

# TRIO | FACT SHEET

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ACOUSTIC

## TRIO FACT SHEET

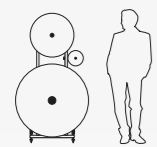
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### TRIO

109 dB sensitivity  
19 ohm system impedance  
38 inch low-midrange horn  
23 inch midrange horn  
7 inch tweeter horn  
CDC system with no crossover  
100V CPC crossover (patent pend.)



### THE SYSTEM

The Trio is a 3-way spherical horn satellite which – below 100 Hz – is complemented with active subwoofers. The transmission of the lower frequencies is handled by the 38 inch low-midrange horn. It is driven by the new 8 inch L3 omega driver with 16 ohm omega voice coil. The heart of the Trio – the midrange with coverage down to 600 Hz – is covered by the redesigned 27 ohm 2 inch M3 omega driver with the 23 inch midrange horn. The 16 ohm 1 inch tweeter H3 omega with its 7 inch horn blends in at 4 kHz.

The CDC technology allows for a minimalist concept with only 4 passive crossover components for the complete 3-way system. All capacitors have been completely redesigned and are configured with the patented CPC-technology. The sensitivity of the system is 109 dB.

In the low frequencies the Trio-series can be combined alternatively with the SUB231 subwoofer of the Duo Grosso, the ADRIC horn bass modules of the Duo Mezzo or, in its ultimate configuration, with from 2 up to 6 Basshorn modules.



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OMEGA TECHNOLOGY

To significantly improve the sound quality Avantgarde Acoustic™'s *Omega* approach is based on two major concepts: simplification of the passive crossover design and high impedance voice coils.

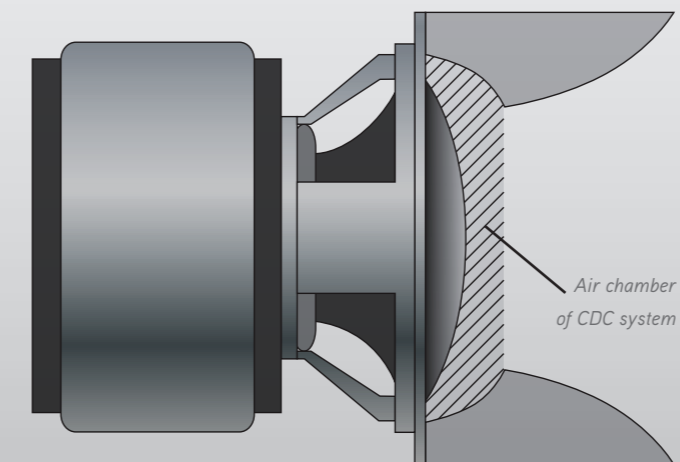
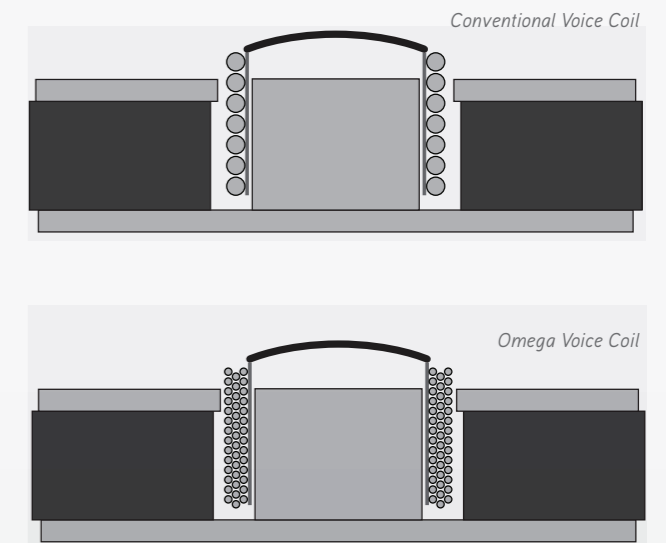
Different to 2nd order conventional passive crossover with nine and more components for a 3-way speaker, the Trio omega allows for a minimalist concept with only 4 passive crossover components for the complete 3-way system.

Using a simple 1st order crossover for the low and mid frequency drivers is usually not easy due to the large overlapping of the frequency response. Using their "Controlled Dispersion Characteristic" of the driver/horn configuration, Avantgarde Acoustic™ effectively controls the output.

This is how CDC works: The lower cut-off frequency of a horn loudspeaker is determined by the size of the horn. The larger the horn, the lower the response. Below the cut-off frequency of the horn, the response falls off steeply at 18 dB/octave. Avantgarde

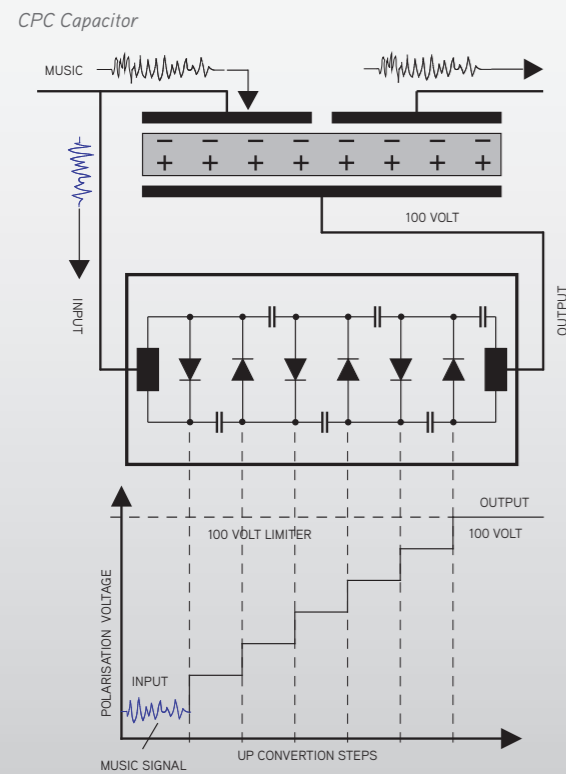
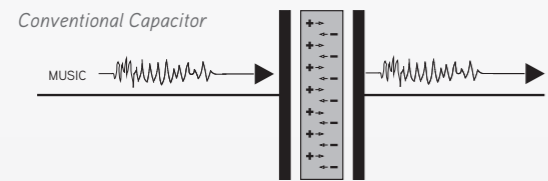
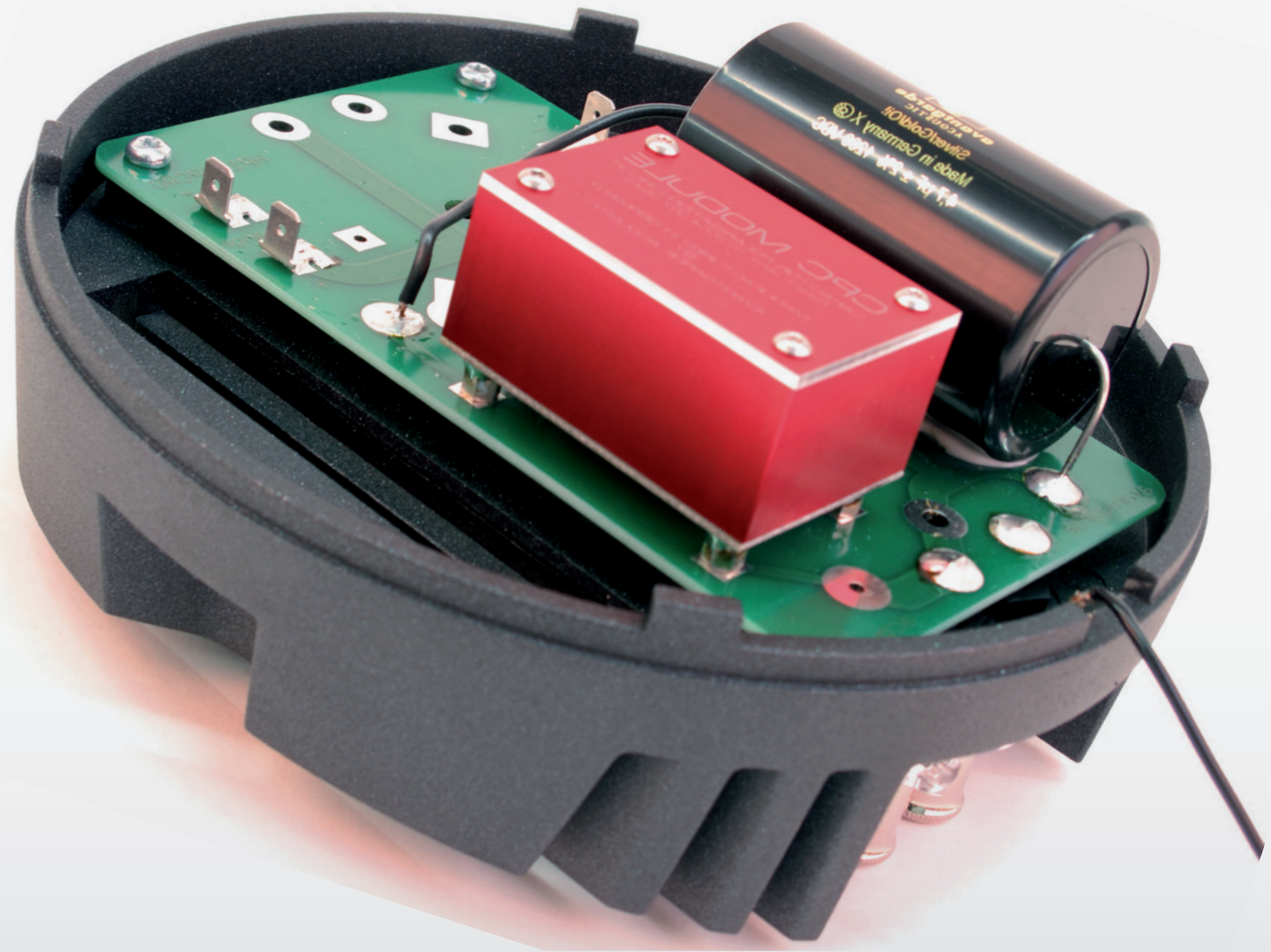
Acoustic™ speakers thus operate only down to their cut-off frequency limit and require no high pass filters. The upper frequency response is determined by the driver. However, it can as well be influenced acoustically by the horn. For this purpose, Avantgarde places a small chamber between the driver's membrane and the horn throat. The driver does not emit directly but via a small air chamber into the horn throat opening. This air volume operates as a kind of band-pass filter and automatically filters frequencies above the resonance volume of the chamber (at 6 dB/oct.). By choosing an adequate driver with a natural roll-off at 6 dB in this frequency range, Avantgarde Acoustic™ obtains an acoustic attenuation of the frequency response of 12 dB without any passive frequency crossover. Thus the CDC system causes the lowrange and midrange drivers to only operate within their operational band and steeply fall off at the transition points. This way only one crossover component for the low and mid frequency drivers is required for seamless integration.

The attached graphics show the difference of conventional and the new Omega voice coils. To achieve very high resistance the voice coils of the Omega drivers are made with very long but very thin wires. Up to four windings are placed on the voice coil former. Elaborate production technology is required as the wire is so thin and easily breaks and the voice coil gap is so narrow. Now, why is the horn manufacturer taking so much energy and effort to simplify the passive crossovers and enhancing the impedance of their voice coils?.



The key point is the damping factor. Damping factor is the technical term for the ability of an amplifier to control the movement of the membrane. E.g. simply speaking the force the amplifier applies to the voice coil to follow exactly the musical signal. According to common knowledge the damping factor is determined by the quotient of load impedance (driver) and output impedance of the amplifier. An amplifier with an output impedance of 0,04 ohm will thus theoretically have a damping factor of 100 when connected to an 4 ohm speaker. But this is a purely theoretical figure! In real life the signal has to pass a speaker cable and the passive crossover components till it reaches the voice coil. Using a typical 5m long speaker cable with an W-resistance of 0,36 ohm and a resistance of the crossover coil of 0,6 ohm, the effective real damping factor will decrease to a value of only 4! Connecting the same amplifier/cable configuration to the Duo omega will result in a real damping factor of 18, which gives 4,5 times more control and precision! E.g. the control of the amp will increase by 450% and at the same time will reduce the negative effects of long speaker cables by 80%.

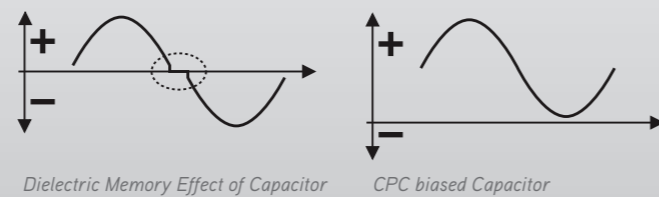
As a result the Omega drivers have more authority, less distortions and an excellent detailed response characteristics.



THE CPC CROSSOVER

Unlike the Omega midrange driver of the Duo which is running full range without any crossover, the Trio omega tweeter and midrange drivers require passive filters for thermal protection. As with all their products Avantgarde Acoustic™ was taking a very puristic approach. Less is more is the design philosophy.

A potential limitation of any passive crossover is the capacitor required to filter low frequencies. A capacitor consists of two plates or conductors. As both plates are separated by a dielectric or insulator, the conductors have no direct contact but the signal is passed through a dielectric field. Every time the music signal is changing from the positive to the negative half-wave and vice versa the dielectric field gets inverted. The permanent change of direction of the field in a capacitor - a phenomenon called "dielectric memory effect" - causes distortions which get worse the closer the signal passes through the zero point and are at a max just when the electric field changes its direction.



To avoid these distortions Avantgarde Acoustic™ uses with the "Capacitor Polarisation Circuit" an elaborate approach. Different to conventional capacitors the CPC-capacitor has multiple conductor-foils connected with a special electric layout shown in the attached graphics. The CPC module up-converts the income music signal to the required voltage to bias the conductors. Only the inner conductor is biased with DC. In the CPC module a voltage cascade through a network of diodes increases the voltage of the music signal to a multiple. This high direct current is than fed into the inner conductor. Furthermore is the diode circuit electrically

decoupled through a very high impedance transformer to avoid any backlash to the music signal. Already a view moments after turning on the music the CPC module has generated the required direct current to bias the capacitor. As the CPC diode cascade can build-up voltages by far beyond allowable levels, Avantgarde Acoustic™ has included a protective circuit to avoid overloading the capacitor.

The CPC biased capacitors for the midrange and tweeter drivers of the Trio have less distortions and can more precisely handle incremental signal variations.

## TRIO DRIVERS

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### THE LOWRANGE HORN DRIVER

The specially optimized lowrange driver - L3 omega - is characterized by its extremely high efficiency of 109 dB (1W/1m) and utmost power handling capabilities.

A huge ferrite magnet, a 16 ohm voice coil and a very stiff, mass reduced membrane will ensure highest resolution and authority even with complex signals at extreme sound pressure levels.

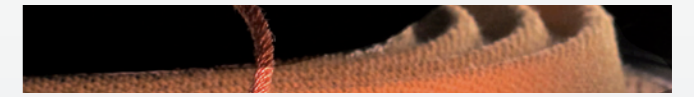
Due to the Avantgarde Acoustic™ CDC system, the L3 omega works exclusively within its optimal frequency range and automatically rolls-off at the crossover frequencies. Thus only one crossover component is required for seamless integration with the midrange.

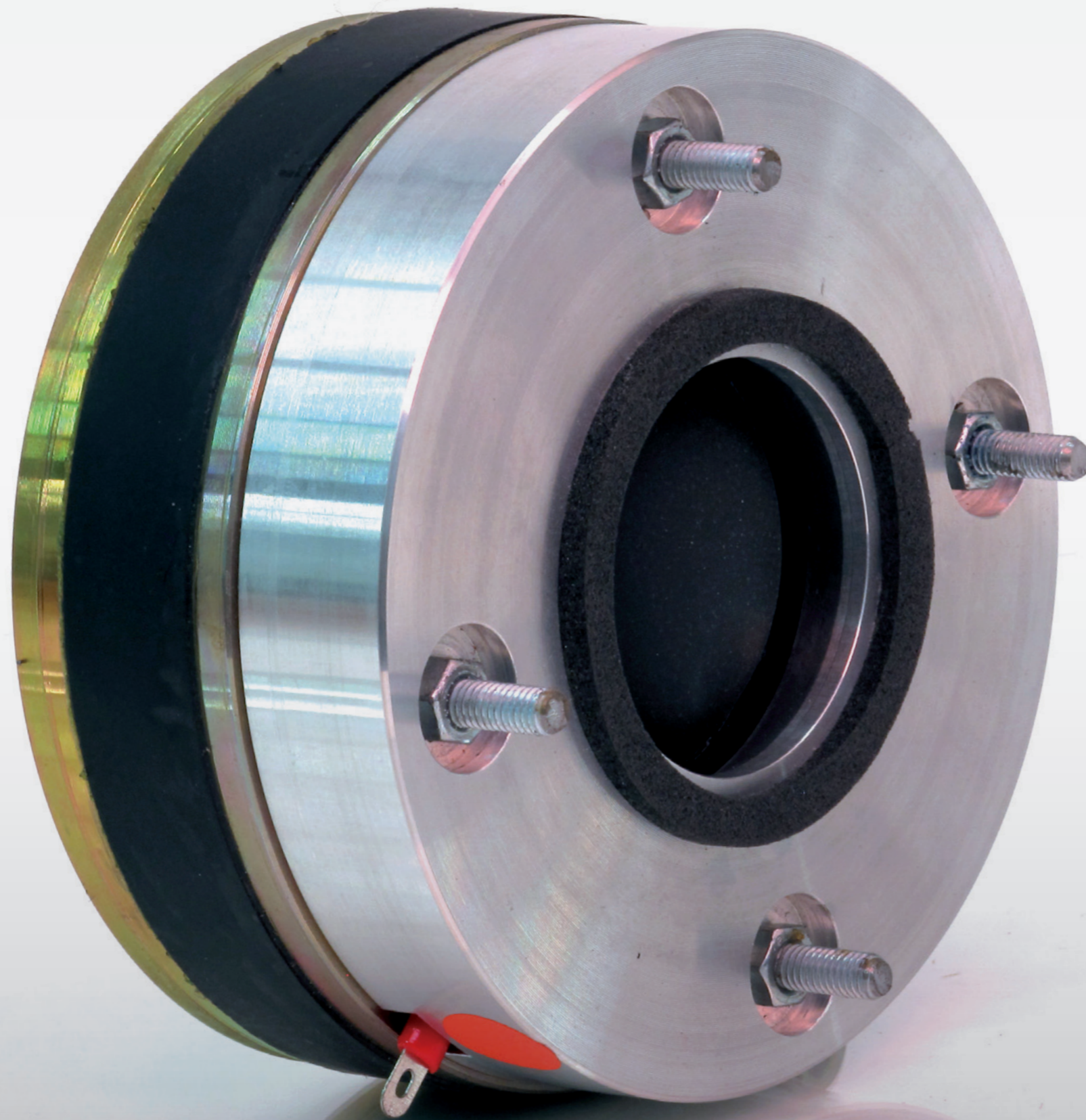
Connected to the impressive low-midrange horn SH9504 with 950 mm diameter (37 inch), the L3 omega offers a very neutral, dry and contoured sound reproduction across the entire mid-bass range.

The design of the dome ensures a phase-neutral radiation of the sound waves into the midrange horn SH9504 and wide bandwidth of the extended lowrange down to 100 Hz. This is approximately one octave lower than the response of the Duo midrange horn!

The kevlar midrange cone of the L3 omega is coated with trillions of tiny microfibrils generating a "Velours Damping Effect". This incrementally small fur of the VDE technology cone effectively reduces partial resonances of the cone itself. Furthermore the microscopic fibres of the VDE technology help to effectively absorb high frequency distortions.

Vocals, instruments and complex signals are reproduced with speed and ease that will let you forget that you are listening to a recording.





## THE MIDRANGE HORN DRIVER

The utmost care at choosing the drivers is the key to successfully transforming the theoretical advantages of the horn technology into an outstanding High End speaker. As mostly people focus on treble and bass response, Avantgarde Acoustic™ considers the midrange as the “heart” of each speaker system.

M3 omega, Avantgarde Acoustic™’s midrange driver system, is the core of the Trio and especially designed for our 570 mm (22 inch) spherical horn SH5702. With its outstanding 27 ohm voice coil it amazes with its high sensitivity, very low distortion and an excellent linear response.

The exactly calculated CDC system allows us to reduce the passive crossover to only one component in the signal path, which is purely required for thermal protection.

Further characteristics of the Avantgarde Acoustic™ M3 omega system are the generously dimensioned strontium ferrite magnet structure which offers very high power handling and long linear excursion of the diaphragm.

The M3 omega has a very low cut-off frequency with seamless and crossover-less integration to the lowrange and tweeter drivers. The design of the dome ensures a phase-neutral radiation of the sound waves into the midrange horn SH5702. The frequency bandwidth covers the range from 600 Hz to 4 KHz.

In contrast to the typical compression driver, the M3 omega uses a special dispersion characteristic with a very low compression ratio. The energy which is needed for the lower frequency range is provided by a strong and linear movement of the voice coil and not by a high compression ratio. It is this special design that makes a major contribution to the crystal clear transparency of the midrange frequencies even at extremely high power levels.

## TRIO DRIVERS

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### THE TWEETER HORN DRIVER

H3 omega is Avantgarde Acoustic™'s statement for the Trio high frequency range. This exceptional driver combines the smoothness of an electrostatic driver and the power of a strong 1 inch horn driver.

The H3 omega features a voice coil former made of Kapton with a minimised air gap, a special geometrical shape of the 17 ohm voice coil and an ultralight diaphragm makes this special driver really outstanding.

Its massive 3 kg magnet with high magnetic flux density help produce enormous power and authority on the movement of the voice coil. Each signal is reproduced one-by-one, exactly to the original. The H3 omega convinces by its ability to produce absolute precision and detail of reproduced music of any kind.

Instead of a 2-way system with an additional super-tweeter, the Trio actually is a real 3-way-satellite-system. The L3 omega midrange-bass driver works exclusively up to 600 Hz; thereby eliminating the critical „break-up“ of the cone as well as distortions that are typical of the upper frequency range of a cone driver.

The tweeter H3 omega starts working at 4 kHz and thus avoiding the problems of an excessive membrane movement. Thus, the H3 omega could be optimized for the high frequencies, instead of being misused for the midrange. The result is a harmonic system with 3 drivers working exclusively in their own well defined frequency range.





## TRIO CONSTRUCTION

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### MECHANICAL CONSTRUCTION

Low-midrange, midrange and the tweeter horn are mounted into circular housing tubes with solid cast aluminium back covers on its back end. A straight three pillar steel-tube frame is used to support the horns. Newly designed aluminium spacers with knurled head screws, connecting the frame rails with the housing tubes of the three spherical horns.

The entire loudspeaker system is placed on a solid cast aluminium base frame. The spike assembly of the base frame – featuring solid 55 mm spikes and massive adjusting handles – are easily accessible from the top.

The horn alignment is a functional straight line and demonstrates visual integrity without any frills. Due to this compact design the Trio satellite only has a width of 950 mm (37 in). Alternatively to this mechanical design, the Trio Classico is available with a circular frame structure.

# TRIO COLORS

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## EXAMPLES



## COLORS FOR THE HORNS

- |  |                                    |
|--|------------------------------------|
| Stealth Nocturne Black <small>(panel only)</small> | Turmaline Vivid Black              |
| Stealth Nocturne Grey                              | Shiny Citrine Orange <sup>1)</sup> |
| Diamond Crystal Silver                             | Ruby Brilliant Red                 |
| Akoya Pearl White                                  | Sapphire Burma Blue                |
| Light Amber Bronze                                 | Light Topas Blue                   |
| Saona Beach Cream                                  | Smaragd Pearl Green                |

A selection of ten standard colors is available for the horns. This includes eight metallic lacquer finishes, the uni-color „*Saona Beach Cream*“ finish and the moderne „*Stealth Nocturne Grey*“ finish. The special „*Shiny Citrine Orange*“ multi-layer coating is available as an option.

On this page you will only find a small selection of thumbnails of the color combinations possible. For a better overview you should visit our website [www.avantgarde-acoustic.com](http://www.avantgarde-acoustic.com).

Here you can download a special *Color & Finishes.pdf* for each product. In this document you can find a nice overview of all combinations available.

## COLOR CONFIGURATOR

On our website [www.avantgarde-acoustic.com](http://www.avantgarde-acoustic.com) you will find as well a comprehensive color selection tool. Just go to the Trio product within the *HORN*-section. Under *DESIGN* you can select the color of the horn. If you have found your favorite color combination, simply click on the download-button for a high resolution picture (6 mb).

TEST REVIEWS\*

"Pure acoustics, only the absolute necessary electronics - and a realism in sound is achieved in the audiophile royal class only by the size of the TRIO horns. Back to the roots of the physics - again the membranes are incredibly small, move at lightning speed, dynamic and clean. The reward: the elaborate designed horn-transducers reproduce a sound like at a life concert. Ironically as well at very low volumes as the TRIO translates even the slightest soupcon of difference in sound pressure into full sound." (HANDELSBLATT, A. Postinett, GERMANY)



"Mmmm, Mmmm, Gooooood! Straightaway, I was captivated by the speed and immensity of the sound. The TRIO/BASSHORN combo was blazingly fast, incredibly dynamic, frequency-extended, exceptionally detailed, lushly layered - and vividly lifelike. Was it the real thing? Hmmmmm - I don't know. But it was visceral enough that you could reach out and touch the performers. Was it just like live music? Welllllll, again, that's a reach, but it sure felt life-like, and what's more, it was just plain fun." (6MOONS.COM, C. Stern, USA)



"The TRIO with BASSHORN is - so to speak - resetting the clock. It reminds us that a speaker with high sensitivity and correctly executed horn technology is the only serious solution for people who like to have a real concert feeling at home. The speaker is beautiful, its curves irresistible and the sound is simply seductive. If you like the real thing, there is not much to think about ..." (PRESTIGE AUDIO, Pierre-Andre Viollet, FRANCE)



"This speaker reveals details, which no boxed speaker is capable of. Listening in front of these majestic horns is like driving a racing car. The acceleration is incomparable. Enormous efficiency. The big acoustical magnifying glass: deeper soundstage than probably any other speaker on the world market. Fascinating presence and incredible analytical detail. Engineered and built to perfection - like a sculpture." (STEREOPLAY, A. Günther, GERMANY)



"Mr. Matthias Ruff of Avantgarde Acoustic was shocked by the sound of ordinary horn systems and since then was taking pains to develop the ideal horn concept by the means of a logical approach. The approach was to achieve the best sound by acoustically minimizing the existence of the speaker. Listening to the TRIO system, I came to feel that the speaker reached a state of speaking the truth at last - after taking a long time and long way." (STEREO, Kouichi Imaizumi, JAPAN)



"They are unquestionably the finest loudspeakers I have heard in my home and, without any doubt, one of the best loudspeaker systems in the whole blooming world ... and from an engineering standpoint the most remarkable. There is no sense of stepping up o the next dynamic level - no hard-ceilinged upper limit, no lost-in-the-murk lower limit, no mechanical ratcheting in between. Well-recorded music breathes forth with the naturalness of the real thing." (FI, J. Valin, USA)



TEST REVIEWS\*

"The only criteria that really counts - capability to reproduce music - the TRIO is an offer without any competition in the top end. The TRIO controls the atmosphere and dominates the air in the room like no other speaker. The level of radiated energy is over-whelming. Thanks to the perfect clarity - cleanness of the world's best low/mid combination - the TRIO<sup>o</sup> mainly mediates the emotional impact of music. A "true" speaker for real music lovers." (HAUTE FIDELITE, O. Corton, FRANCE)



"If you have any affinity for horn speakers, you must admire and perhaps even lust for the TRIO. This is another speaker that makes a statement big as life. The TRIO made beautifully dynamic music, displaying the qualities I would look for in a big horn speaker without showing any traditional weaknesses. And remember not to close your eyes all the time while listening - the TRIO is very nice to look at. (SOUNDSTAGE, M. Frank, USA)



"These gorgeous flowers make music and music-makers sound astonishingly realistic. There is no loudspeaker on the planet with better dynamic range and scaling than the TRIO. Considering that they rival their competition, they are something like a bargain. You cannot buy a loudspeaker that gives you more 'in the room' presence." (THE ABSOLUTE SOUND - Golden Ear Awards, J. Valin, USA)



"A percussion solo or the powerful cue of a large orchestra quickly teaches us that absolutely perfect sound reproduction is possible. Realised to an extent that turns even high-quality standard speakers into tired, worn-out background figures. Concurrently, just as a side effect, a nearly imperceptible network of details comes to the surface which - due to its transparency and neat structure of details - offers another, so far unknown quality." (IMAGE HIFI, R. Kraft, GERMANY)

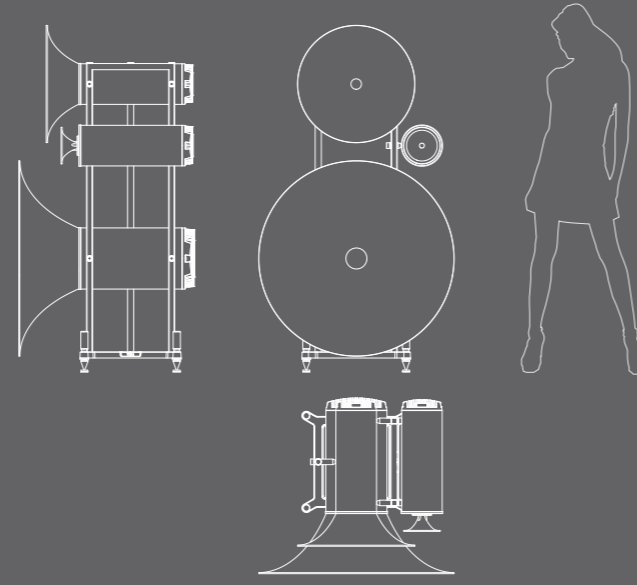


"Horn culture par excellence: three spherical horns guarantee unlimited dynamics and a new level of fun. The natural tonal balance - which I absolutely did not expect - did the rest. Incredible: For the first time I did not hear any horn-typical colorations! On the contrary, the TRIO impressed with a lifelike and sheeny reproduction. The TRIO is without any doubt the most fascinating and sensible speaker system of our times." (STEREO, H. Barske, GERMANY)



"They are easily the fastest and most realistically dynamic loudspeakers I've heard. Their greatness lies not only in their huge dynamic capabilities but in the natural lifelike speed with which they recreate dynamic gradations. They can shade dynamics as Sinatra can shade a lyric, eliciting the most subtle emotional nuances from music. I can think of no higher praise." (STEREOPHILE, A. Kay, USA)





## SYSTEM DATA

Frequency response	satellite subwoofer
Power capacity	
Sensitivity (1 Watt / 1 m)	
Crossover frequencies	
Nominale Impedance	
Recommended amplification	
Recommended room size	
CDC (Controlled Dispersion Characteristic)	
CPC crossover (patent pend.)	

## HORN

Horn type	
Horn material	
Horn finish	
Dispersion type	
Horn mouth area	low mid range mid range high range
Horn mouth diameter	low mid range mid range high range
Horn length	low mid range mid range high range

## HORN DRIVERS

Diameter	low mid range mid range high range
Magnet material	low mid range mid range high range

## SUBWOOFER

Power Output (RMS)	
Power capacitance	
Toroidal transformer	
REAL TIME feedback control	
ADRIC circuit (patent pend.)	
Aktive frequency crossover	
Subsonic filter, 3-positions	
Automatic 12V remote On/Off	
Smart Limiter	
SoftStart circuit	
Driver diameter	
Number of drivers per module	
Magnet material	

## DIMENSIONS/WEIGHT

Dimensions	width depth height (+/- 15 mm)
Weight	

100 - 20.000 Hz
18 - 350 Hz
150 Watts
> 109 dB
100 / 600 / 4.000 Hz
19 Ohm
> 2 Watts
> 25 m <sup>2</sup> / 250 ft <sup>2</sup>
Yes
Yes

Spherical horn
ABS injection mold
polished
180 degree

0,709 m <sup>2</sup> / 1099 in <sup>2</sup>
0,255 m <sup>2</sup> / 395 in <sup>2</sup>
0,025 m <sup>2</sup> / 39 in <sup>2</sup>

950 mm / 37 in
570 mm / 22 in
180 mm / 7 in

650 mm / 26 in
430 mm / 17 in
85 mm / 3.3 in

200 mm / 8 in
50 mm / 2 in
25 mm / 1 in

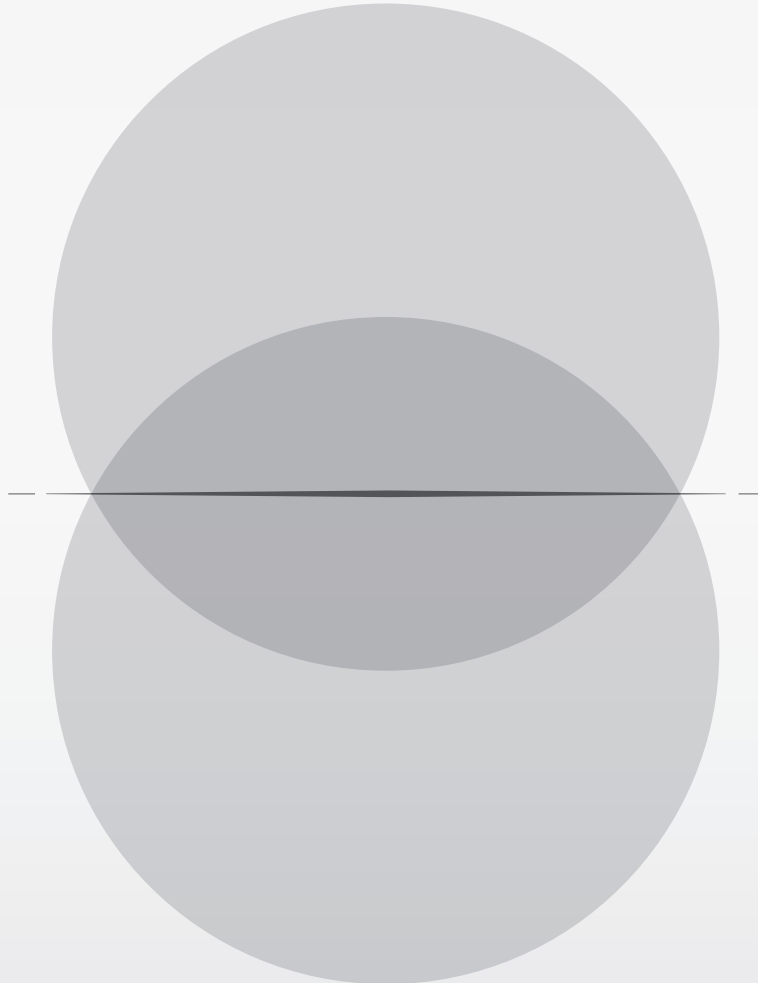
Ferrite
Strontium Ferrite
Ferrite

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n/a
n/a

950 mm / 37 in
830 mm / 33 in
1.670 mm / 66 in
56 kg / 123 lbs

purity



performance



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ACOUSTIC

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