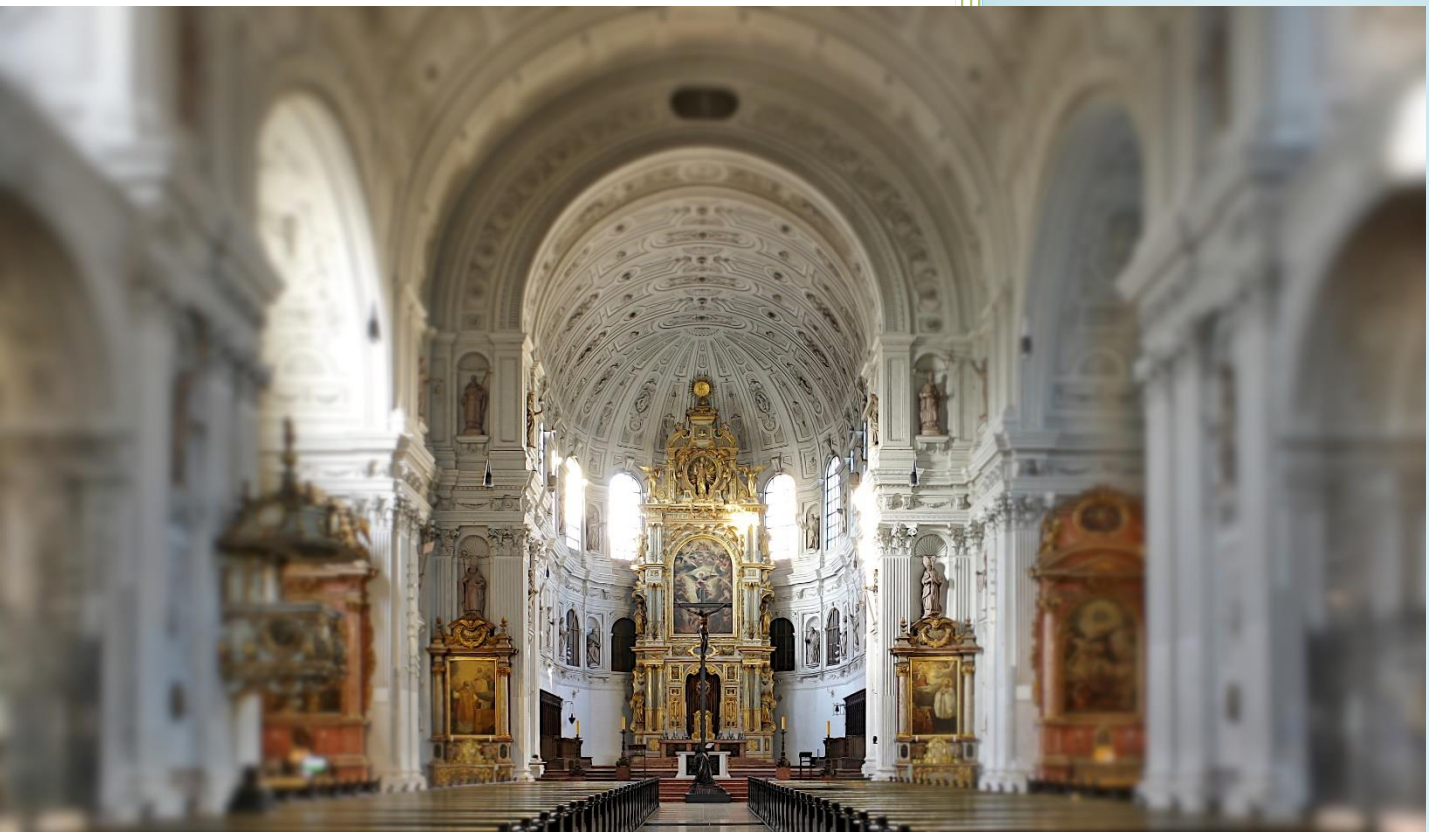


AVE GmbH

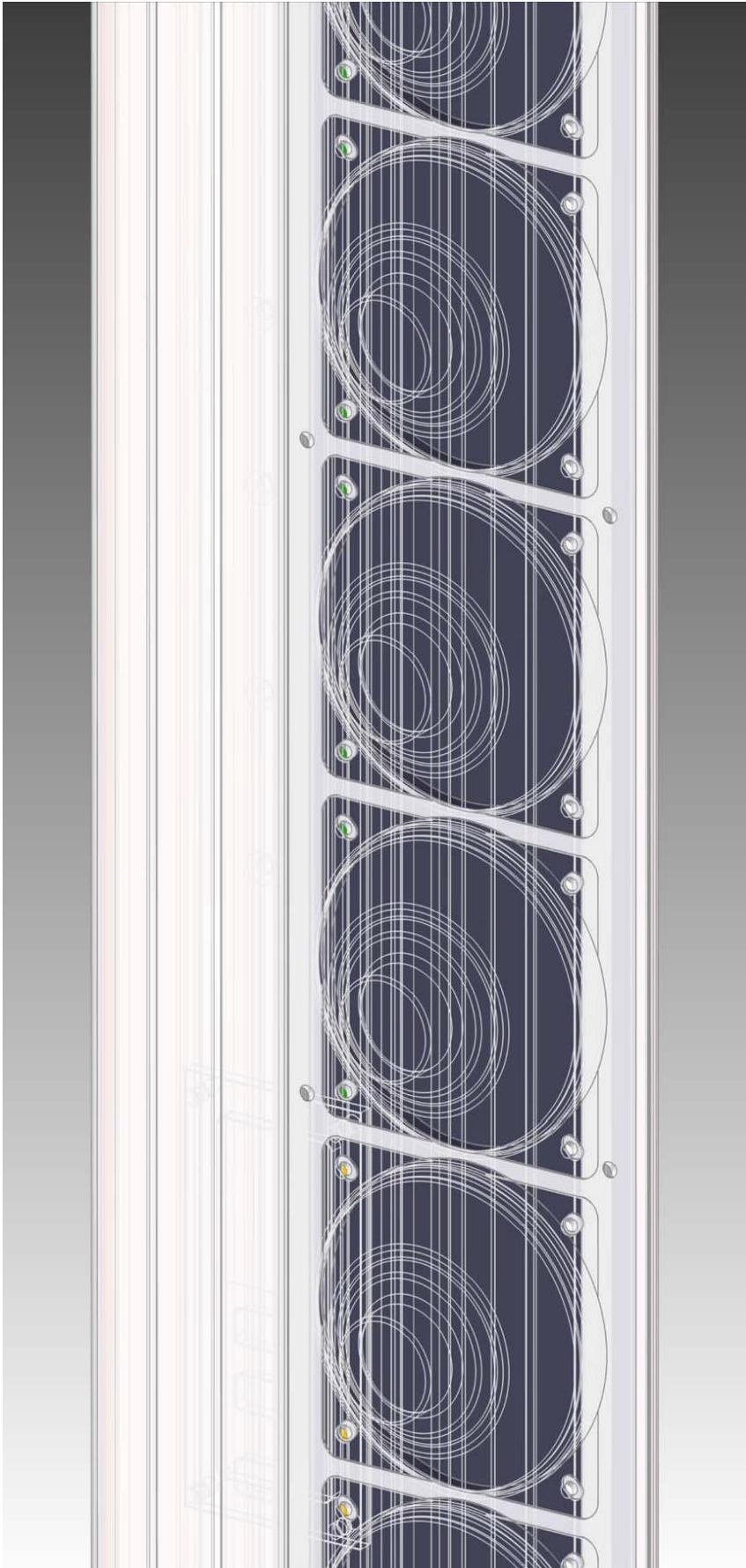
Digitally Steerable Column Speaker
Ascolto



A.V.E. GmbH

Audio Vertriebs-
Entwicklungsgesellschaft

Germany



**Digitally
Steerable
Column
Speaker
Ascolto**

**Installation
Manual**

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1. Approvals

This equipment has been designed and tested to comply with the requirements of the following standards:

EMC Standards

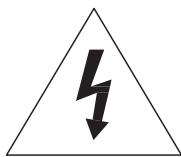
- EN 55032
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-11

Electrical Safety Standards

- EN 61140, Class I

2. Warnings

2.1 Explanation of Graphical Symbols



The lightning symbol within a triangle is intended to alert the user to the presence of un-insulated “dangerous voltages” within the unit’s chassis that may be of sufficient magnitude to constitute a risk of electric shock to humans.



The exclamation point within a triangle is intended to alert the user to presence of important operating and service instructions in the literature accompanying the product.

2.2 Warning



To reduce the risk of fire or electrical shock, do not expose the equipment to rain or moisture unless otherwise specified by its IP grade protection..



To reduce the risk of electric shock, do not disassemble this equipment unless you are qualified.



This equipment must be earthed.

2.3 Important Safety Instructions

Please read carefully before proceeding.

Please keep this manual in a safe place for future reference.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources, such as radiators, heat registers, stoves, or other apparatus that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wider blade or third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Connect only to AC power outlets rated from 90 VAC to 265 VAC, 50-60 Hz as dictated by the unit's voltage configuration.
11. Do not use this unit if the power cord is broken or frayed. Protect the power cord from being walked upon or pinched, particularly at the plug and the point where it exits from the apparatus.
12. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
13. Only use attachments/accessories specified by the manufacturer.
14. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
15. Unplug this apparatus during lightning storms or when unused for long periods of time.

AVE GmbH cannot be held responsible for damage caused by improper use or modifications to the instrument, or data that is lost or destroyed.

3. Introduction

Dear valued customers, congratulations and thank you for purchasing the **Ascolto Digitally Steerable Column Speaker**.

The **Ascolto** digitally steerable column speakers are a comprehensive set of column loudspeakers to address people with clear intelligible audio wherever large reverberant spaces degrade audio quality.

The **Ascolto** digitally steerable column speakers are characterized by uniform sound distribution throughout the whole listening area and all relevant frequencies are present everywhere in the listening area.

The **Ascolto** digitally steerable column speakers have highly optimized side lobes in the vertical plane allowing a much clearer, less 'colored' voice and sound.

In the **Ascolto** digitally steerable column speakers, the audio shape pattern can be completely controlled by Digital signal processing (DSP) without any mechanical installation changes.

DSP capability includes:

- Multi Beam Forming up-to 5 independent audio beams.
- Anti-Reverberation System ARS.
- Volume control.
- Delay control.
- Multiband equalization (HP/LP Butterworth, PEQ, HP/LP Shelving).
- Music Adaptive Equalizer.

This manual describes the following aspects of an installation:

- **Mechanical installation**
- **Mains connection and wiring**
- **Audio connections with relative wiring**
- **RS-485 Network connections with relative wiring**

In order to get the most out of your digital column of loudspeaker and its sophisticated functions, we suggest you read through this manual thoroughly. Also keep it in a safe, convenient place so that you can regularly refer to it when necessary.

4. Unpacking and Inspection

1. Inspect the Shipping Box:

- Carefully open the shipping box and check for any signs of damage to the packaging or its contents.
- Each **Ascolto** digitally steerable column speaker undergoes rigorous testing and inspection before leaving the factory and is designed to arrive in perfect condition.

2. Report Any Damage:

- If you notice any damage to the column speaker or its components, notify the shipping company immediately and document the issue with photographs if possible.
- Retain all packaging materials, including the wooden shipping box and protective inserts, as these may be required for inspection or claims.

3. Retain Original Packaging:

- Do not discard the shipping box or packing materials. Should you ever need to transport or ship the digitally controlled column speaker in the future, using the original packaging ensures maximum protection against damage.

4. Verify Equipment Contents:

- Inspect all items included in the shipment and confirm that no parts are missing or damaged.
- If you find any discrepancies or issues, contact your supplier promptly for assistance and resolution.

5. Preparing for Installation

1. Prepare a Safe and Clean Workspace:

- Set up an assembly area that is clean, stable, and free from obstructions.
- Cover the assembly area with a heavy cloth or other soft material to protect the speaker components during assembly. The foam bag removed from the speaker array can be repurposed for this purpose.

2. Handle the Column Speakers Carefully:

- Avoid resting the column speakers on their grille. The modules are heavy, and improper placement may deform the grille.
- Instead, rest the modules on their sides or back to ensure stability and prevent damage.

3. Run Cables in Advance:

- It is recommended to run all necessary cables to the mounting location before physically installing the loudspeaker. This minimizes the need for adjustments once the speaker is in place.

4. Ensure User Safety:

- Always prioritize safety during the installation process.
- Avoid laying the column speaker in walkways or areas where people might trip and fall during assembly and installation. Choose a safe and unobstructed location for the column speaker to prevent accidents.

6. Mechanical Installation

6.1 – Installation Precautions

The **Ascolto** digitally steerable column speakers must be installed by experienced installation personnel using the full installation kit provided.

Install the unit only in a location that can structurally support the weight of the unit and the mounting bracket. Doing otherwise may result in the unit falling down and causing personal injury and/or property damage.

To prevent equipment malfunctions, do not install the **Ascolto** digitally controlled column speaker in locations exposed to both high temperatures and high humidity. Failure to do so may result in corrosion or damage to the speaker or the unit that could cause it to fall, possibly causing personal injury.

6.2 - Mounting Brackets

The wall brackets with hinge allow the **Ascolto** digitally steerable column speakers to be mounted on a flat wall or pillar. It is important to ensure that all mounting points are in the same vertical plane, to avoid the unit being bent when the screws are tightened.

The number of wall brackets required to mount each configuration is two.



Figure: Stable steel wall brackets for Ascolto column speakers.

Follow the instructions below to install the Ascolto digitally steerable column speakers.

1. Identify the Components:

- Each bracket consists of two parts: the base plate for wall mounting and the adjustable arm for speaker attachment.

2. Prepare the Wall:

- Place the wall brackets with hinges flat against the wall and mark the positions for the 8 mm or greater holes for the wall plugs.
- Drill the holes at the marked positions and insert the appropriate wall plugs.
- Determine the spacing needed between the top and bottom wall brackets based on the total length of the line array unit.

3. Install the Base Plate:

- Use appropriate screws and wall anchors (if necessary, depending on the wall type) to attach the base plate securely to the wall. Ensure the screws are tight and the base plate is firmly fixed.

4. Attach the Adjustable Arm to the Speaker:

- Locate the mounting points on the rear aluminum cabinet of the Ascolto Column Speaker.
- Align the threaded holes on the speaker with the adjustable arm of the bracket.
- Securely attach the arm to the speaker using the screws provided. Ensure the screws are tightened evenly to prevent misalignment.

5. Adjust the Angle:

- Once the bracket is attached to the wall and the speaker, adjust the angle of the speaker as needed using the pivot joint on the bracket.
- Tighten the adjustment knob to lock the speaker in place.

6. Final Check:

- Confirm that the speaker is securely attached to the brackets and that the brackets are firmly fixed to the wall.
- Ensure there is no wobbling or instability before use.

Note: Use only the screws and accessories provided with the bracket or those recommended by the manufacturer. Improper installation may lead to instability or damage to the speaker. If unsure, consult a professional for assistance.

6.3 - Mounting Position

The **Ascolto** digitally steerable column speakers are designed to be mounted on a vertical surface. If the column loudspeaker is aimed up or down such that it is not planar to the vertical plane, the effective audio coverage area could be considerably modified. To get a well-defined installation, it is strongly recommended to measure mechanical tilting of the line array loudspeaker before to configure the audio beam shape. Unless specified otherwise the line array loudspeaker should be mounted at a position exactly perpendicular to the listening plane (i.e. vertical if the floor is horizontal).

Mounting brackets have to be in the same vertical plane and the vertical angle of line array loudspeaker has to be zero with respect such plane.

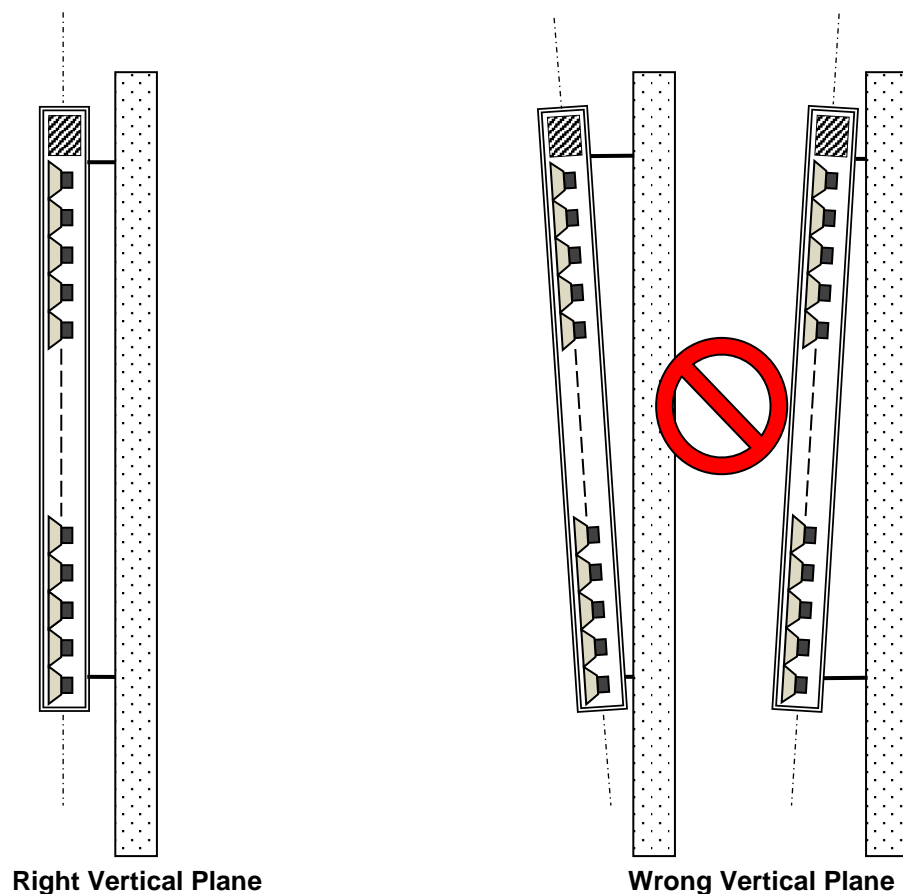


Figure: Recommended vertical plane.

Each amplifier unit inside the digitally steerable column speakers **Ascolto** uses cooling system with heatsink. The heatsinks absorb heat from the amplifier ICs and couples it directly to the external rear surface of the

column speaker maintaining operating temperature inside the cabinet within defined limits.

Make sure that the rear side of the digitally controlled line array has sufficient space from the wall to allow the air flowing.

WARNING!



Only use the mounting brackets that are supplied with the line array loudspeakers. Verify that the digitally steerable column speakers Ascolto is properly fixed to a solid vertical surface.

WARNING!



The screws used and wall material onto which the mounting bracket is attached must be capable of supporting the load of the line array unit to be mounted. It is the responsibility of the installer to verify these items.

WARNING!



Install the unit only in a location that can structurally support the weight of the unit and the mounting bracket. Doing otherwise may result in the unit falling down and causing personal injury and/or property damage.

6.4 - Mounting Height

The correct operational height for proper installation is the height between below floor and bottom side of line array unit (referring to the side with audio/network input panel).

It is highly recommended that the “Column Height” dimension entered in the **AVE Line Array User Control** software is exactly the same as the height of the line array loudspeaker column.

NOTE!



Ascolto series digitally controlled line arrays must only ever be mounted with the audio/network connector panel at the bottom of the assembly, never upside down.

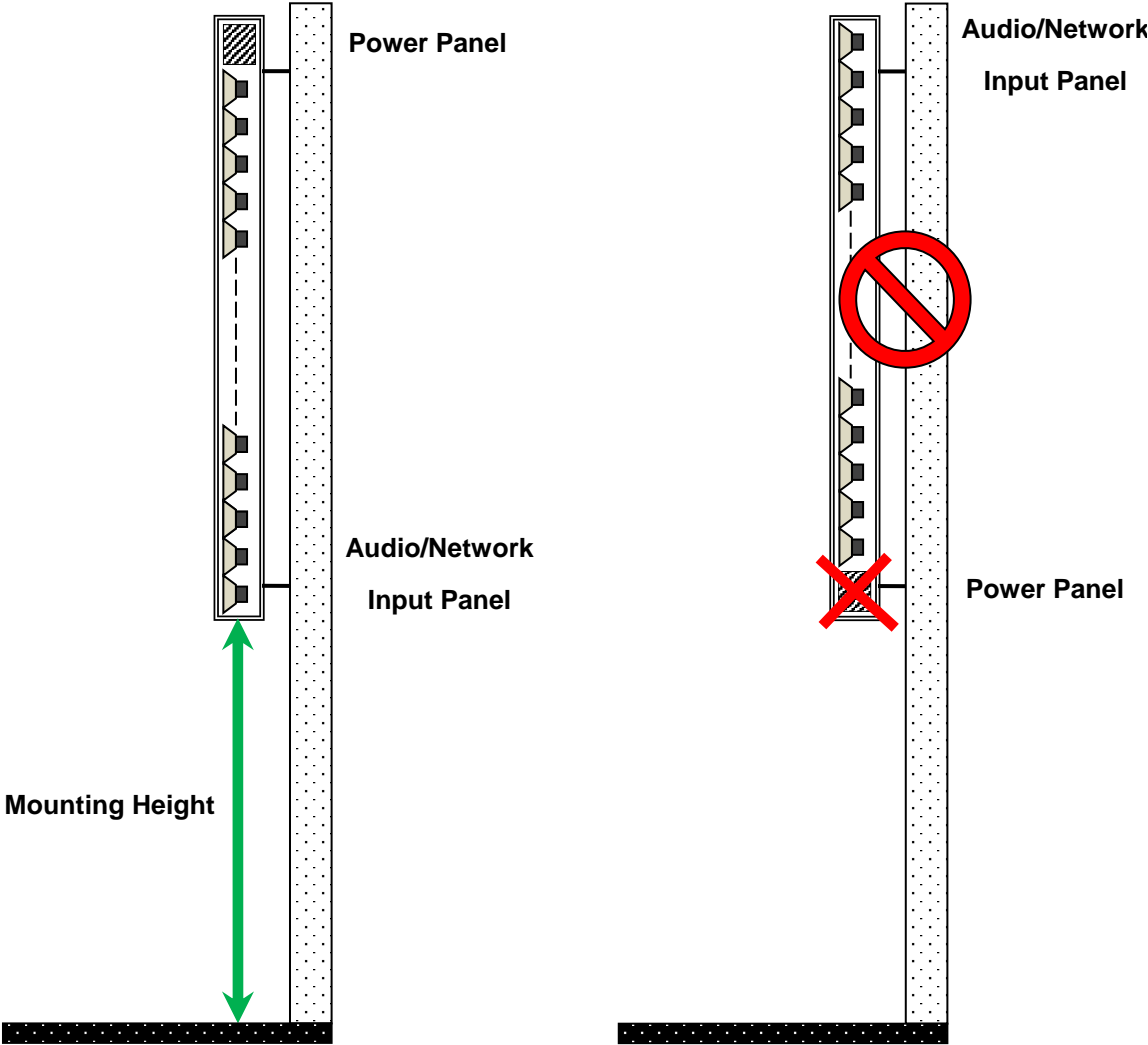


Figure: Mounting Height.

7. AC Mains Supply

The **Ascolto** digitally steerable column speakers unit require an AC mains supply. The **Ascolto** digitally steerable column speakers use internal power supply with universal input, from 90 VAC to 265 VAC. It is equipped with power factor correction (compliance to EN 61000-3-2) and has short circuit and over-temperature protection.

Inrush power is controlled and limited during “soft start”, enabling multiple **Ascolto** column speakers to be powered up simultaneously.

7.1 - Connecting to AC power

The **Ascolto** digitally steerable column speakers are equipped with different power connection systems based on the series. Proper connection is essential to ensure safe and reliable operation. Refer to the following instructions for each series.

7.1.1 - AH and LH Series

The AH and LH series are equipped with a **3-pin IEC mains connector (mod. EN 60320 - C14)** with an integral fuse holder. Follow these steps to connect the mains power:

1. Location of the Connector:

The IEC mains connector is located in the connector compartment at the top of the AH and LH series digitally controlled line arrays. Access to the 3-pin IEC mains connector is via the **power panel (end plate)** located at the top of the column. Remove the screws at each corner to access. It is not necessary to remove the front grille to access the connector.

2. Connection:

Pass the AC power cable through the **cable gland** provided in the **10 mm diameter hole** at the rear of the AC power connector compartment to ensure a secure and safe installation. Plug the 3-conductor AC power cable into the IEC socket, ensuring it is properly seated.

The pins on the connector are assigned as in table. Refer to your country's standard for AC power wiring color codes when connecting the mains cable.

After connecting, reinstall the power panel by inserting the four screws and firmly tightening them.



Figure: Power panel at top of Ascolto column speaker (AH, LH Series).

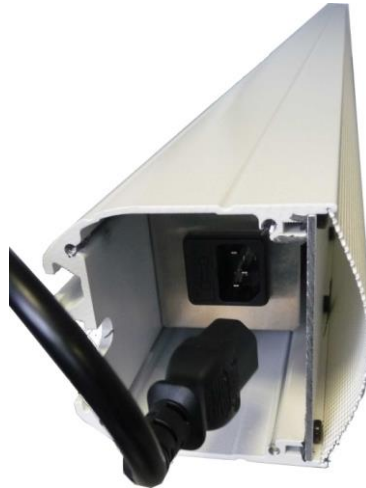


Figure: 3-pin IEC mains connector (AH, LH Series).



Figure: Power cable access (AH, LH Series).

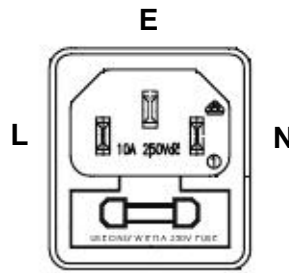


Figure: 3-pin IEC connector front view (mod. EN 60320 - C14).

Pin	Description
L	Line
E	Safety Earth
N	Neutral

Table: 3-pin IEC connector pinout (mod. EN 60320 - C14).

Note: The Ascolto digitally steerable column speakers are Class 1 devices, which means the chassis is connected to the earth pin of the mains connector. It is essential that this pin is securely connected to the electrical earth/ground to ensure proper safety and operation.

Note: Ensure that the mains cable used has a sufficient diameter to safely carry the current required by the Ascolto column speaker. Consult the datasheet for the maximum current specification of the speaker and select a cable with appropriate current-carrying capacity based on the installation's length and electrical safety standards.

Note: For the AH and LH Series, the fuse is located inside the IEC connector's integral fuse holder. If the fuse needs replacement, use only a fuse of the same type and rating as specified. Replacing the fuse with an incorrect type can compromise the safety and functionality of the speaker.

7.1.2 - FF Series

The FF Series uses a Wago system for connecting the mains, consisting of two components:

1. The **Wago Socket (cod. 770-203)**, which the installer wires to the mains cable.
2. The **Wago Strain Relief Housing**, which is pre-installed on the back panel of the column speaker to securely hold the plug in place.

Follow these steps to connect the mains power:

1. Prepare the Wago Socket (cod. 770-203):

The installer must wire the mains cable to the Wago socket. Refer to the symbols printed on the socket for proper wiring:

- **L** for Line,
- **N** for Neutral, and
- \perp (Earth) for Safety Earth.

Double-check the connections and ensure they match your country's standard AC wiring color codes.

2. Locate the Wago Strain Relief Housing:

The strain relief housing is located on the **back panel of the column speaker** and is designed to securely hold the Wago socket once connected.

3. Connect the Wago Socket to the Strain Relief Housing:

Insert the wired Wago socket (cod. 770-203) into the strain relief housing on the back panel. Ensure the socket is fully seated and securely clamped in place.

4. Verify the Connection:

Check that the Wago socket is firmly secured in the strain relief housing and that all wires are correctly connected and insulated.



Figure: Wago Socket 770-203.

Note: The Ascolto digitally steerable column speakers are Class 1 devices, which means the chassis is connected to the earth pin of the mains connector. It is essential that this pin is securely connected to the electrical earth/ground to ensure proper safety and operation.

Note: Ensure that the mains cable used has a sufficient diameter to safely carry the current required by the Ascolto column speaker. Consult the datasheet for the maximum current specification of the speaker and select a cable with appropriate current-carrying capacity based on the installation's length and electrical safety standards.

Note: For the FF Series, the fuse is located in the dedicated fuse holder, panel-mounted near the Wago strain relief housing on the back panel of the speaker. Ensure the correct type and rating are used for replacements to maintain safety and functionality. Replacing the fuse with an incorrect type can compromise the safety and functionality of the speaker.

7.2 - Power-Down Recommendation

Since the mains connector of the Ascolto digitally steerable column speaker unit is not readily accessible, the mains connection to the column speaker unit should include a manual circuit breaker. This allows for a reliable and convenient means to disconnect power from the speaker when necessary.

Proper grounding and the inclusion of a manual circuit breaker ensure both operational safety and ease of maintenance for the Ascolto column speakers.

WARNING!



Only qualified service personnel are allowed to assemble the mains connection.

WARNING!



Ensure the power cable is not connected to the AC mains supply during the mechanical assembly procedure.

WARNING!



In the interests of safety, never disconnect the earth (ground) pin on the AC power cable. Power down the units during lighting storms or when unused for long periods of time, unless special functions are to be maintained.

7.3 - General Protections

The **Ascolto** digitally steerable column speakers incorporate a sophisticated and comprehensive set of protection features.

To prevent any damage or costly service interruptions, the **Ascolto** digitally steerable column speakers offer advanced features to protect internal circuits. These features even protect the mains fuse that, in extreme cases, could be overloaded.

Following are short descriptions of standard built-in protection features:

Current Peak Limiter: ensures that the amplifier's output does not exceed the safe current handling parameters of amplifier components.

Temperature protection: ensures that the amplifier will not be damaged by exceeding thermal limits.

Power Average Limiter: limits the maximum average power consumption according to the power supply and mains-breaker capabilities.

Short Circuit Protection: shuts down the output stage amplifier when a malfunctioning loudspeaker is short circuiting the amplifier output.

8. Audio Inputs

The **Ascolto** digitally steerable column speakers are available in two distinct variants to meet different installation and usage needs:

- **Standard Version:**

This variant is equipped with two balanced input channels capable of accepting audio signals at either line 0 dBu level or from a 100 V level speaker distribution system.

It is a straightforward solution designed for installations that require reliable performance without additional networking capabilities.

The inputs are accessible via 3-pole, 3.81 mm-pitch balanced connectors located on the Input Panel.

- **DANTE™ Version:**

This variant integrates DANTE digital audio networking technology, providing advanced capabilities for high-quality audio distribution over standard Ethernet networks.

DANTE enables users to simplify cabling, reduce interference, and enjoy easy setup and routing of audio signals through the **DANTE Controller software** from Audinate company.

Additionally, Ascolto column speakers are AES67-compatible, ensuring interoperability with other AES67-compliant devices in networked audio environments.

This version is ideal for users seeking a scalable, flexible, and standards-compliant networked audio solution.

Important: The DANTE input is only available in the DANTE version of the **Ascolto** digitally steerable column speaker. Customers must explicitly request the DANTE version when placing an order.

The following subsections provide detailed information about the input features and setup processes for each version of the Ascolto column speakers, allowing users to make the most of their chosen configuration.

8.1 – Standard Version

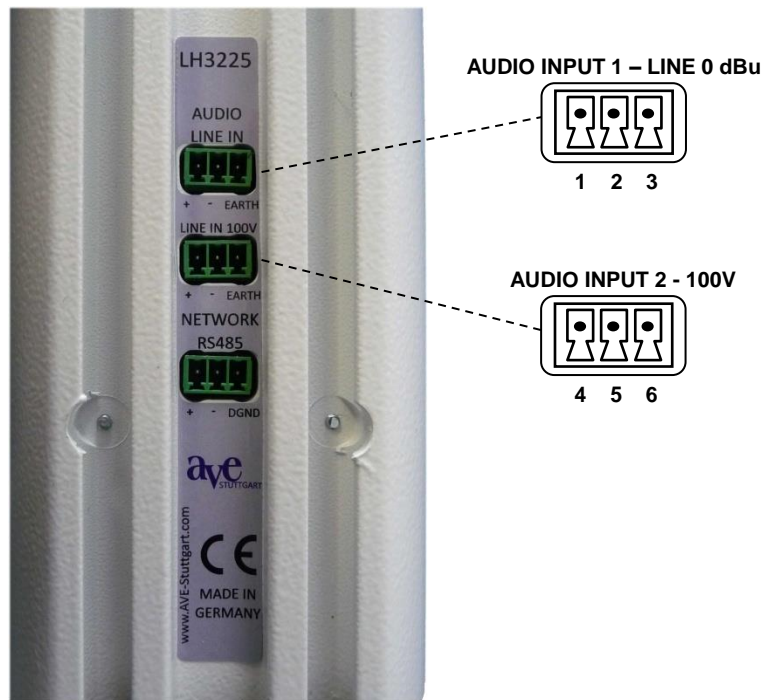


Figure: Audio input connectors in rear panel.

The **Ascolto** digitally steerable column speaker - **Standard version** - provides two balanced input channels that accept audio signals at either line 0 dBu level, or from a 100 V level speaker distribution system. Two balanced 3-pole, 3.81 mm-pitch connector inputs are available at the top of Input Panel.



Figure: 3-pole, 3.81 mm-pitch terminal block.

Two 3-pole, 3.81 mm-pitch connectors are supplied for attaching cables to the audio inputs. Compatible terminal blocks with audio input connectors are listed below:

- Phoenix Contacts - part number: 1803581
- FCI - part number: 20020004-D031B01LF
- TE Connectivity - part number: 284507-3

The **Ascolto** digitally steerable column speaker unit uses internally fully differential amplifiers at each analog stage, including input stage with protecting circuits from harmful electrostatic discharges (ESD) and electromagnetic interference (EMI) filter to prevent RF disturbances.

Use only good-quality balanced audio cables consisting of a twisted pair and an overall screen (shielded 2-conductor cable). Additionally, avoid running audio cables close to mains power lines or other high-voltage cables, as they can emit noise and interfere with the audio signal quality.

8.1.1 - Line 0 dBu Input

Use the Line 0 dBu input if the signal source is a standard item of audio equipment such as a mixer. In audio applications, 0 dBu represents a reference level of 0.775 volts RMS, commonly used to standardize line-level signals for professional audio equipment. The Line 0 dBu input features a fully electronic balanced circuit for optimal performance. Follow the +, –, and Earth labels when connecting the input signal.

Pin	Description
1	Hot (+)
2	Cold (-)
3	Earth (chassis ground)

Table: Line 0 dBu connector pinout.

8.1.2 - 100 V Input

Use the 100 V input if The **Ascolto** digitally steerable column speaker unit is being installed as part of a system which uses other 100 V line loudspeakers.

The 100 V input is transformer-coupled, providing galvanic isolation, ensuring superior safety, and preventing electrical interference or ground loops during operation.

Selection of Line 0 dBu Input or 100 V Input as audio source is made from the **AVE Line Array User Control** software PC via the network or from infrared remote control.

For most common installations, only Line Input is necessary. However, 100 V Input may be connected to a secondary signal path.

Pin	Description
1	Hot (+)
2	Cold (-)
3	Earth (chassis ground)

Table: 100 V connector pinout.**WARNING!**

Do not connect a 100 V line signal to Line 0 dBu Input.

8.2 – DANTE™ Version

The DANTE™ version of the **Ascolto** column speaker features advanced digital audio networking capabilities in addition to a standard Line 0 dBu input. This allows flexibility in combining sources if needed.

8.2.1 - Dante Input

To connect the Ascolto Column Speaker to a DANTE network, follow these steps:

1. Access the LED Bottom Panel:

- Unscrew the four screws located at the corners of the LED bottom panel of the Ascolto column speaker.
- Carefully remove the panel to access the internal connections.

2. Prepare the Ethernet Cable:

- Use a high-quality, shielded Cat 5e (or higher) Ethernet cable with the following specifications:
 - Bandwidth: Minimum 100 MHz.
 - Maximum Transmission Distance: Up to 100 meters.
 - Shielding: Shielded Twisted Pair (STP) is recommended to minimize interference.

3. Connect the Ethernet Cable:

- Pass the Ethernet cable through the cable gland in the LED bottom panel.
- Plug the cable securely into the internal RJ45 socket inside the column speaker.

4. Secure the Panel:

- Reattach the LED bottom panel and tighten the four screws at the corners to ensure a secure fit.

5. Configure the DANTE Network:

- Use the DANTE Controller software from Audinate to configure and route audio to the speaker.
- Refer to the DANTE Controller software documentation for detailed setup instructions.

8.2.2 - Line 0 dBu Input

The DANTE™ version retains the Line 0 dBu input, just like the Standard version, providing a reliable analog connection for standard audio equipment. This input is featured with a fully electronic balanced circuit for optimal audio quality.

To use the Line 0 dBu input, refer to the **Line 0 dBu Input** in Standard Version section.

Note: The Line 0 dBu input is always present and internally mixed with audio signals from the DANTE input. This configuration allows users to combine multiple sources when necessary, offering additional flexibility for complex audio setups.

9. Audio Connections**9.1 – Recommended Wiring Schemes**

Follow shows recommended wiring for combinations of balanced driving units interconnections when 2-conductor shielded cable is used. Identifying these schemes for every unit in a system is essential to avoid system hum and buzz.

9.2 - Chassis Ground

The **Ascolto** digitally steerable column speaker uses to bond the input cable shield connected at pin 3 of audio input connectors as directly as possible to his conductive aluminum chassis, solidly bonded to safety earth.

This provides a *non-audio* return path through the chassis for any externally induced noise into the cable shields. No hum and buzz occurs.

This scheme differs from current practices in that most manufacturers connect cable shield to *signal ground* creating potential ground loops in the audio path and modulating the audio signal ground.

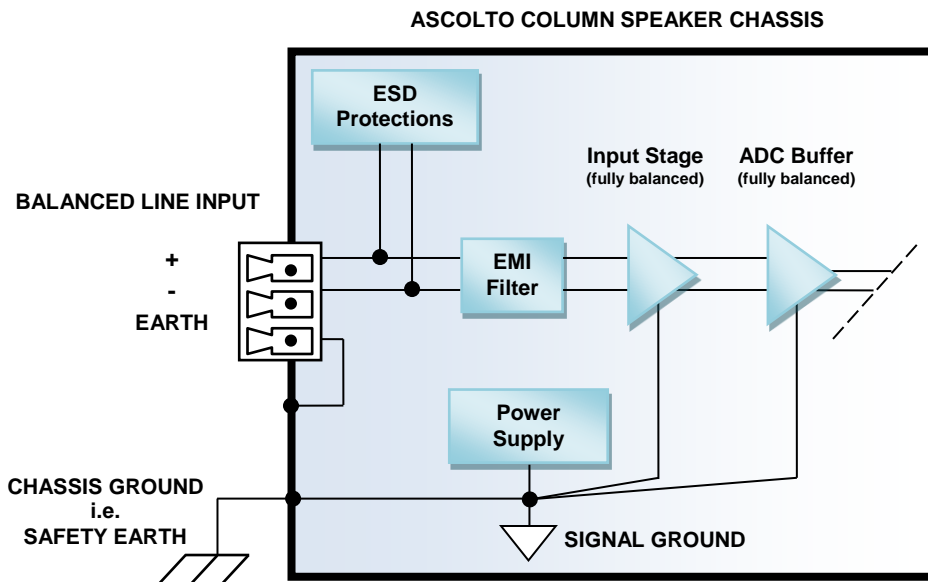


Figure: Grounds scheme

9.3 - Balanced Output Driving

The use of a balanced connection between the audio driving unit (e.g., a mixer) and the Ascolto digitally controlled column speaker, **with the shield connected to chassis ground (i.e., safety earth) at both ends** at the point of entry, provides the best available performance (see figure below).

This configuration ensures that any noise currents picked up by the shield are safely directed through the chassis ground, rather than the signal ground, preventing contamination of the audio signal quality.

By isolating noise from the signal path, this setup delivers superior rejection of electromagnetic interference (EMI) and radio frequency interference (RFI), maintaining a clean and high-quality audio signal to the speaker.

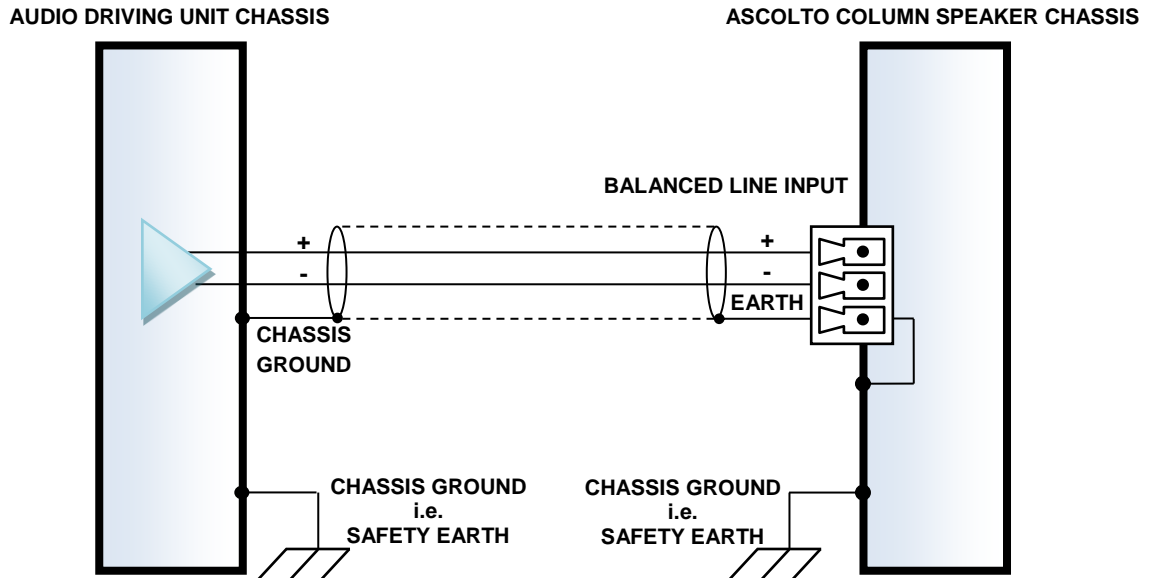


Figure: fully balanced connection with “chassis ground” at driver unit.

When encountering audio driving units with signal-grounded shields, disconnect the shield at the signal-grounded end (see figure below).

This practice is particularly important because disconnecting the shield at the driver side minimizes the risk of forming a ground loop, which can introduce unwanted noise into the audio signal.

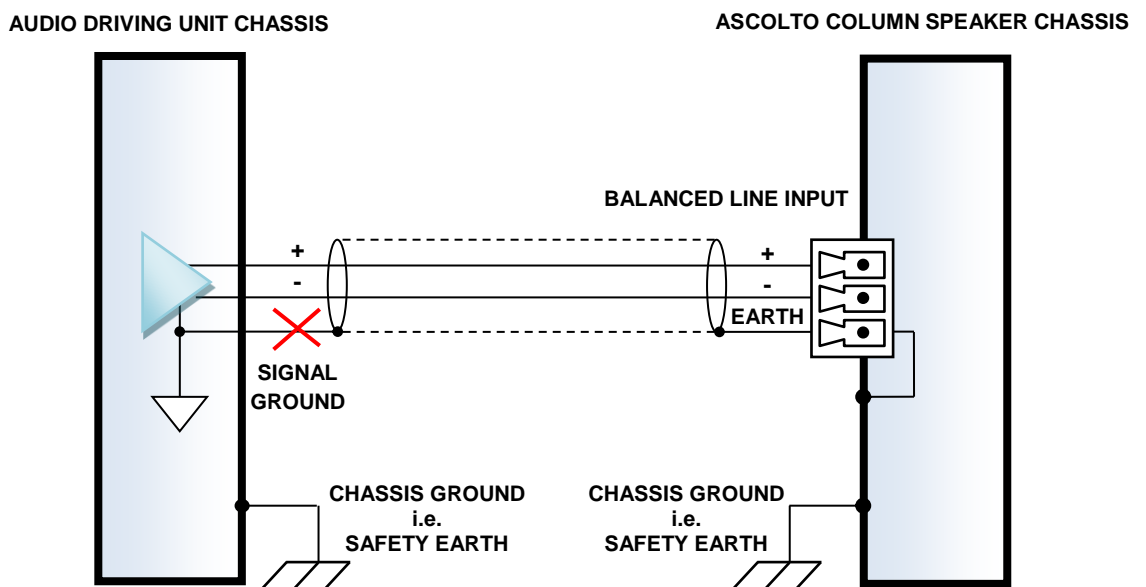


Figure: fully balanced connection with “signal ground” at driver unit.

NOTE!

When linking the same source signal to several input channels, be aware that there is a limit to the number of channels an output source can “drive”. Line Input has typically 20 kΩ as nominal impedance. A typical output drive unit (e.g. a mixer) can drive up to 16 digitally line array units before line-drivers would be required to buffer the signal.

10. LED Panel

10.1 - LED indications

The **Ascolto** digitally steerable column speaker unit's bottom panel presents power, RS-485/Infrared communication and fault condition indicators.

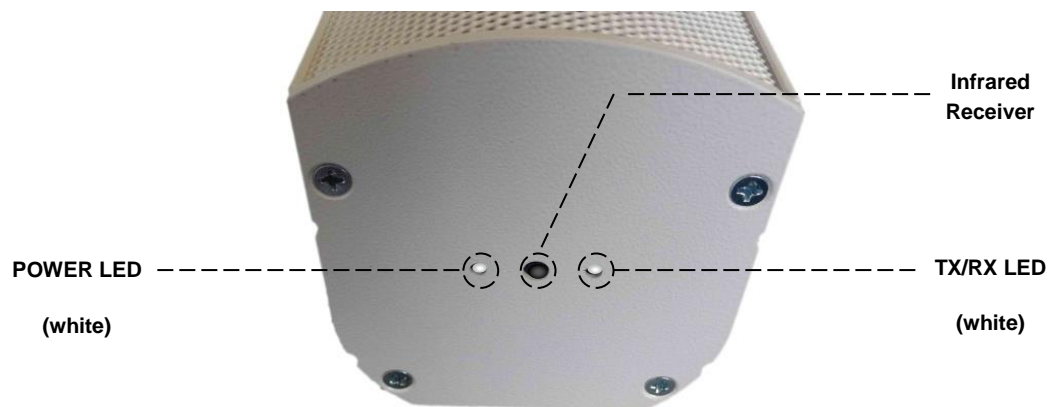


Figure: LED Panel.

LED indications are:

- Power LED: lights up when DC power voltages are running;
- TX/RX LED: blinks for data sending/receiving from RS485 Serial port side or through the Infrared Sensor;

System statuses of line array unit are summarized by LED status as stated in table:

System Status	Power LED Status	TX/RX LED Status
Power off	Off	off
Booting	blinking (period 1 s)	blinking (period 1 s)
Running in Idle	on	off
Running and Communicating	on	blinking
General Fault	on	on

Table: LED Status Descriptions.

11. RS-485 Network Connection

The **Ascolto** digitally steerable column speakers are equipped with an **RS-485 network connection**, enabling comprehensive control through a PC using the dedicated **AVE Line Array User Control** software.

The **RS-485 bus** is a robust, industry-standard communication protocol designed for reliable data transmission over long distances and in electrically noisy environments. Its key advantages include:

- **Long-Distance Communication:** RS-485 supports cable lengths of up to 1,200 meters, making it ideal for large venues and installations.
- **Multi-Device Connectivity:** The bus can support multiple devices (up to 32 nodes or more with repeaters) on a single network, allowing for easy integration of multiple speakers.
- **Noise Immunity:** With differential signaling, RS-485 effectively suppresses electrical interference, ensuring stable and accurate data transmission even in challenging conditions.

Note: For RS-485 connections, it is recommended to use Ethernet cables. Their twisted-pair construction enhances signal integrity and minimizes interference, making them particularly suitable for RS-485 networks, especially in electrically noisy environments or long-distance setups

11.1 – RS-485 Network Panel



Figure: RS485 connector in rear panel.

All **Ascolto** digitally steerable column speakers are equipped with RS485 half-duplex network interface. This includes a 3-pole, 3.81 mm-pitch connector.

The pin assignments for the connector can be found in the following table as well as on a sticker applied to the unit.

Pin	Description
1	Data +
2	Data -
3	Digital Ground

Table: RS485 connector pinout.

Up to 32 **Ascolto** digitally controlled column speakers can be connected in a daisy-chain configuration, enabling centralized control from a single PC. However, the maximum number of speakers that can be effectively integrated depends on the complexity and layout of the RS-485 network. Factors such as cable length, signal integrity, and network topology may influence the total number of supported units.

In such a system, each digitally controlled column speaker must be assigned a unique network address to ensure proper communication and control. This address can be pre-assigned during factory programming.

11.2 – Ascolto Configuration Kit

The PC running **AVE Line Array User Control** software should be connected to the column speaker using the USB to RS-485 converter and cables supplied with the AVE Line Array User Control - Configuration Kit.

When connected to a PC USB port the USB to RS-485 converter module is automatically detected and is installed as a native COM port which is compatible with any existing serial communication application. The USB to RS-485 converter is powered from the USB port and no external power is needed.



Figure: Ascolto Configuration Kit.

Ascolto Configuration Kit includes:

- USB cable to connect PC to USB – RS-485 converter;
- RS-485 twisted-pair cable (length 5 m) with DB-9 male and 3-pole, 3.81 mm-pitch connector;
- CD for installation drivers.

11.3 - Driver Installation

Follow the steps below to install driver of USB-High Speed Serial Converter:

1. Power on your computer and make sure that the USB port is enabled and working properly.
2. Plug in the USB-High Speed Serial Converter into the USB port, the PC should then detect the new hardware, or if not, then run the Add New Hardware Wizard to assist you in setting up the new device.
3. If the PC detect the new hardware it ask you to insert the USB – RS-485 Serial Converter software driver (FTDI USB driver) into the CD-ROM drive and click next to continue.
4. Windows will now detect the driver. Click Next to continue installation.

If Windows is configured to warn when unsigned (non-WHQL certified) drivers are about to be installed, the following screen will be displayed unless installing a Microsoft WHQL certified driver. Click on “Continue Anyway” to continue with the installation.

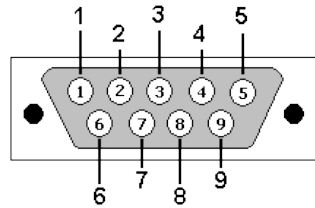
Windows will repeat the installation procedure, but without the Windows Logo testing. If Windows is configured to ignore file signature warnings, no message will appear.

11.4 - Wiring Configuration

RS-485 cable supplied with AVE Line Array User Control Configuration Kit is intended to connect PC and line array unit within a short distance. If any longer connection or to implement daisy-chain multiple **Ascolto** column speakers in parallel, use standard straight Cat-5 Ethernet.

The USB to RS-485 converter is implemented with a DB-9 male plug.

Follow the pin assignments for the DB-9 male connector as shown in table to rewire RS-485 cable.



DB-9 male connector

Pin	Description
1	Data -
2	Data +
5	Digital Ground

Table: DB-9 male connector pinout of USB – RS-485 converter.

11.5 – RS-485 Line Termination

RS-485 has defined the termination as $120\ \Omega$ parallel termination across the differential lines of the bus. Although reflections are present with no termination at the last receiver inputs, at selected data signaling rate, the column speaker reads the input differential voltage and produces internally a clean signal.

The decision on whether to terminate the line is system dependent and is affected by the choice of the maximum line length and signaling rate.

Generally, only for highly reliable applications in a noisy environment or for line-array networks with long cable length, proper cable termination is essential. In this cases, place a $120\ \Omega$ parallel termination across the differential lines (D+) and (D-) at the end of the cable, near the last line array unit.

DGND should not be connected to EARTH pin on audio inputs.

12. Warranty

This product is manufactured by AVE GmbH, and it is warranted to be free from any defects caused by components or factory workmanship, under normal use and service, for a period of two (2) years from date of purchase from an authorized AVE GmbH dealer.

If the product fails to perform as specified during the warranty period, AVE GmbH will undertake to repair, or at its option, replace this product at no charge to its owner, provided the unit is returned undamaged, shipping prepaid, to an authorized service facility or to the factory.

This warranty shall be null and void if the product is subjected to: repair work or alteration by a person other than those authorized by us; mechanical damage including shipping accidents; war, civil insurrection, misuse, abuse, operation with incorrect AC voltage; incorrect connections or accessories; operation with faulty associated equipment; or exposure to inclement weather conditions.

Damage due to normal wear and tear is not covered by the warranty. Units on which the serial number has been removed or defaced will not be eligible for warranty service.

AVE GmbH shall not be responsible for any incidental or consequential damages. AVE GmbH's responsibility is limited to the product itself. AVE GmbH takes no responsibility for any loss due to cancellation of any events, or rent of replacement equipment or costs due to a third party's or customer's loss of profit, or any other indirect cost or losses however incurred.

AVE GmbH reserves the right to make changes or improvements in design or manufacturing without assuming any obligation to change or improve products previously manufactured.

This warranty is exclusive, and no other warranty is expressed or implied. This warranty does not affect the customer's statutory rights.

For international warranties, please contact your supplier or distributor for this information, as rights and disclaimers may vary from country to country.

13. Technical Assistance and Service

International

If your AVE GmbH product requires repair, contact your dealer or distributor, or contact AVE GmbH by fax or email to obtain the location of the nearest authorized service centre.

Factory service

In the event AVE GmbH product requires factory service, you may contact AVE GmbH's service department for return instructions and a Return Authorization number.

Please note for product return:

1. Use the original packing.
2. Include a copy of the sales receipt, your name, return address, phone and fax number, email address and description of the defect.
3. Mark the Return Authorization number on the outside of the packing.
4. Ship the product prepaid to:



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