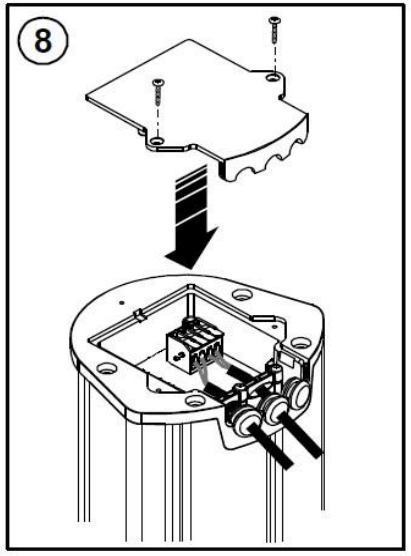

7
+ - + -
In Out
Plug-On
Polarized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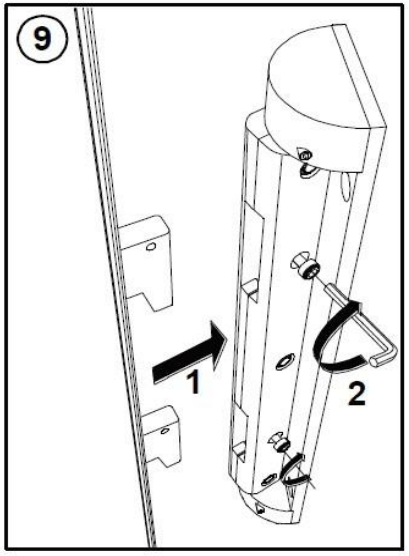
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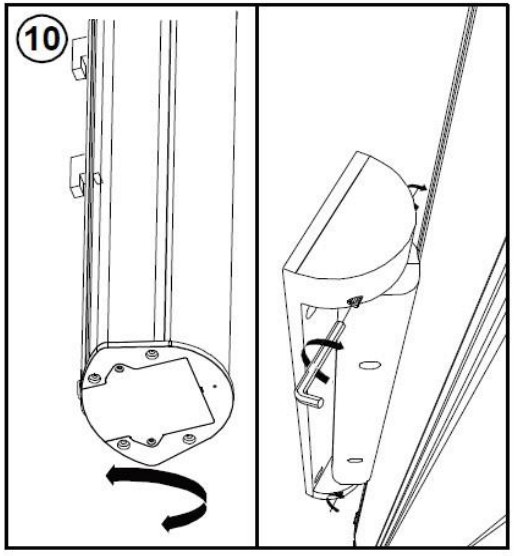
1
2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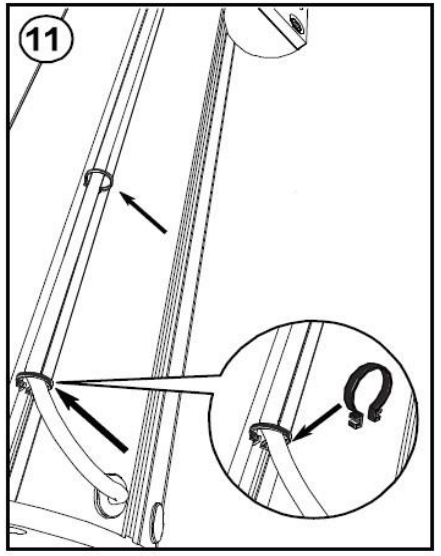
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6.1 General Characteristics

	Ray-On 110
Acoustical data [4]	8Ω mode
Continuous power	150W
SPL max	92dB at 8m
Sensitivity	72dB / W at 8m
Freq. bandwidth at -3dB/-10dB	150Hz - 16,5kHz / 120Hz - 18kHz
Range ±3dB/±5dB	15 / 20 m
Vertical directivity	Wavefront synthesis
Horizontal -6dB opening angle	360° at 500Hz / 190° at 1kHz 156° at 2kHz / 119° at 4kHz
Loudspeakers	12 loudspeakers 70x70mm, outdoor

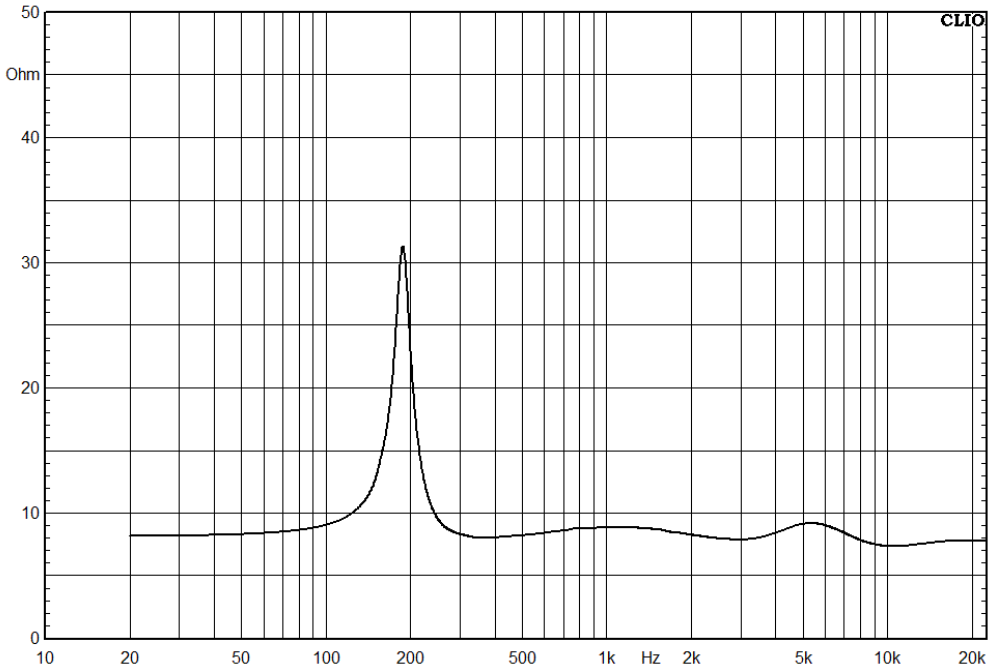
Electrical data	8Ω mode
Nominal impedance	8
Amp. power recom.	150 W
Connectors	Lever terminal block, with "loop-through"
Wire section	from 0,5 to 2,5mm²
Protection	Thermal fuse and protection against overload

Mechanical data	8Ω mode
Materials	Body: aluminum ; Grid: steel treated against rust and UV
Dimensions H x L x P	1115 x 128 x 117 mm
Net / shipping weight	8.5 / 9.3 kg
Environment	IP55 ; from -25°C to +55°C, indoor / outdoor
Colors	White (RAL9016 paintable) and Black (RAL9005)
Mounting	Vertical mounting on a wall or on a mast

Tuning and exploitation	8Ω mode
Mounting height (cm)	1.80 seating / 2.20 standing
Recom. equalization	Speech: 4 parametric cells / Music: 6 parametric cells
Modeling	EASE and CATT-Acoustic models available

4. Unless specified otherwise, characteristics are measured with column at nominal mounting height on horizontal reflecting floor, and using recommended music equalization.

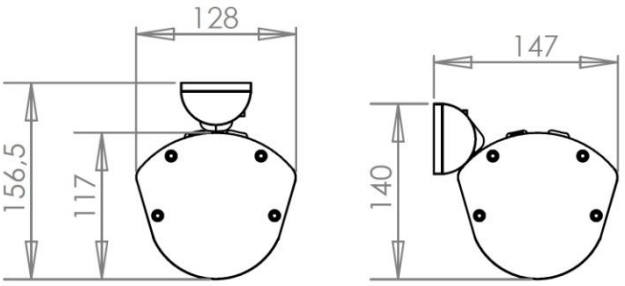
	Ray-On 110
Miscellaneous	8Ω mode
Warranty	5 years
Maintenance	No maintenance required
Serial number	YYMMXXXX (YY: year - MM: month - XXXX: serial)



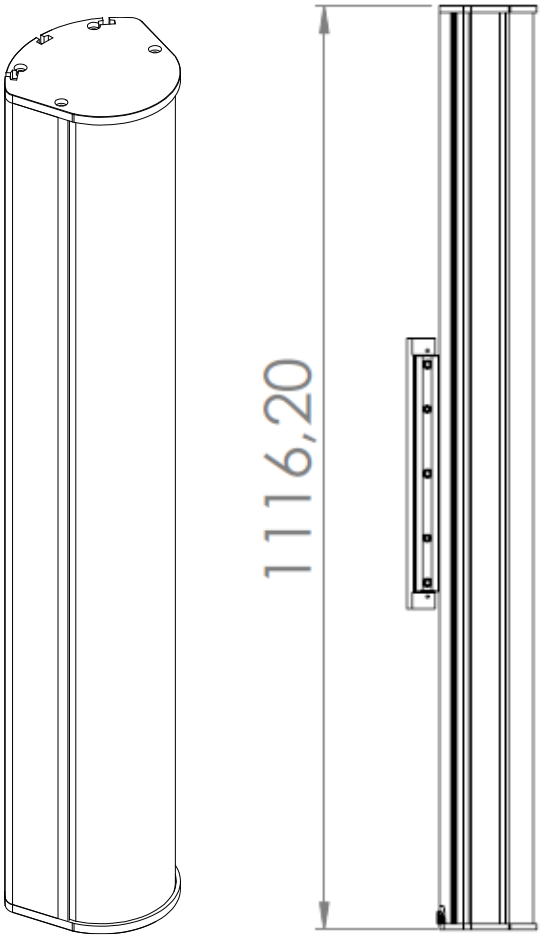
(b) R110 impedance curve

Figure 4 – Ray-On loudspeakers impedance curves

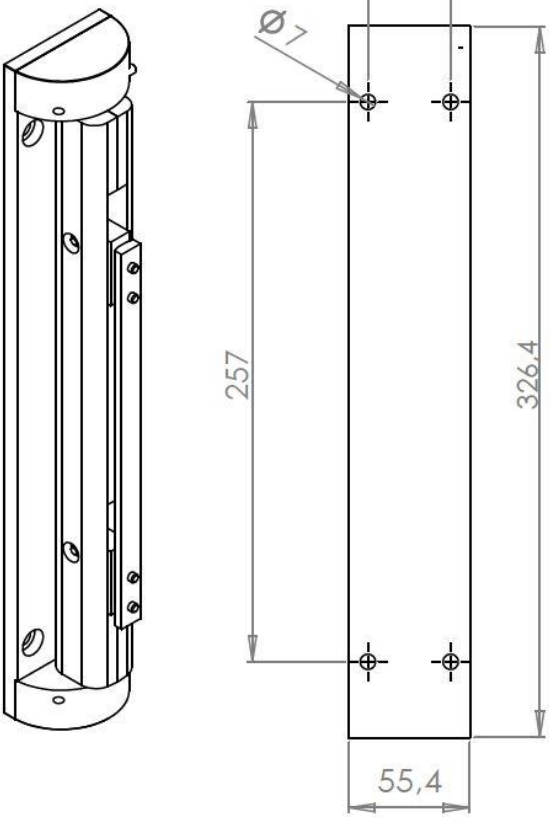
6.2 Technical drawings



Top views



Ray-On : General and Front view

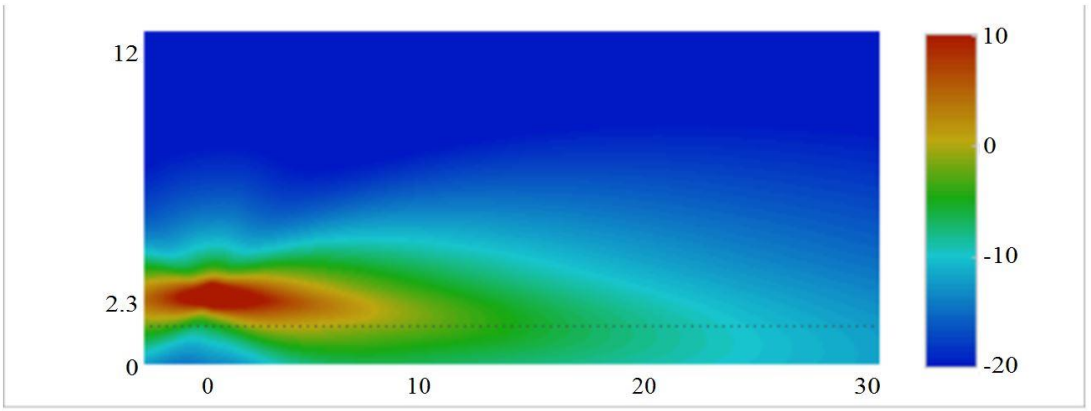


Fixation: General and Back view

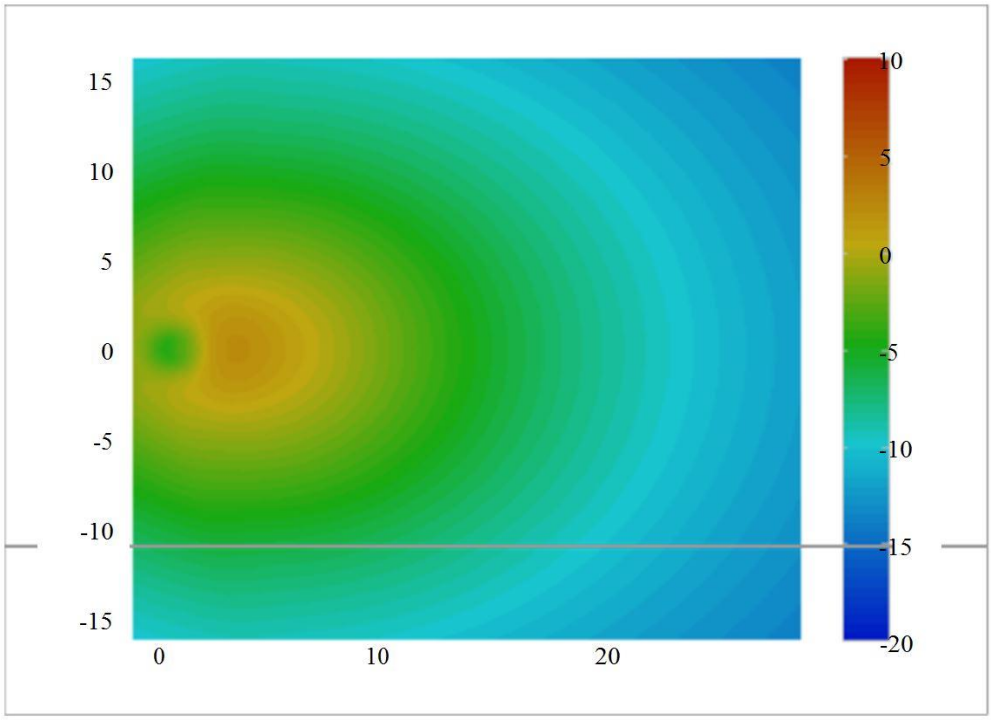
Figure 5 – Technical drawings

6.3 Acoustical data

Acoustical data [5].

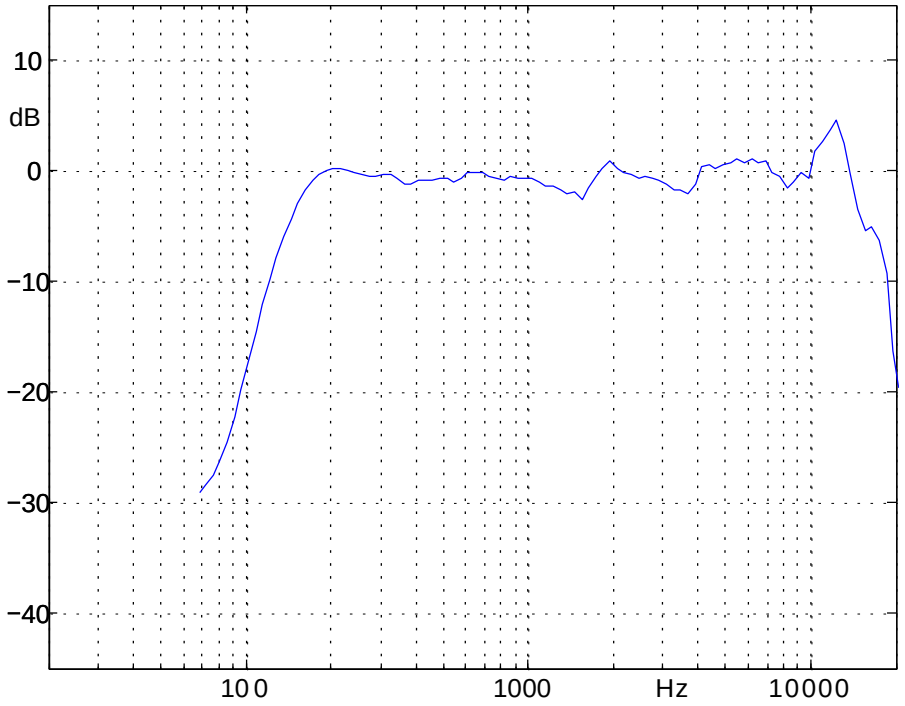


(a) R110 vertical directivity: sound level for the speech octaves (500Hz,1kHz,2kHz) in the vertical median plane.



(b) R110 horizontal directivity: sound level for the speech octaves (500Hz,1kHz,2kHz) on the listening plane (80cm below the column).

5. Column in nominal position at 2.30m from the floor. The reference SPL is the mean level in the listening zone.



(c) R110 frequency response, with recommended music equalization. Average from 2 to 15m in the axis.

Figure 7 – R110: acoustical data.

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