Installation Guide

V1.31 May 2014

AIW750E

High-end
Invisible Loudspeaker

Caution: Read before installing this product

- To ensure optimal performance, please read this guide carefully and keep in a safe place for future reference.
- Install this product in a cool, dry, clean place - away from direct sunlight and heat sources, vibration, chemical fumes, dust and moisture (steam).
- Do not expose this product to sudden temperature changes or locate it in an environment with high humidity. This is to prevent condensation forming inside which may cause damage to the product.
- Do not clean this product with chemical solvents as this may damage the finish. Use a clean, dry or damp cloth.
- Ensure that all installation mounting surfaces are able to support the weight of the product.
- After installation, avoid pushing on the wall or ceiling surface immediately in front of the speaker. Excessive excursion, whilst unlikely to damage the speaker, will undoubtedly crack the plaster around its perimeter.
- Do not attempt to modify or repair the product. Contact your distributor or manufacturer if a fault should occur.
- The rear of the product should not be subject to chemical cleaning and should not be painted in any way.

ENVIRONMENTAL:

Before installing, ensure that the building is environmentally sealed, de-humidified and at a stable temperature of at least 16 degrees centigrade (61 degrees fahrenheit).

This product should not be used with single thick coat plaster solutions or with other finshing methods that take days (rather than hours) to dry out.

Please be aware that when this product is directly fitted into a solid wall structure (e.g when using the solid wall backbox) vibrational energy is inevitably transferred into the solid wall structure. This energy can travel for some considerable distance up, down and along the structure. It is therefore recommended the product be fitted within acoustically insulated stud walls or ceiling sections where possible. The use of the product directly embedded in solid walls is not recommended in multi occupancy buildings.

WARNING:

No attempt should be made to install this product within existing building structures unless you are certain that no electric cables, water pipes, gas pipes or supporting joists will be cut through.

Contents

Message from the Managing Director

Congratulations and thank you for purchasing an Amina Technologies Evolution Series high performance invisible loudspeaker.
At Amina we are proud of being at the forefront of flat panel loudspeaker technology. All the components that make up your Evolution Series loudspeaker have been developed specifically to provide the ultimate in sound quality and reliability, while allowing you to decorate, furnish and enjoy your home in any way you wish without any visible "clutter" from your audio system.
At the heart of an Evolution Series loudspeaker is our high performance vibrational panel driver, featuring a unique high power neodymium magnet motor system. This enables the product to provide high quality, high sound pressure levels from such a compact design. Please take a moment to read this guide which will help you achieve the best possible performance from your product.

Thanks and enjoy listening.

Richard Newlove

About the manufacturer

Amina Technologies Ltd is the world's leading designer and manufacturer of truly invisible loudspeaker solutions. Their invisible loudspeakers have been used in a wide range of both commercial and residential applications for well over a decade.
Exclusive hotel spas, fashion retail outlets and stunning private residences have all benefited from using Amina invisible loudspeakers. Amina has the discreet solution ideal for architects, interior designers and all design conscious clients.
See their website for more details about Amina and a selection of prestigious projects completed using our products.

Included in the Carton

Please check that your carton contains the correct accessories

Model Number	Single
AIW750E	1x HF loudspeaker panel 1x LF loudspeaker panel 1x APU750 (crossover / protection unit) 2x Spacesaver template

Packaging

CAUTION:

Take care when removing the speakers from the carton.

The packaging for the AIW750E loudspeaker has been carefully designed to protect the product during transit. Please retain it in the unlikely event you need to return the product to your dealer or manufacturer. Please recycle the packaging should you wish to dispose of it.

The outer carton is made up of 80% recycled single wall board.

Fixing options (ordered separately)

BackboxCV345 & BackboxCV200

The AIW750E has been designed to work optimally within the Backboxes in plasterboard installations. Installers should ensure that the wall or ceiling can accomodate the Backboxes when specifiying the AIW750E.

IMPORTANT:

Make sure that long drying renders in the building where speakers are to be installed are fully dry before fitting the AIW750E.

DO NOT use singlecoat spray-on plasters on this product.

Excessive moisture can damage this product. For expert advice contact your dealer or Amina Technologies Ltd: +44 (0) 1480 354390

03

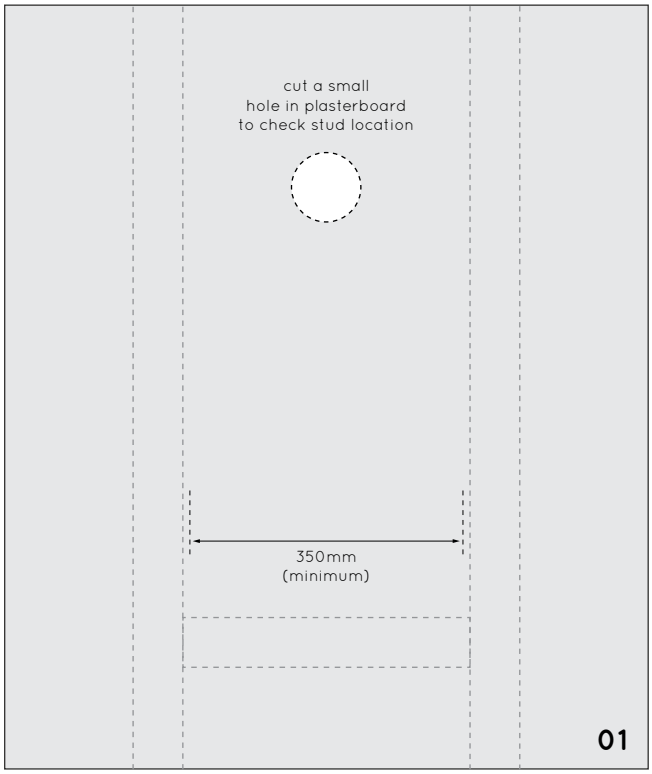
Cutting the plasterboard (drywall)

01 Locate joist/stud work

When you have chosen your speaker locations, before cutting a hole in the plasterboard it is important that you locate the position of the joists/studs. Ensure the spacing between them is at least 350mm (13 3/4") for a portrait orientated speaker.

SPACESAVER:

The supplied Spacesaver may be used to show the position of the speaker prior to installing by securing it to the studwork. Secure the speaker cable to the Spacesaver before any building electrical inspection.



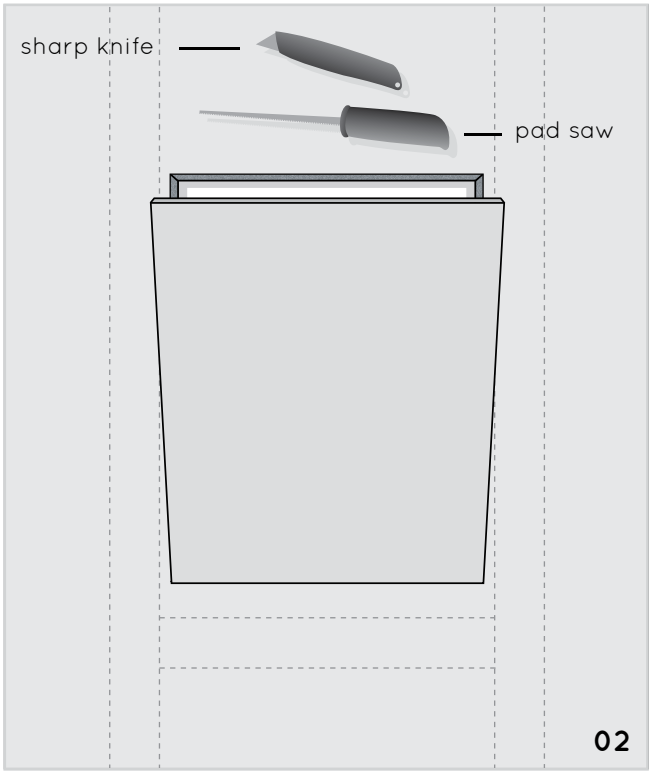
02a Create 455mm x 350mm aperture for LF panel

Using a sharp knife or pad saw, cut an aperture with dimensions 455mm x 350mm (18" x 14") in your plasterboard wall or ceiling. Ensure aperture is created between supporting joists or stud work.

We strongly advise that joists are not cut to make space for the product. Any activity of this sort may well influence the structural integrity of your property.

Important: Double check the size of the aperture is 455mm x 350mm (18" x 14") as this is important further on into the installation process.

02b Create 455 x 205mm aperture for HF panel by following the same procedure.



Installing the BackboxCV345 & CV200

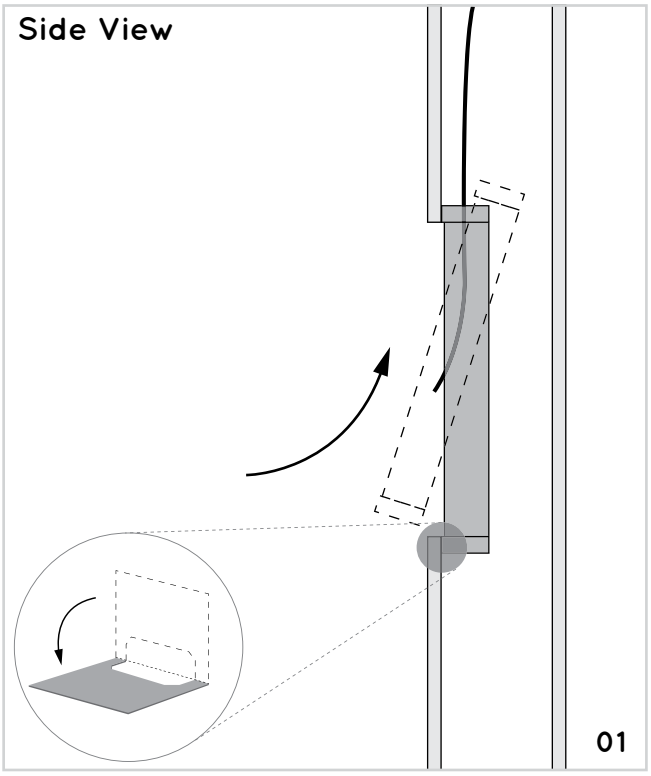
01 Locate cable and position backbox

Pull the speaker cable through the rubber grommet in the top side of the backbox and ensure speaker cables are pulled through with a manageable length available. Apply the Backbox through the hole at an angle until the end cheeks rest against the back side of the plasterboard.

Use the fold out tabs at either end of the backbox to help support it in position before securing it to the plasterboard.

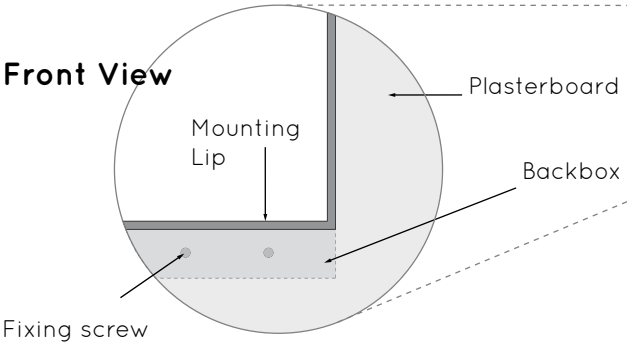
A minimum 75mm/3" cavity depth is required to fit BackboxCV345 & Backbox-CV200

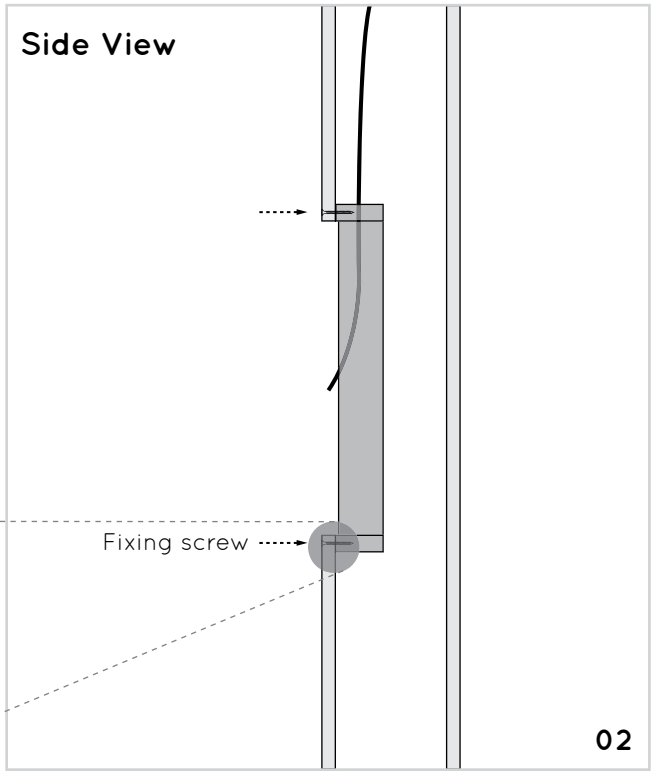
IMPORTANT:
Allow at least 80mm gap between plasterboard cut-outs to accomodate both HF and LF loudspeaker panels when positioned one above the other.



02 Fix backbox

Using a minimum of 8 drywall screws (4 at each end) fix the backbox by screwing through the plasterboard and self tapping into the flat end cheek areas at each end of the backbox. When positioned correctly, the backbox's speaker mounting lip with soft foam surface should be visible along all four sides of the aperture. Connect the speaker cable by using a high quality crimping tool.





Installing the Backboxes continued...

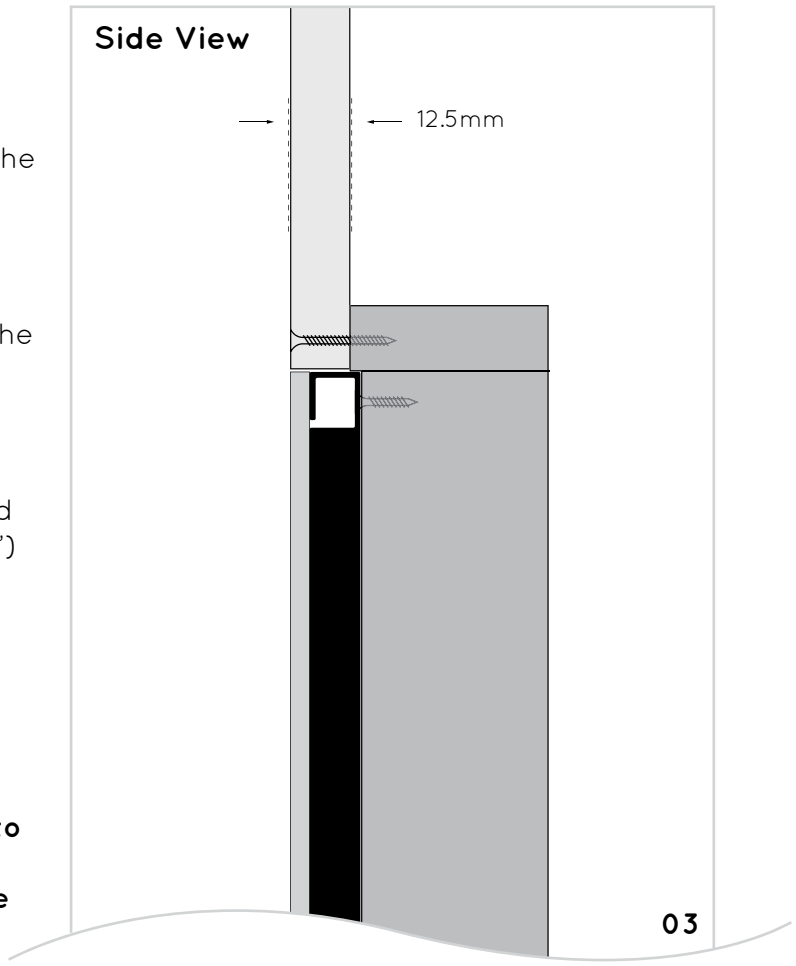
03 Secure the speaker

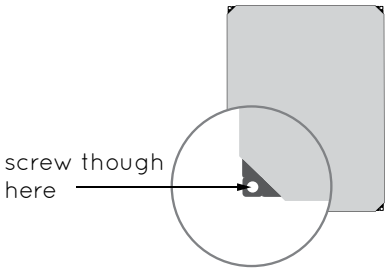
With the speaker resting on the backbox mounting lip, use screws provided to secure the speaker onto the backbox by self tapping into the mounting lip, through the pilot holes provided at each corner.

Ensure the speaker face is flush with the front of the plasterboard and that everything is firmly held in position. Shims may be necessary.

Amina backboxes (BackboxCV345 and CV200) are designed for 12.5mm (1/2") plasterboard.
Shims can be supplied to adapt the backbox for different plasterboard thicknesses. Contact your supplier when ordering.

IMPORTANT: at this point you should perform the first set of speaker tests to check for correct cabling and to identify any sources of buzz and rattle in the building construction.





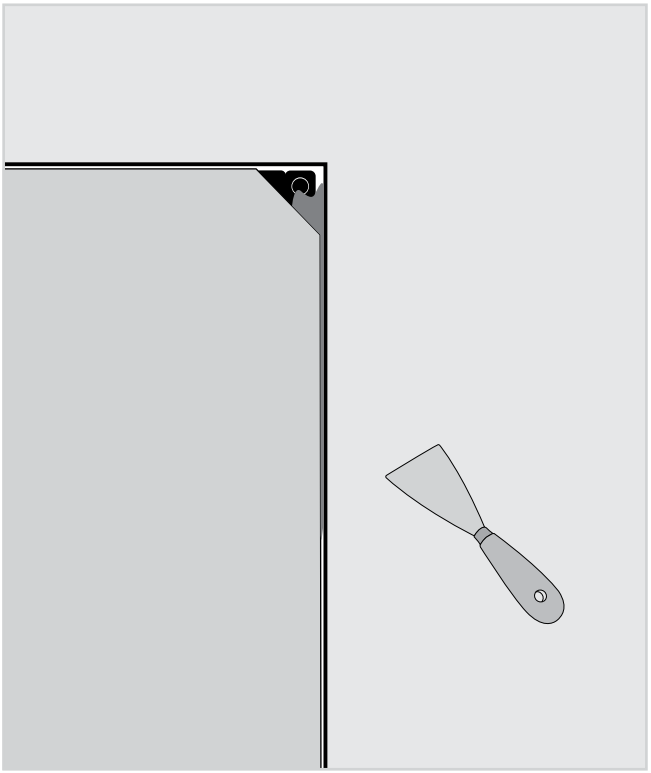
Plastering and decorating

01 Fill gap between speaker and surrounding area

It is important to ensure that plaster is pushed into the 2mm (5/64") gap that surrounds the speaker. This will create a strong bond between the edge of the speaker and the plasterboard/render.

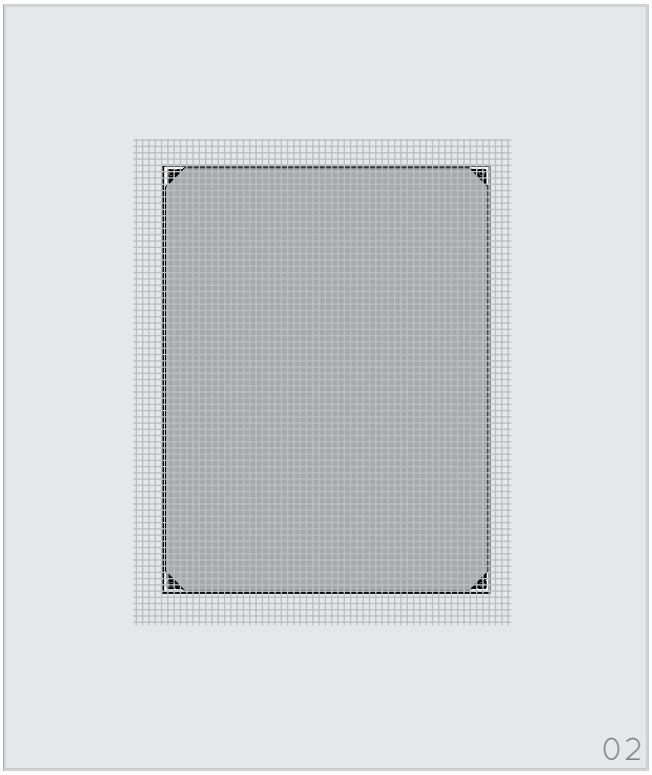
This prevents any cracks appearing in the final skim finish.

IMPORTANT: There MUST be a gap of 2mm (5/64") all the way around the speaker edge. If there isn't simply remove the speaker and increase the aperture size accordingly.



02 Apply joint tape

Apply professional plasterboard joint scrim (Amina recommend use of a self adhesive fibreglass scrim tape) over the joint between the speaker and the surrounding wall.



Plastering and decorating continued...

03 Plastering

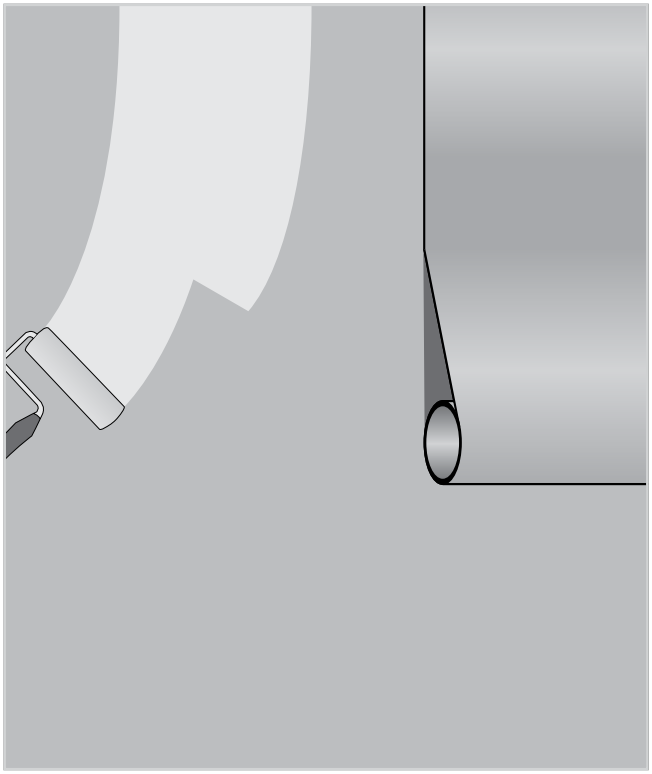
Use standard finishing plaster for large areas. For patch plastering use a repair plaster or joint compound such as British Gypsum Easi-fill®

Important: To ensure proper operation and sonic performance, no more than 2mm (5/64") of plaster/compound must be applied to the surface of the panel. The working environment must be dry enough to allow the plaster finish coat to dry within hours, not days.

04 Decorating

Allow your plasterwork to dry completely. Test the speaker again. You can then paint the surface or hang wallpaper in the usual manner.

Evolution Series speakers have been optimised for up to 3 coats of emulsion once plastered. Additional coats will cause very small reductions in the maximum sound pressure levels achievable.



Testing the speakers

Important: Always test the speaker before plastering over it.

CAUTION:

- *Without plaster on the surface of the speaker it is highly efficient and will generate very high sound pressure levels with minimal power input. Take care to protect your ears when testing at this stage.*
- Using a multimeter and without the APU750 crossover connected, check the nominal impedance (DC resistance) of the HF and LF loudspeaker at the amplifier end of the speaker cable. Allow for approx. +/-10% for cable resistance. The impedance should be 4 Ohm for both speakers.
- Amina recommends a tone sweep be used at a moderate volume level (0.5 Vrms). Such a test will quickly highlight any buzzes or rattles that could be caused by loose screws, cables touching the speaker or loose elements/studs within the wall itself.
- If the plasterboard is not securely fastened to the joists this could also create a buzz or a rattle. Apply more screws if necessary - particularly around the speaker location.
- Ensure that the speaker cable is not touching any part of the speaker (or backbox) as this can lead to buzzes and rattles. To avoid this it is advised to lay the cable behind the mineral wool or other wadding.
- If metal studs are used, ensure the crossover point of the studs are secured together. This can be achieved by applying drywall screws through the wall surface and through the metal joists. If they are not secure this may well lead to audible vibrations and rattles.
- Check cable continuity back to the amplifier by using a multimeter to mark up the cables correctly for the HF and LF panels.
- Play music to check for buzzes and rattles during transient peaks. Do not judge the speaker's sound quality at this stage. Once plastered over it will sound as intended.
- Always connect the APU750 when testing, except when measuring impedance.
- Perform these tests again after the plaster is dry.

  If the correct 2mm thick plaster coat has been applied, the speaker face, when tapped with fingers, will sound slightly more hollow than the surrounding areas of plasterboard. If there is little or no difference between these two sounds it is almost certain the plaster coat is too thick. This will compromise the speaker performance.

Amina have a lot more information available from its technical help desk for those wishing to measure frequency response curves at different stages of the installation.
Please contact +44 1480 354390 for assistance.

Setup tips

- **APU750**
  Your Evolution Series AIW750E speaker must be used with the supplied APU750 crossover/protection device. Please refer to the instructions supplied with the APU750 for further details.

- **Installation Backboxes**
  The AIW750E has been designed for optimum sound quality when used in the Amina Backboxes. We recommend that they are used wherever possible in a cavity type installation. If our basic fixing block kit is used you may find that the low/mid frequencies are reproduced less accurately and a possibility of increased sound transmission between rooms. Any effect will be very much installation specific.

- When installed into solid walls or ceilings using the Amina BackboxSW, you may find that your AIW750E reproduces slightly less low frequency output compared to a BackboxCV345 installation. Also, depending on the building construction there may be significant mechanical sound transmission into adjacent rooms/properties (see inside front cover).

- **AIW750E Audio Characteristics**
  The AIW750E generates sound in a similar way to an acoustic musical instrument. The speaker's front face is effectively the "musical" soundboard and the sound waves generated from it are diffuse and are dispersed over a very wide angle. This means that loudspeaker positioning is far less critical than with conventional speakers. Additionally, just like the acoustic musical instrument, the AIW750E has excellent room filling abilities.

- The AIW750E is a planar device and this feature is further enhanced when it is flush mounted into your wall or ceiling. Being planar (or flat) means that the audio's arrival time to the listener is the same for all frequencies, i.e. there is very little phase distortion. Therefore the AIW750E (and other planar devices such as electrostatic loudspeakers) can reproduce subtle nuances on a recording with incredible accuracy.

- In addition to the above characteristics, the radiating surface of an AIW750E is very stiff and undergoes very small amounts of movement in order to generate high sound pressure levels. This means that the AIW750E is inherently "fast" making it a highly articulate loudspeaker.

- **Wall or Ceiling Placement**
  The AIW750E is suitable for both wall and ceiling installations. When the most uniform audio coverage in a room is required, space the speakers evenly in the ceiling. However if the room has a height greater than 6m (19') Amina suggests installing them in the walls at a height of around 1.8m (6').

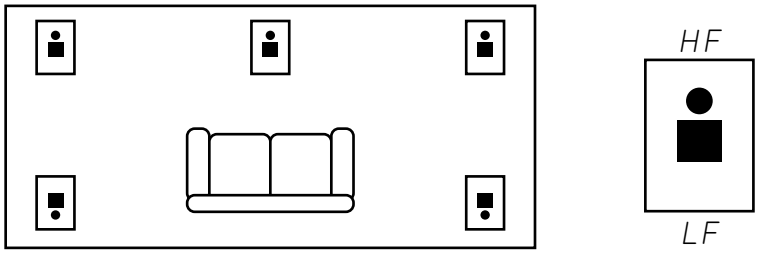
- In dedicated listening rooms where AIW750E speakers are used in stereo or multi channel systems, position them in the walls so that the centre point of the AIW750E's HF panel is approximately 1 – 1.8m (3.5 - 6') from the floor. This will give excellent results, but don't worry if this is not possible to achieve in your room as the audio characteristics of the AIW750E make exact positioning according to stereo/5.1/7.1 conventions far less critical.

Setup tips continued...

- **Speaker Orientation**
  The AIW750E can be installed either in portrait or landscape orientations, but has been optimised for portrait orientaion and for the HF and LF panels to be positioned one above the other.

- For critical listening in ceilings, e.g. a 5.1 surround system, ensure that the orientation of all speakers is the same relative to the main listening position and that the top of the HF speaker is positioned closer to the walls.

Recommended Speaker Setup



- "HiFi" position - low in wall

Correct HF and LF panel orientations

The spacing between LF and HF should be:
80mm min - 200mm max.

- "HiFi" position - high in wall

Correct HF and LF panel orientations

Setup tips continued

- **Boundary Loading**
  It is possible to increase the low frequency output of the AIW750E by positioning them close (50mm - 150mm) to the corners of a room. The recommended setup on the previous page show the LF panel in both cases being either close to the floor or ceiling. The AIW750E has been optimised for this proximity to boundaries and will reproduce slightly less bass if positioned well away from room boundaries.

- **System Requirements**
  From a system compatibility point of view your AIW750E (and its accompanying APU750 crossover/protection unit) can be treated like any conventional 4 Ohm loudspeaker. Amina recommend you use a good quality amplifier so as to avoid driving them with high levels of distortion which at best, will provide poor sound quality and at worst, may permanently damage the loudspeaker. Amina also recommend you connect the AIW750E to your amplifier with at least 16AWG oxygen free (OFC) cable or alternatively 14AWG for long runs to avoid any chance of reduced efficiency and audio bandwidth.

- For 2.1, 5.1 and 7.1 systems use the amplifier's crossover settings to divert frequencies below 60Hz to your subwoofer. This will improve the dynamic range and power handling of the system. (APU750 MUST still be used).

- IMPORTANT: the AIW750E is highly revealing of any shortcomings in the source or amplifier. Please be aware that some low cost zone amplifiers will produce high amounts of distortion well within their operating range and this will be ruthlessly revealed by a speaker such as the AIW750E.

- **Sound Transmission**
  As with any speaker designed to be fixed to a structure within a wall or ceiling, careful consideration should be given to sound transmission into adjacent rooms or properties. We recommend specialist advice is taken if sound transmission into adjacent rooms needs to be minimised. See the Amina Specifier's guide for information on reducing sound transmission as a starting point or contact Amina directly for advice.

- **100/70V Option**
  The AIW750E is not compatible with 100/70V line audio systems.

Further details

Maintenance and cleaning
Once your AIW750E speaker is plastered into your wall or ceiling, it requires no physical maintenance. Your wall or ceiling can be cleaned with products appropriate to the finish finally applied to the plaster surface.

The wall or ceiling can be painted or redecorated any number of times (see proviso - page 07, step 5). Extreme care should be taken when removing wallpaper type coverings to ensure the plaster surface is not damaged. If damage to the plaster work occurs, use repair plaster to restore the plaster surface prior to re-decorating. Amina Technologies Ltd recommends British Gypsum Easi-fill® repair plaster.
Avoid pushing the wall or ceiling surface immediately in front of the speaker. Excessive excursion, whilst unlikely to damage the speaker, will undoubtedly cause the plaster to crack around its perimeter.

Reliability
Correctly installed and used within its specification, the AIW750E speaker is designed to give many years of trouble-free service. The vibrational soundboard technique used by the AIW750E has very few moving parts. Compared to a conventional moving coil speaker these movements are insignificant. Whilst the human touch can feel the tiny movements, they cannot be seen by the naked eye. Such small movement of this electromechanical structure means the long term reliability is enhanced compared to the much larger movements of conventional loudspeakers.

Removal
In the unlikely event of a problem developing with the product, or you simply wish to remove the item to change its location, please refer to the following guidelines:

Locate the speaker by tapping the wall or ceiling listening for a hollow sound compared to the rest of the wall/ceiling. Then, with a sharp chisel or decorator's scraper, carefully chip into the plaster along the edge of the speaker to expose a small area of the panel surface. To ensure you do not damage the panel, hold the tool at an acute angle to the wall or ceiling.
Now, holding the scraper almost parallel to the panel surface, work outwards towards the product's corners easing the plaster away from the panel (during this process, attempt to remove as little plaster as possible). Do not worry if the panel surface receives marks or indented scratches during this process (it should not, however, have holes entering through to the unique honeycomb panel). Once the product is plastered back into its original or new location, the new skim of plaster will cover all these imperfections and the speakers performance will not be unduly affected.

Clear the surface plaster material from the surrounding plasterboard to expose all the joint tape and subsequently remove it. Use a narrow chisel or flat blade screwdriver to remove the plaster and expose the screws at each corner of the product. Using a suitable screwdriver, remove the four screws and then ease the product from the wall or ceiling and disconnect the speaker cable. Leave all eight fixing blocks or the BackBoxes in place as these can be used to support a small section of plasterboard when making good the wall or ceiling.

If the product needs repairing, please return it to your supplier or Amina Technologies Ltd again leaving as much plaster on the panel surface as possible. Once repaired, the product can be refixed into position following appropriate installation steps detailed earlier within the manual.

For further details on removal, please see the Amina website: www.amina.co.uk

Troubleshooting

Thorough testing of the speakers should be carried out both prior to and after plastering to avoid time consuming repairs or modifications at a later stage. Should you encounter any problems at either of the test stages, the following guide is designed to help determine possible problem areas.

Advice for testing:

- When testing always use a basic sound system (amp, source, speakers) to eliminate the possibility of faults with other more sophisticated components, such as control systems.
- Test at low and medium volumes and be careful not to exceed the specific speaker model's recommended power. Using tone sweeps or music as test material, listen for distortion, buzzing or rattles at appropriate levels. Using test discs or music, confirm that all channels are in-phase.

Low or No sound output:

- Check continuity of all cables.
- Check that all cables and connections are made correctly, are intact and that all channels are correctly phased (+ to + and - to - from amp to speaker).
- Using an impedance meter, check the nominal impedance of the HF and LF speakers (APU750 must not be connected) both at the terminals and the amp end of the cable. Do these measurements match each other? (Allowing for the small impedance increase of less than 1 Ohm along the wire length) do they match the stated nominal impedance on the speakers specification label? If the nominal impedance does not match the product's stated impedance, a speaker driver may be open circuited or short circuited. If so, the product may need to be returned to Amina for repair or replacement.
  If the nominal impedance at the end of the cable is very different to the impedance at the speaker, check your cables. Cuts or nicks in the cable along its length can dramatically increase impedance or create a short circuit, dramatically lowering the impedance.

Distortion, buzzing or rattles at modest volumes:

- Try to identify the location of the buzz or rattle. It may be caused by a loose screw or other mechanical object. Check the assembly and ensure screws and fixings are tight.
- If the rattle persists, remove the speaker from the wall and check your wiring to the product. Ensure that wires, with the speaker in the final location, are not resting against the speaker or backbox (if used), causing vibrations.
- With no audio signal applied, lightly push the speaker face in and out at its center. Listen carefully for rubbing on the driver, which may sound like scratching. This may indicate the speaker has been over driven and subsequently damaged. The speaker will need to be sent to Amina for repair.

Very low output after speaker passes electrical tests:

- With no audio signal applied, lightly push the panel in and out at its center. Listen carefully for rubbing voice coils on the driver, which may sound like scratching. This may indicate the speaker has been over driven and subsequently damaged. The speaker will need to be sent to Amina for repair.

Distortion at higher volume levels:

- Diffuse source panel loudspeakers of this type have an extremely fast response, articulating the signal from your audio system very accurately. Take your system back to the bare minimum (amplifier, source and speakers) to eliminate distortions introduced by other components.
- When using your amplifier at maximum power levels, or if the input of your amplifier is being overloaded, the signal level may be 'clipping'. With some conventional speakers this may not be evident, but with a diffuse source panel speaker you are much more likely to hear the distortion. Consider adjusting or upgrading your system.

Specifications

Model Number	AIW750E
Dimensions LF	450mm x 345mm x 40mm (17 3/4" x 13 5/8" x 1 5/8")
Dimensions HF	450mm x 200mm x 40mm (17 3/4" x 7 7/8" x 1 5/8")
Weight (LF/HF)	1.3Kgs (2.86lbs) / 1.2Kgs (2.64lbs)
Nominal Impedance	4 Ohm
Frequency Response	50Hz - 20kHz (-6dB) mounted in Backboxes (APU750 connected)
Sensitivity (2mm plaster/mud skim)	87dB 1m/ 2.83Vrms (APU750 connected)
Connection	Twin blue butt-splice crimp terminal (suitable for 1.5 - 2.5mm^2 / 16-14AWG cable thickness)
Crossover/protection unit	APU750
Fixing requirement	Amina BackboxCV345 & BackboxCV200
Power Handling	100W (cont) ; 200W (peak)
Manufacturer warranty	10 years

Specifications: APU750

Model Number	APU750
Dimensions	190mm x 100mm x 42mm (7 1/2" x 4" x 1 5/8")
Weight	0.6kg (1. 3lbs)
Filter type	2-way crossover, 2nd order type with adjustable mid/treble output level
Fuse protection	Self-resetting, current sensing type
Compatability	Suitable for use with Amina AIW750E only
Number of channels	1
Connection type Supplied	Input – 1x Springcon® 2 pole connector / Output – 1x Springcon® 4 pole connector
Maintenance requirements	Repeated tripping of protection fuse may require fuse replacement by manufacturer to ensure optimal speakerperformance

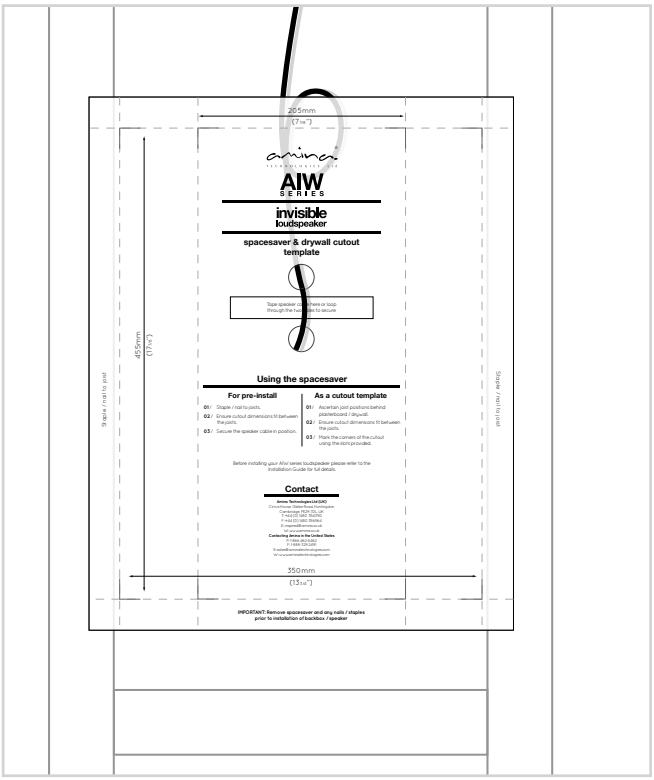
Spacesaver information

Using the spacesaver for pre-install

The AIW/Evolution Series spacesaver is designed to be pinned/taped to joist work prior to the plasterboard/drywall being fitted.

Your speaker cable can then be secured to the spacesaver using the holes provided.

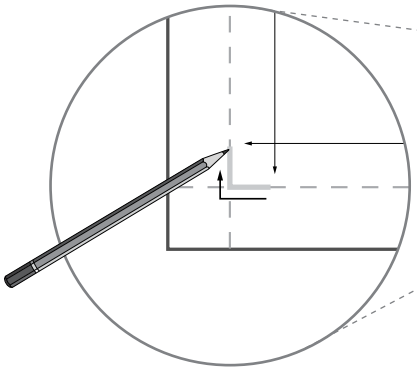
There are two ways to secure the speaker cable in position. The first is to pull the cable through one (or both) of the holes and tape in position.
The other method is to again pull the cable through the two holes, loop and tie the cable in position.

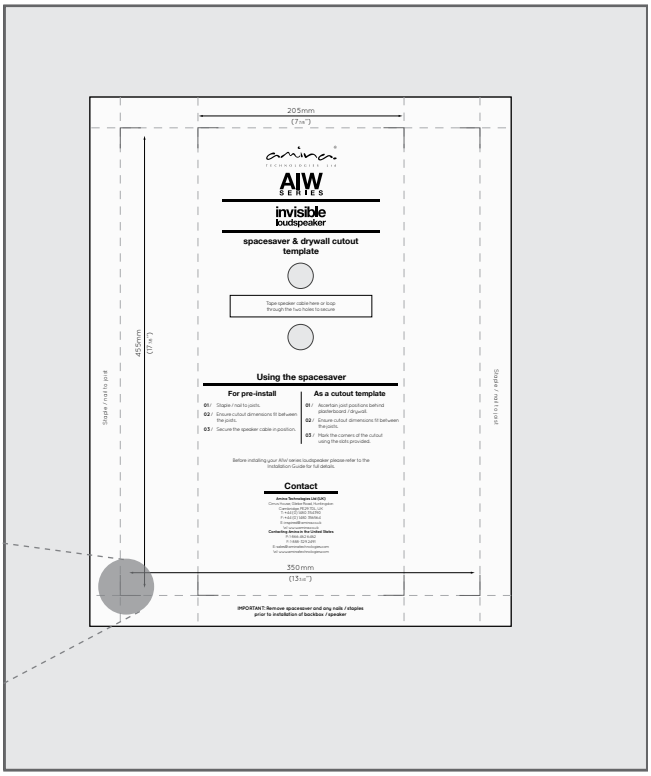


Using the spacesaver as a cutout template

For installations where the plasterboard/drywall is already in place, the spacesaver can be used purely as a hole cutout template.

Carefully mark the corners of the cutout using the four slots provided.





Warranty information

Limited Warranty:

The AIW750E is designed to operate reliably for many years. Correctly installed in accordance with these instructions, Amina warranties the AIW750E against defective materials and workmanship for a period of five years in commercial applications and ten years in residential applications.

At the end of the speakers useful life and in compliance with the European directive on waste electrical and electronic equipment (WEEE), this product is to be returned to your supplier, or directly to Amina for recycling. If you have any questions please contact Amina Technologies Ltd.

* Please refer to our full warranty statement for details, available on our websites, or alternatively contact us via email on any of the addresses opposite

Important Note: This product does not comply to European Construction Products Directive EN 54-24 and therefore must not be used in European voice evacuation systems.

Copyright information

Contact Information

Amina Technologies Ltd (International)
Cirrus House, Glebe Road, Huntingdon
Cambridge, PE29 7DL, UK
T: +44 (0) 1480 354390
E: inspired@amina.co.uk
W: www.amina.co.uk

Contacting Amina in the United States
P 1-866 462 6462
F 1-888 329 2491
E: sales@aminatechnologies.com
W: www.aminatechnologies.com

Notes

Contact Information

Amina Technologies Ltd
Cirrus House, Glebe Road
Huntingdon, Cambs, PE29 7DL England
T: + 44 1480 354390 / E: inspired@amina.co.uk