



Owner's Manual

S57i

In-wall 2x4 Transmission Line Subwoofer

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DOCUMENT CONVENTIONS

This document contains general safety, installation, and operation instructions for the Wisdom Audio High Output TL Subwoofer. It is important to read this document before attempting to use this product. Pay particular attention to:

WARNING: Calls attention to a procedure, practice, condition or the like that, if not correctly performed or adhered to, could result in injury or death.

CAUTION: Calls attention to a procedure, practice, condition or the like that, if not correctly performed or adhered to, could result in damage to or destruction of part of or the entire product.

Note: Calls attention to information that aids in the installation or operation of the product.

Introduction

Congratulations on purchasing your **Wisdom Audio S57i** Transmission Line (TL) in-wall subwoofer. The S57i's Transmission Line design delivers tremendous bass performance, in terms of depth, dynamics, and distortion, resulting in articulate bass that integrates seamlessly with high-resolution speakers such as Wisdom Audio's Insight or Sage Series.

We recognize that setting up a passive TL subwoofer can be a bit more involved than connecting a common stand-alone subwoofer, which is why we recommend that your installations be engineered and calibrated by Factory Personnel.

NOTE: For optimal performance, you **MUST** use an SW-1, or SA-DSP amplifier. The S57i (like all TL subwoofers) requires a very specific non-standard EQ slope to ensure proper performance. Using a non-approved EQ or amplifier without the correct signal processing will result in less-than-optimal performance. For an approved list of amplifiers and surround processors, please email us at info@wisdomaudio.com. For the purposes of this manual, we will assume that you have an approved signal processor or amplifier with the necessary signal processing for the S57i.

Overview

There is a class of bass enclosure which has been around since the 1930's, that was originally described as an "Acoustic Labyrinth." It was an idea that was a bit ahead of its time, since fully optimizing it required complex modeling. Your Wisdom Audio S57i subwoofer uses a variation of this labyrinth, or Transmission Line, as they are now called, for high quality, low distortion bass reproduction. Utilizing sophisticated computer modeling, we've optimized the S57i specifically for this application. We call our unique implementation a "Quarter Wave Offset Transmission Line" subwoofer.

For a partial and very simplified understanding of the TL, consider that all dynamic drivers develop energy on both sides of the diaphragm, with the rear energy being out of phase with the front energy. If you allow the driver to operate in free space (no enclosure), the front and rear energies cancel at low frequencies, (long wavelengths).

In our Transmission Line subwoofer, the energy from the back side of the driver is sent along a long, folded path so that its lowest frequencies arrive back at the front side of the driver in phase, summing to produce up to 6 dB more output. In short, the energy from both sides of the woofer combine to increase output, reduce cone motion, extend frequency response, and substantially reduce distortion. The results are quite stunning. Low frequencies are strikingly dynamic and responsive and integrate quite seamlessly with the fast and detailed Insight and Sage Series planar magnetic hybrids.

Subwoofer Placement (An Introduction)

Subwoofers offer flexibility in placement since the frequencies they reproduce are not readily localizable by the human ear. This is because the wavelengths they reproduce are more than 10 feet (3 meters) long, but our ears are located only about 6-7 inches (17 cm) apart. Thus, these extremely long waves do not meaningfully contribute to the imaging that the main speakers create.

However, this fact does not mean that the placement of the subwoofers has no effect on the sound quality in the room. Far from it. Subwoofers are the most likely to suffer from the response irregularities introduced by the room itself, operating, as they do, below approximately 80 Hz in most systems. This is not a property of subwoofers but rather a characteristic of low frequency reproduction in a closed space. In fact, in a typical room where a stereo pair of full-range speakers are used, or a single subwoofer, it is common to see a variance exceeding 20 decibels (dB) in sound pressure level (SPL) between various seating positions. Is that a lot, and can we use an EQ to fix the issue?

The short answer is, yes, that is a lot. Unfortunately, equalization simply won't work, nor would we want to, even if we could. Here's why. For reference, 20dB is a factor of 100 in power. 100X! To put that in context, suppose you had a 50-watt power demand to reproduce a bass note at one seating location, and a 2nd seating location only 1 meter away had a 20dB depression in the response of the same note. To establish the same output at the 2nd seating location would require 100X more power, (5000 watts), to bring it to the same acoustic level. This is fully outside the capabilities of nearly all systems, and it would have driven any conventional system well beyond its limit. In addition, the EQ would affect all seating locations equally, and the first position would now have a 20dB peak. This is why equalization, in general, has limited value. But it is useful when an overall correction is needed. What, then, can be done so everyone experiences the same deep, articulate, and impactful bass? The answer lies in minimizing the acoustic variance.

Acoustic variance is caused by the low frequency waves (pressure and rarefaction cycles) reflecting around the room and interfering with themselves. At some frequencies and locations, the reflected waves sum to higher sound pressure levels (pressure/rarefaction cycles are more in phase). At other frequencies and locations, they sum to lower sound pressure levels, (pressure/rarefaction cycles are more out of phase). The dimensions of the room primarily dictate the interaction, but placement of the subwoofers, or bass radiators affect the excitation of these room modes, or standing waves, as they are often called. Careful placement of subwoofers can significantly reduce and even eliminate some room modes. A single subwoofer can reduce variance if

it is properly placed, but it is limited in what can be achieved. In practice, 2 subs should be considered a minimum where there is a single row of seating. However, more should be used to minimize variance where multiple rows of seating are present or where uniform hi-fidelity sound throughout the room is desired. Controlling variance and having the finest listening experience is one of the primary reasons to choose multiple subwoofers over full range speakers.

Compared to full-range speakers, subwoofers have the advantage that they can be placed at various locations and in multiples around a room to mitigate the naturally occurring standing waves. How many and where to place them is a science unto itself and beyond the scope of this introduction. It is truly the job of an expert to provide guidance in placement. There are also professional tools and computer programs available now to aid in selecting the optimal, or as it is in many cases, the best compromise in placement. We recommend contacting us directly at info@wisdomaudio.com to arrange to run a subwoofer analysis on your room and to help you find the absolute best placement for each of your subwoofers.

Room Treatment

Room Treatment for subwoofers is quite different than that for satellite speakers, (primary listening speakers). The absorbers need to dissipate an enormous amount of energy and have a broad bandwidth without introducing their own resonances. This typically requires large absorbers that are placed at intersecting boundaries. It can also be done actively, but this again requires very powerful transducers to keep up with the demands of the primary subwoofers. Room treatment for subwoofers should always be considered a last resort for tweaking response irregularities, since, at best, they are only tweaks. The best approach is to use modeling software along with multiple subwoofers to minimize the standing waves in the room. This approach should be conducted by an experienced professional who is familiar with acoustics in the room-size of interest. Please contact your Wisdom Dealer for more information.

Note: Room treatment for Satellite Speakers is quite different and can be very effective in changing the sound character of the room and improving detail, intelligibility, and imaging. More information on this can be found in other Wisdom publications not dedicated to subwoofer installation.

Professional Acoustic Design

Does this all sound too complicated? For good reason: it is complicated.

The difference between the average listening room and one that is professionally designed and implemented is huge. A great listening room will disappear to an astonishing degree, letting the experiences captured in your recordings speak to you directly. A well-designed room is also quieter and more comfortable. It can easily become a favorite retreat for peace and rejuvenation.

If you decide to investigate the possibility of improving your room with the help of a professional, it is important to find someone who focuses on residential spaces. Most acousticians are trained to deal with large spaces – airports, auditoriums, lobbies in commercial buildings, etc. The problems seen in “small” rooms (residential spaces) are quite different, and outside the experience of most acousticians. Find someone who specializes in and has a great deal of experience designing home studios, home theaters, and the like. Your Wisdom Audio dealer may be such a person; failing that, he/she can help you find such a professional.

References

Books on Acoustics

The Master Handbook of Acoustics, F. Alton Everest, TAB Books

Sound Reproduction: The Acoustics and Psychoacoustics of Loudspeakers and Rooms by Dr. Floyd Toole, Focal Press

Unpacking the S57i

The **Wisdom Audio High Output TL S57i** subwoofer is a substantial piece of equipment. Please exercise caution when unpacking your S57i to ensure you do not strain yourself.

CAUTION

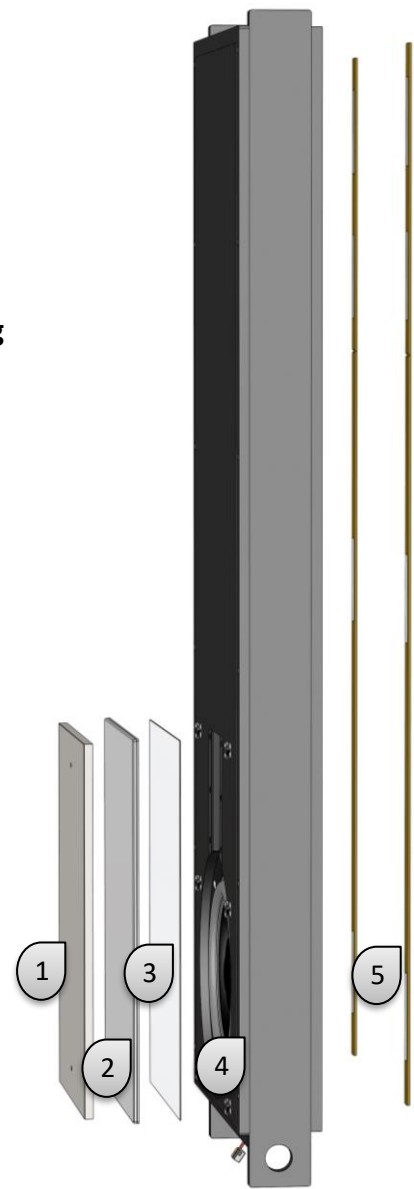
Do not attempt to lift your S57i while bending or twisting from the waist. Use your legs for lifting, not your back.

Always stand as straight as possible and keep the S57i close to your body to reduce strain on your back.

Carton Contents:

- 1) Paint Shield
- 2) Fine Perforated White Grille
- 3) Scrim Cloth*
- 4) S57i Subwoofer Enclosure
- 5) Shim Strips (2 pieces)

*The scrim cloth is provided for optional aesthetic use.



Installing the S57i

The following provides an overview of the S57i installation in a standard stud wall, a very straightforward process. It is expected that the installer has common knowledge and a basic understanding of construction principles sufficient for the task.

The S57i subwoofer utilizes 6 of our patented Magnetic Recoil Fasteners to hold the grille to the subwoofer. These are adjustable over a range of 5mm to account for the variation in skim coat thickness that might be applied in the finishing process.

The output of the subwoofer may be placed either up near the ceiling, or down near the floor. In most rooms, these are largely equivalent positions, in terms of acoustics. The difference will usually be aesthetic rather than performance based.

The front board of the S57i is made from **1/2" MDO plywood**, which has a smooth, paintable surface finish like drywall. It can be taped, textured, and painted like any other wall surface. It will also accept skim-coating if construction calls for plaster walls.

The S57i can be installed in walls with **1/2" (13mm) or 5/8" (16mm)** thick drywall. Shim strips are provided to accommodate the different wall thicknesses. **NOTE: Both installations require shim strips. The wall thickness determines shim strip placement.**

The S57i has predrilled, countersunk screw holes so standard #6 drywall screws will sit with their heads below the surface. As with other drywall joints, they can be taped and spackled without any trace. A total of 12 drywall screws are required.

S57i Preparations

1) Select the 2x4 stud bay(s) to be used.

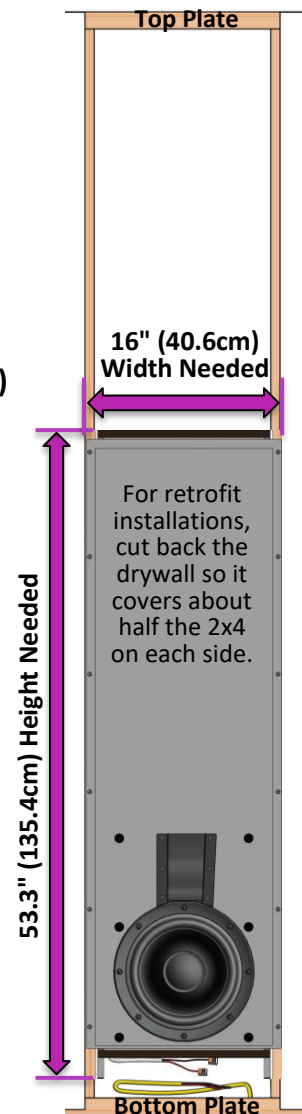
NOTE: It is important that you consult your Wisdom Audio Dealer when planning your subwoofer placement. See the section on [Subwoofer Placement](#).

- a) Ensure there is no plumbing, wiring, firebreak, or other obstruction in the stud bay that will interfere with the installation. The S57i will require a minimum of **53.3" (135.4cm)** of height within a 2x4 stud bay and **16" (40.6cm)** of width between the mating drywall surfaces.
- b) Should you be installing the S57i in an existing wall, cut back the drywall so it covers about half of the 2x4's on each side of the bay. The front panel flange of the S57i will cover the other half of the studs.

2) Prepare the subwoofer wiring.

There are a couple ways to route wire to the subwoofer input.

- a) As shown on the right, bring the cable from the amplifier through the top plate or bottom/sole plate of the same stud bay in which the S57i is located. The connection can be made in the space between the feet at the end of the S57i. If the S57i is "upside down," with its feet at the top of the bay, the input cable needs to come through the top plate. This "upside down" orientation places the grille high on the wall, which may be preferred aesthetically (since it can appear as a surround speaker).



- b) Alternatively, if you have access to the adjacent stud bay, drill a hole through the 2x4 stud adjacent to the S57i's feet, and feed the cable through the hole. (This method is shown in subsequent installation images in this manual.) You can then make the connection within the subwoofer bay or in the adjacent stud bay. If you choose an adjacent bay, you could put the connections inside a Junction box for future serviceability if desired.

3) 5/8" (16mm) Drywall Installations – (Skip to step (4) for 1/2" Drywall Installations.)

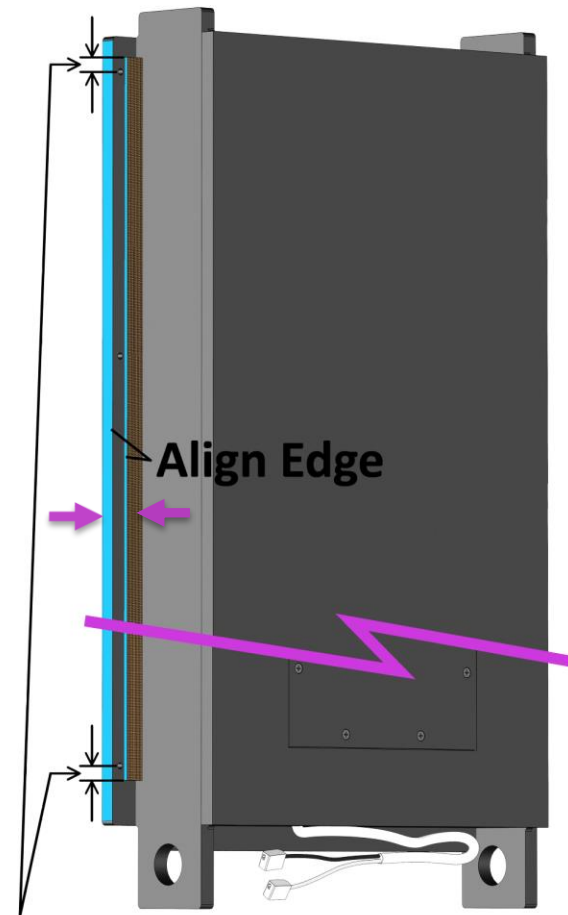
- a) Place the S57i face down on a flat, smooth, and protected surface. We suggest placing the subwoofer on the supplied packaging.



Peel Backing from all Adhesive Strips.

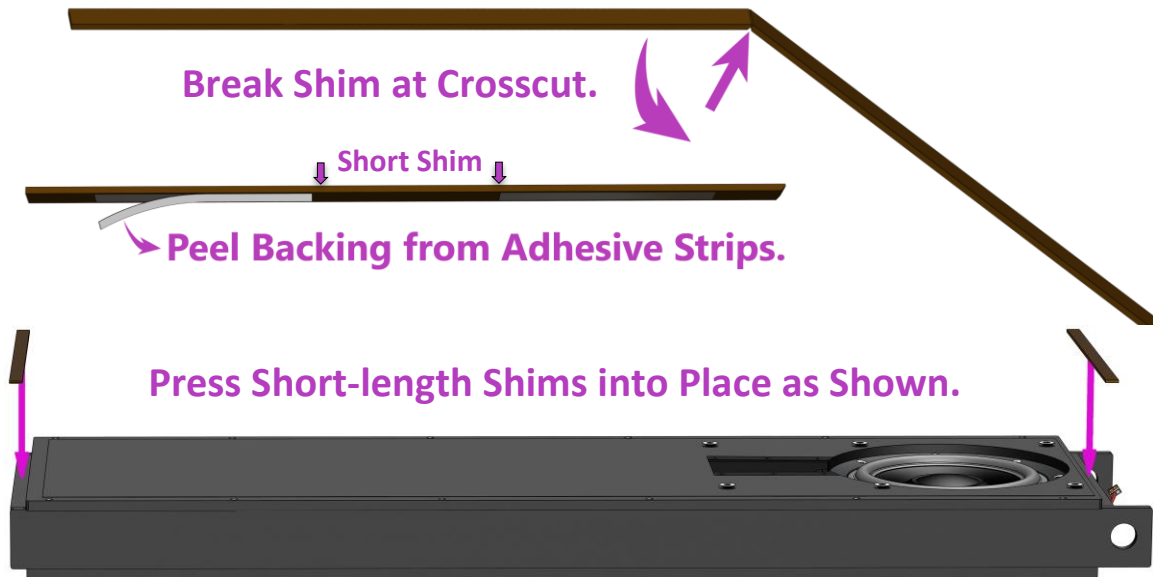
Press Shims Firmly into Place.

- b) Peel the backing from all the adhesive strips on the full-length shims and attach the full-length shims to the backside of the S57i enclosure flanges.
- c) Align the edge of the shims with the edge of the mounting flange, and ensure the shims are aligned so the top and bottom mounting holes are covered.
- d) Press the shims firmly into place.



Center Shims to Cover Upper and Lower Mounting Holes

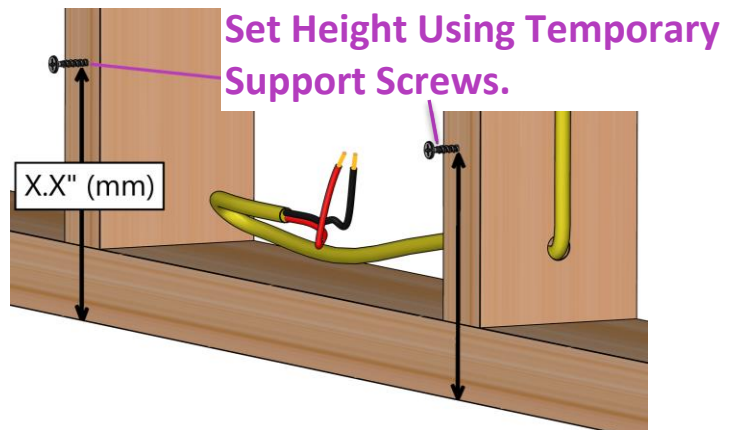
4) 1/2" (13mm) Drywall Installations – (For 5/8" Drywall Installations, go to step (3).)



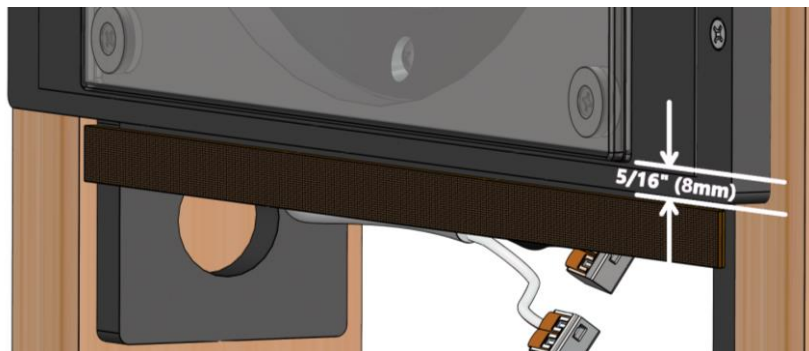
S57i Attachment

5) Set mounting height of the S57i.

Determine the desired height of the S57i and install a temporary support screw into each stud to support the bottom of the enclosure.



For reference, the home-position of the grille is **5/16" (8mm)** above bottom of the enclosure. The grille's vertical adjustment range is $\pm 1/8"$ (3mm).



6) Screw the S57i to the studs.

NOTE: The S57i should be attached in a manner that does not subject it to bending or torsional (twisting) forces that would stress the enclosure. No wooden or metal enclosure should be forced against an irregular surface. If the studs are curved or warped in an installation, the installer must insert shims between the S57i front panel and the stud surfaces to avoid such stress. **Ensure all 12 screw locations are used.**

a) Set the enclosure on the temporary support screws.

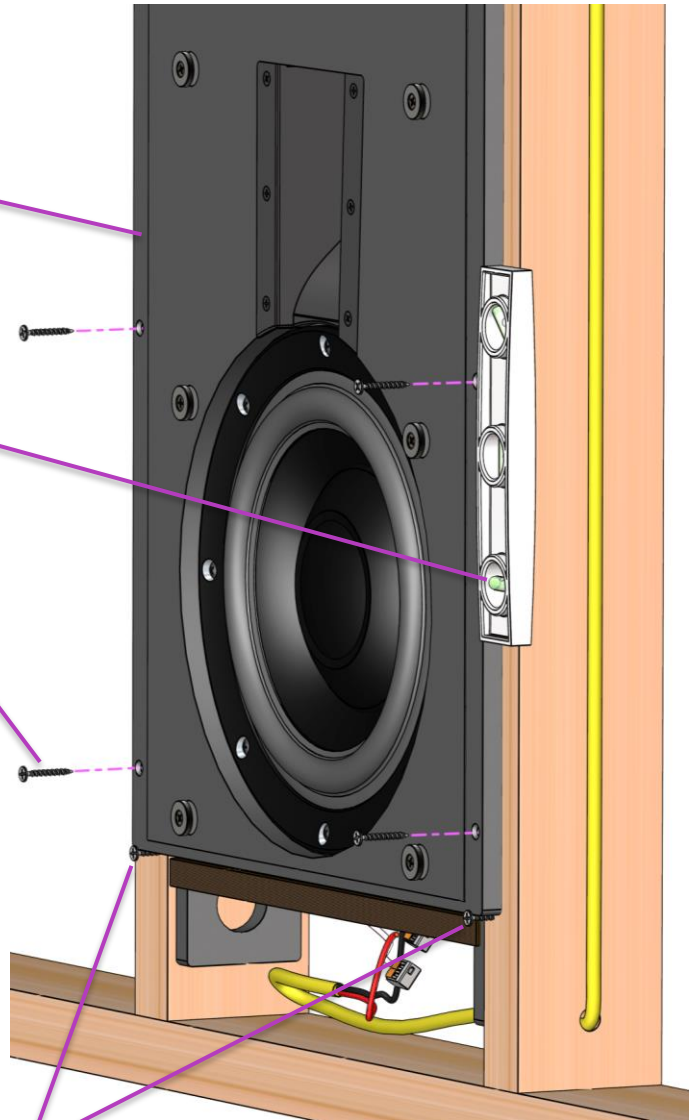
b) Using a level, ensure the S57i is aligned vertically.

c) Screw the enclosure to the studs.
Use all 12 attachment points.

NOTE:

For 1/2" installations, use
(12) 1-1/4" #6 drywall screws.

For 5/8" installations, use
(12) 1-5/8" #6 drywall screws,
screwing through the shim strips
and into the studs.



7) Remove the temporary support screws.

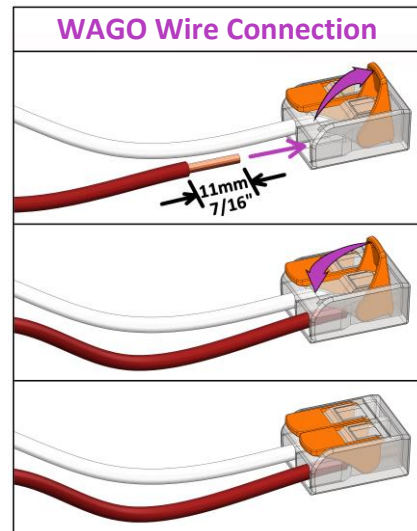
Making the S57i Connections

As with any system, before making connections, turn off the power to avoid any chance of inadvertently causing a problem (such as a short circuit).

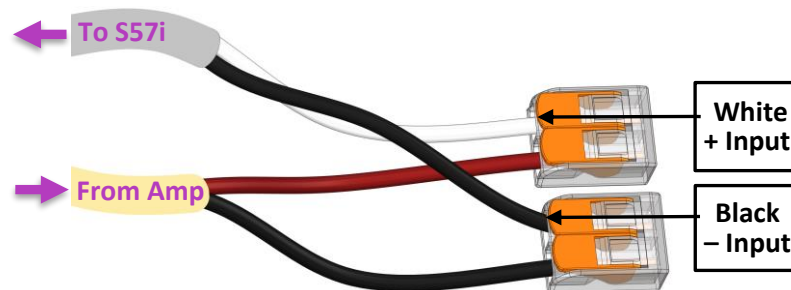
We recommend using heavy-gauge speaker wire, the gauge will vary dependent on your speaker run length. Please consult an authorized dealer to determine what gauge would be best for your application.

“Quick connect” WAGO® splicing connectors are provided at one end of the S57i.

1. As shown, strip back the conductors from your amplifier **7/16" (11mm)**.
2. Lift the lever of the empty terminal to open the clamping mechanism and insert a stripped conductor.
3. Then, lower the lever to close the clamp and secure your input connection.

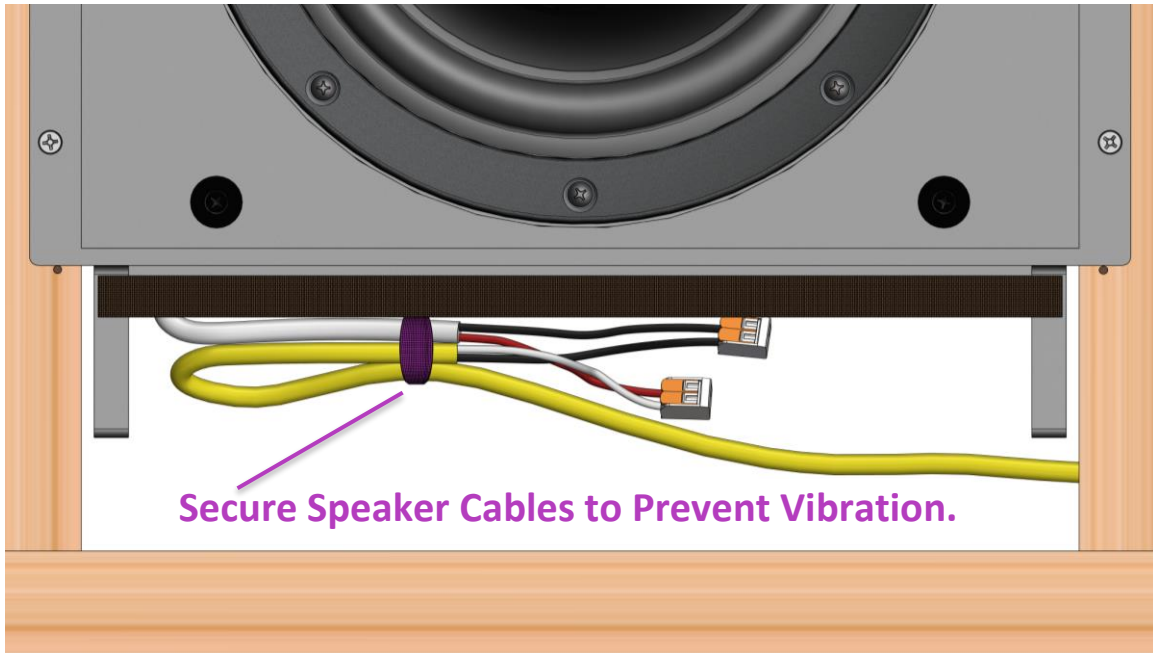


8) Connect the speaker cables as shown below



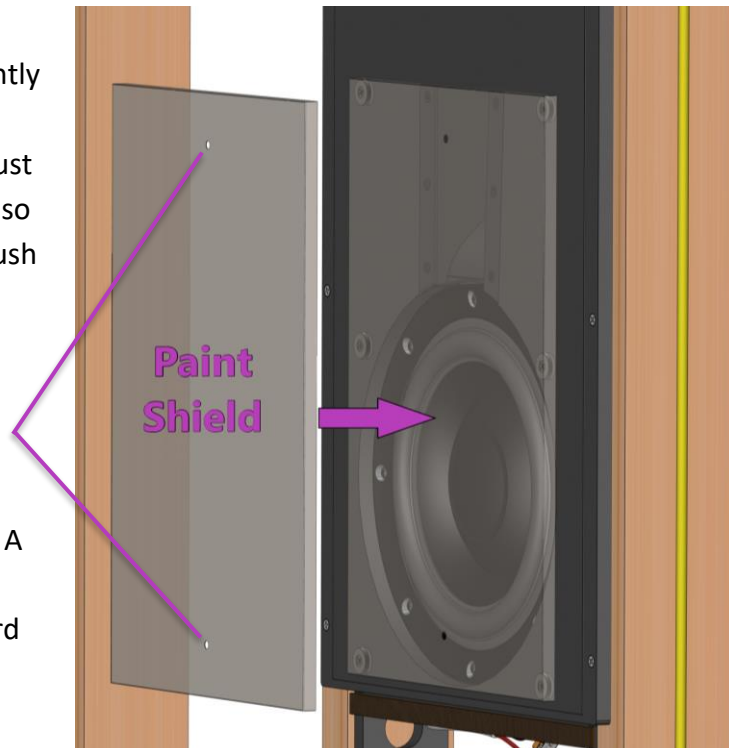
9) Secure wires, by wrapping and attaching as needed to prevent unwanted vibration.

- a) The cables and connections can be wrapped with soft material that prevents them from directly touching adjacent hard surfaces. If access permits, the cables can be secured using appropriate hardware such as cable ties, Velcro®, staples, etc.



10) Install Paint Shield.

- a) The paint shield will fit tightly and self-center on the magnets. If necessary, adjust the height of the magnets so that the paint shield fits flush with the face of the enclosure.
- b) Holes in the face of the paint shield are provided to aid in removing the paint shield. A small screwdriver or hook can be used to pull outward on it.



11) Check the following to ensure the S57i is ready for taping, texturing, and painting.

- a) Ensure the Paint Shield is installed.
- b) Ensure the connections have been made and are secure. Test the subwoofer to ensure it is working properly by applying a signal to the speaker cable at the system head-end.
- c) Save the grille in a safe place for later installation.

Finishing

12) Paint and Finish Surface:

- a) The face of the S57i has a surface finish similar to drywall. It can be taped, mudded, and painted like any other section of wall. It will also readily accept skim-coating if the construction calls for plaster walls.

Note: It is important to use slow-setting, joint compound when taping the seams around the speaker. Avoid using a lightweight, fast-drying joint compound.

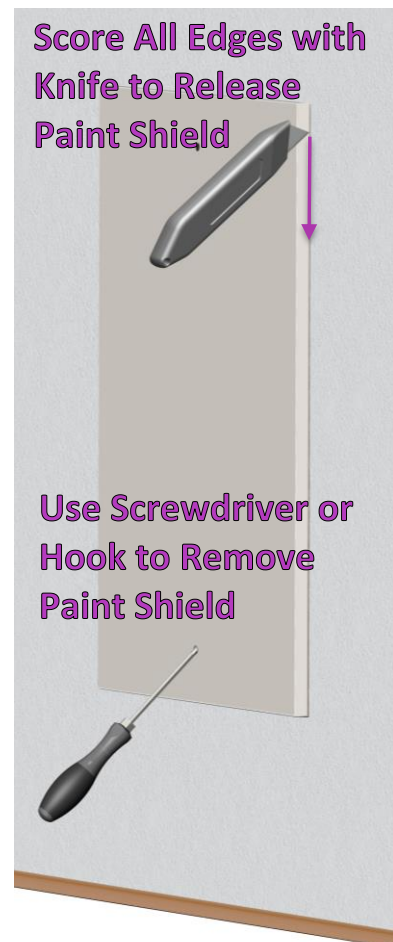
- b) Tape and mud the seams of all joints between the drywall and the S57i flange, taking care to apply mud or skim-coat all the way up to the paint shield. The mud should be smooth and flat around the entire perimeter of the paint shield.
- c) Sand, texture, and paint the S57i to blend with the wall.

13) Score the perimeter of the paint shield and remove it.

- a) After the S57i has been finished (taped, textured, and painted to match the surrounding wall/ceiling), use a knife to cut along the edge of the paint shield to separate it from the paint and plaster material that has bonded to it.

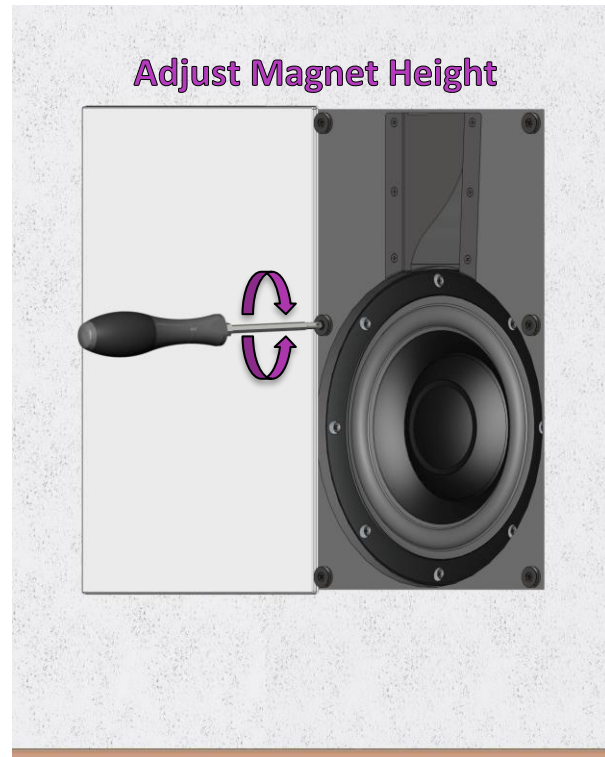
NOTE: Failure to score the edge of the grille could cause damage to the paint and textured wall surface during removal. Any rough edges will be covered by the grille, but can be trimmed if desired.

- b) Using a small screwdriver or hook, use one or both holes to pull outward on the paint shield.
- c) Discard the paint shield.

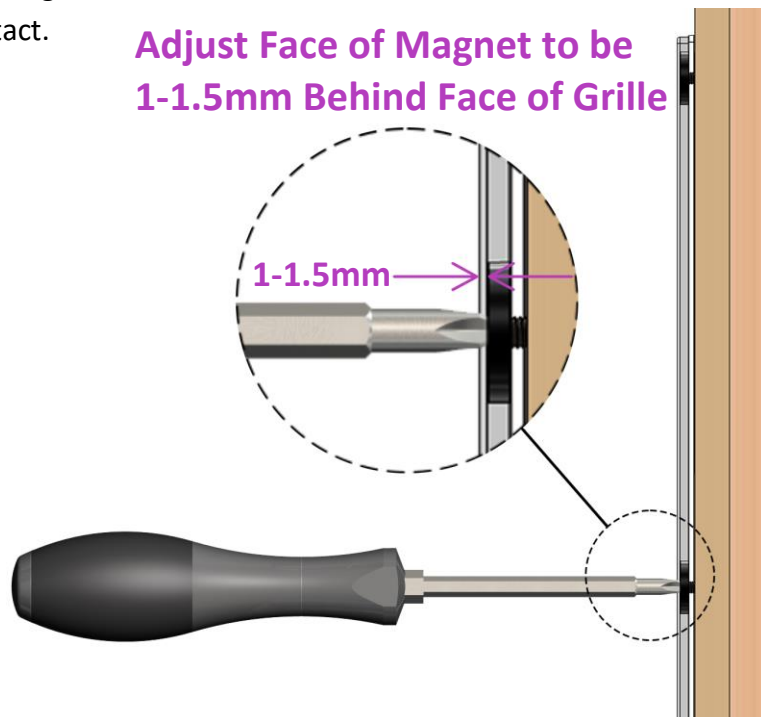


14) Install the grille to the front of the S57i.

- a) Place the grille alongside the magnets, and adjust the height of the magnets using a #2 Phillips screwdriver. The magnets should be adjusted so they are approximately 1 to 1.5mm below the outer face of the grille.
- b) Place the grille over the magnets, centering it around the magnets. Use a level if needed to ensure the grille is aligned properly. Check for gaps between the grille and the face of the S57i and readjust as needed.
- c) Readjust any magnets, as needed, if any vibration from the grille is detected when using the system. Adjusting the magnets so that they are slightly short of contacting the grille may be better than full contact.



Adjust Face of Magnet to be 1-1.5mm Behind Face of Grille



Attaching Scrim to Grille (Optional)

If you choose to use the included scrim behind the grille, the material should be attached using 3M 77 spray adhesive. The scrim will make the grille more opaque and slightly more difficult to see through the grille. However, it will also impede the movement of air through the grille at high sound levels and the lowest frequencies. Use discretion when deciding whether to add the scrim. If high SPL output is expected, then avoid using it.

- 1) Find a clear and clean space with good ventilation.
- 2) Lay down paper, cardboard, or other disposable material to protect the work surface. Overspray is unavoidable, so ensure that the area is free of important items.
- 3) Place the grille face down on a clean surface. Again, ensure the area is clean and free of dust and particulate matter.
- 4) Test fit the scrim to get a feel for its placement.
- 5) Layout the scrim, separate from the grille, and apply a light coat of 3M 77 spray to the scrim, ensuring even coverage. Follow the manufacturer's instructions for using the spray. However, it is advisable to use a spray distance of approximately 10"-12" (25cm-30cm) at room temperature.
- 6) Allow the adhesive to dry for a few minutes. It should feel tacky to the touch when ready.
- 7) Carefully lay the scrim over the back of the grille, (tacky side against the grille), aligning it within the backside of the grille.
- 8) Gently press it flat against the grille until fully seated. Use care not to slide your hand across the grille as this may cause the scrim to wrinkle. Once in place and smooth, use a clean, soft cloth to press the scrim into place more securely and with a little more pressure. You may slide your hand across the back of the grille once completed,



North American Warranty

Standard Warranty

When purchased from and installed by an authorized Wisdom Audio dealer, Wisdom Audio loudspeakers are warranted to be free from defects in material and workmanship under normal use for a period of 10 years from the original date of purchase.

IMPORTANT: Wisdom Audio loudspeakers are designed for installation and operation in environmentally controlled conditions, such as are found in normal residential environments. When used in harsh conditions such as outdoors or in marine applications, the warranty is three years from the original date of purchase.

During the warranty period, any Wisdom Audio products exhibiting defects in materials and/or workmanship will be repaired or replaced, at our option, without charge for either parts or labor, at our factory. The warranty will not apply to any Wisdom Audio products that has been misused, abused, altered, or installed and calibrated by anyone other than an authorized Wisdom Audio dealer.

Any Wisdom Audio product not performing satisfactorily may be returned to the factory for evaluation. Return authorization must first be obtained by either calling or writing the factory prior to shipping the component. The factory will pay for return shipping charges only if the component is found to be defective as mentioned above. There are other stipulations that may apply to shipping charges.

There is no other express warranty on Wisdom Audio products. Neither this warranty nor any other warranty, express or implied, including any implied warranties of merchantability or fitness, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts and other states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty is applicable in the United States and Canada only. Outside of the U.S. and Canada, please contact your local, authorized Wisdom Audio distributor for warranty and service information.

Obtaining Service

We take great pride in our dealers. Experience, dedication, and integrity make these professionals ideally suited to assist with our customers' service needs.

If your Wisdom Audio loudspeaker must be serviced, please contact your dealer. Your dealer will then decide whether the problem can be remedied locally, or whether to contact Wisdom Audio for further service information or parts, or to obtain a Return Authorization. The Wisdom Audio Service Department works closely with your dealer to solve your service needs expediently.

IMPORTANT: Return authorization must be obtained from Wisdom Audio's Service Department BEFORE a unit is shipped for service.

It is extremely important that information about a problem be explicit and complete. A specific, comprehensive description of the problem helps your dealer and the Wisdom Audio Service Department locate and repair the difficulty as quickly as possible.

A copy of the original bill of sale will serve to verify warranty status. Please include it with the unit when it is brought in for warranty service.

WARNING: All returned units must be packaged in their original packaging, and the proper return authorization numbers must be marked on the outer carton for identification. Shipping the unit in improper packaging may void the warranty, as Wisdom Audio cannot be responsible for the resulting shipping damage.

Your dealer can order a new set of shipping materials for you if you need to ship your loudspeaker and no longer have the original materials. There will be a charge for this service. We strongly recommend saving all packing materials in case you need to ship your product.

If the packaging to protect the unit is, in our opinion or that of our dealer, inadequate to protect the unit, we reserve the right to repackage it for return shipment at the owner's expense. Neither Wisdom Audio nor your dealer can be responsible for shipping damage due to improper (that is, non-original) packaging.

Specifications

All specifications are subject to change at any time to improve the product.

- **Number of required amplifier channels:** 1
- **Frequency response:** 25Hz – 130 Hz \pm 3dB / -10dB at 22Hz
- **Impedance:** 8 Ω
- **Sensitivity:** 84 dB/2.83V/1m
- **Continuous Power Rating:** 250w
- **Power handling, peak:** 500w
- **Maximum SPL:** 108dB / 1m
- **Dimensions:** See appropriate dimensions drawings on next page
- **Shipping weight, each:** 48 lbs. (22 kg)

For more information, see your Wisdom Audio dealer or contact:

Wisdom Audio

1572 College Parkway, Suite 164

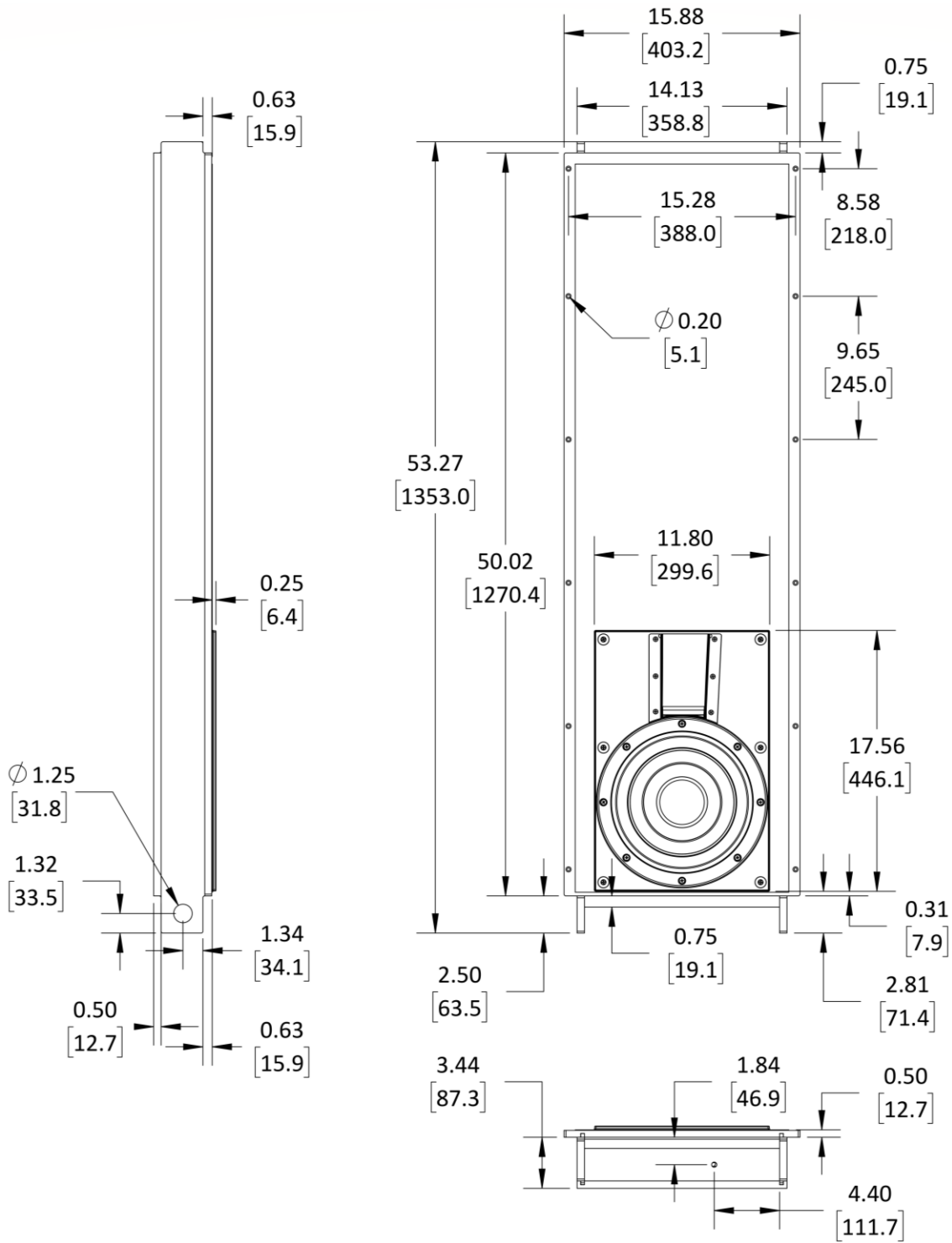
Carson City, NV 89706

wisdomaudio.com

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(775) 887-8850

S57i Dimensions



X.XX Inches
[X.X] mm



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