

FORTY

USER'S MANUAL



peecker sound®

SOUND REINFORCEMENT

CONTROLLED RADIATION

ACOUSTIC RESEARCH

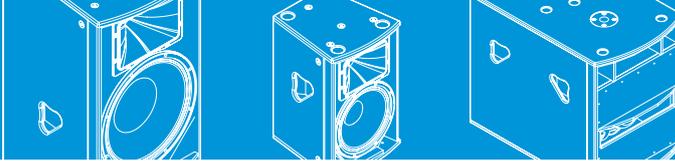
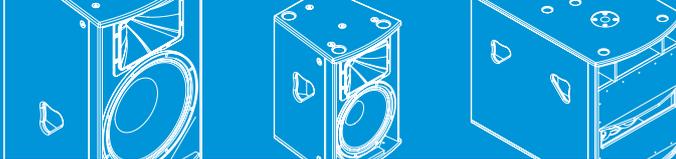


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1. SAFETY INSTRUCTIONS

When using **Peecker Sound** electro-acoustic loudspeaker system it is very important to act in full compliance with safety regulations. Professional electro-acoustic systems are capable of producing high sound pressure levels and must therefore be used with caution. Hearing loss is cumulative and can result from lengthy exposure to sound pressure levels above 90 dB. Never stand close to electro-acoustic speakers operating at high volume.

When positioning systems on the floor, always check that the base is flat and stable to ensure correct speaker installation. Do not stack speakers up too high outdoors where the wind may cause the stack to become unstable. Suspended systems must be installed by qualified, experienced personnel.

2. GENERAL INFORMATION

The **Forty Series** consists of **7 acoustic speakers** (of which two are subwoofers), including the active models with on-board DSP (24-bit, 96 kHz). The table below summarizes the main features of every model.

MODEL	LF transducer	HF transducer	Passive version input config.	Active (A) version amplifier
4008	1 x 8"	1 x 1"	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
4010MH	1 x 10" Neodymium	1 x 1" Mylar	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
4012MH 4012MH/A	1 x 12" Neodymium	1 x 1" Mylar	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
4015MH 4015MH/A	1 x 15" Neodymium	1 x 1" Mylar	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
4030MH 4030MH/A	2 x 15" Neodymium	1 x 1" Titanium	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
40SW15 40SW15/A	1 x 15"	/	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D
40SW18 40SW18/A	1 x 18"	/	Full Range 8 Ω	Full Range 500 W (@8 Ω) Class D

Table 1: Forty Series models

All the speakers are extremely compact and have birch plywood cabinets. They are easy to transport due to their ergonomic dimensions and are easy to install thanks to a carefully designed rigging system and dual-tilt pole mount.

The construction design of the cabinet is optimized to minimize stationary waves inside the speaker and to facilitate use of side-by-side systems. Every part of the cabinet has been additionally reinforced to minimize internal structural vibrations. As a finishing treatment, all loudspeaker cabinets are also given a special coating for high working performance.

The components used in the Forty Series are the very best and most technologically advanced that the electro-acoustic transducers market can offer today. They include:

- Highly reliable lightweight Neodymium woofers;
- Tweeters made with Aluminium coils and Mylar membrane providing perfect balance of mid-high range frequencies;
- Effective tweeter protections preventing drastic clipping, for perfect control of transient response;

- A.W.S.H.[™] (*Acoustic Wave Shaped Horn*): Aluminium horn, designed to completely rephase the acoustic wave guide in relation to the woofer;
- Minimum phase rotation crossovers, equipped with copper coils and Kapton formers containing Ferrite powder, suitable for continuous use at maximum power.

The directivity of Forty Series loudspeaker systems is perfectly controlled and the frequency response is very wide and remains constant even out of alignment, ensuring uniform coverage of the audience area.

The utmost attention to detail is shown throughout, down to the choice of 15/10 impact-resistant grilles with 70% transparency, providing absolute purity of sound.

The subwoofers are *band-pass* and the loudspeaker transducer radiation in them is not direct but through two resonating cavities, one at the front and one at the rear. This achieves highly efficient and exclusive reproduction of ultra-low frequencies, without interfering with the other components of the audio system. Thanks to its particular configuration, the loudspeaker membrane is subject to far less movement compared to traditional reflex systems, consequently distortion is considerably reduced even at maximum power.

To complete the Forty range, amplified versions of some of the models are available. Active speakers are perfectly integrated systems: the extremely lightweight digital amplifiers have been designed to drive electro-acoustic transducers efficiently and effectively, guaranteeing highly reliable and stress-free products.

3. ACOUSTIC WAVE SHAPED HORN[™]

The Aluminium AWSH[™] (*Acoustic Wave Shaped Horn*) has been designed and manufactured using CAE tools (*Computer Aided Engineering*) to secure the alignment between the acoustic centre and woofer while perfectly matching the planes of the woofer cones and of the horn itself.

The manufacturing process is by *die casting*, which involves pouring the molten metal alloy into a permanent metallic mold, or die, specifically designed for this original product upon specifications provided by Peecker Sound engineers. Forcing the molten metal under pressure allows very rapid filling of the mold cavity and produces metal compensation to prevent solidification shrinkage. This results in perfect and complete filling of the mold, creating an end product with a fine, crystalline, flawless structure.

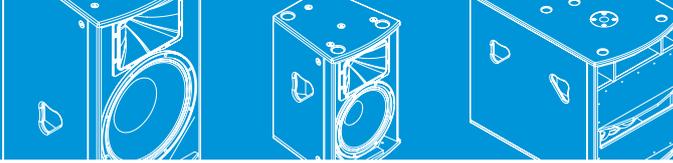
4. NUMBER OF SUBWOOFERS

Subwoofer models (40SW15, 40SW18 and 40SW15/A, 40SW18/A active versions) in bandpass configuration have been physically and acoustically designed to achieve maximum performance - hence the peak power developed - at around 70 Hz. They are therefore compact and "fast" subwoofers, designed to achieve a high output/dimension ratio.

Every model is easy to stack with other units of the same model to create vertical subwoofer clusters, or with the associated satellite unit.

The number of subwoofers to be used mainly depends on the following three parameters:

- 1) *Number of 4008, 4010MH, 4012MH, 4015MH and 4030MH units*
The recommended standard number of 40SW15 or 40SW18 subwoofers is by a ratio of 1:1. Choose subwoofers 40SW15 in case of presence of 4008, 4010MH or 4012MH models and subwoofer 40SW18 in case of 4015MH or 4030MH models.
- 2) *Type of sound program to be reproduced*
The recommended standard subwoofer ratios are suitable for reproducing classical music or for conventions. For these applications, the subwoofers are an extension of the basic systems. In this case, the audio system works in bandpass with three-way extension in bi-amplification.
For live applications with rock or disco music reproduction, a configuration with a satellite unit/subwoofer ratio of 1:2 can be applied.
- 3) *Type of location or installation*
A 1:2 ratio can be applied outdoors, while a 1:1 ratio is enough to be applied indoors thanks to the contribution of the venue.



5. THE FORTY SERIES AND ASSOCIATED TRANSDUCERS

The **4008** model has an 8" (200W - AES) woofer and a 1" driver piloting a polycarbonate horn with an average dispersion angle of 90° horizontal by 60° vertical. The speaker can produce a maximum SPL peak of 124 dB.



Figure 1. The 4008 loudspeaker system

The **4010MH** model has a 10" (250 W - AES) woofer with Neodymium magnet and a 1" driver with a Mylar membrane piloting the Aluminium AWSH™ (Acoustic Wave Shaped Horn), that has average dispersion angle of 90° horizontal by 40° vertical. The speaker can produce a maximum SPL peak of 129 dB.

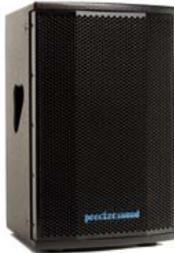


Figure 2. The 4010MH loudspeaker system with Modelled Horn

The **4012MH** model (and the 4012MH/A self-powered version as well) has a 12" (400 W - AES) woofer with Neodymium magnet and a 1" driver with a Mylar membrane piloting the Aluminium AWSH™ (Acoustic Wave Shaped Horn), that has average dispersion angle of 90° horizontal by 50° vertical. Thanks to the particular angular shape of the back surface of the cabinet, it can be used as a floor-standing monitor. The speaker can produce a maximum SPL peak of 132dB.



Figure 3. The 4012MH loudspeaker system with Modelled Horn and related amplifier

The **4015MH** model (like the 4015MH/A self-powered version) has a 15" (500 W - AES) woofer with Neodymium magnet and a 1" driver with a Mylar membrane piloting the Aluminium AWSH™ (Acoustic Wave Shaped Horn), that has average dispersion angle of 90° horizontal by 50° vertical. Thanks to its dual tilt cabinet it can be used as a floor-standing monitor. The speaker can produce a maximum SPL peak of 133 dB.



Figure 4. The 4015MH loudspeaker system with Modelled Horn and related amplifier

The **4030MH** model (like the 4030MH/A self-powered version) has two 15" woofers with Neodymium magnet (total power:1050 W - AES) and a 1" driver with a titanium membrane piloting the Aluminium AWSH™ (Acoustic Wave Shaped Horn), that has average dispersion angle of 90° horizontal by 50° vertical. The speaker can produce a maximum SPL peak of 137 dB.

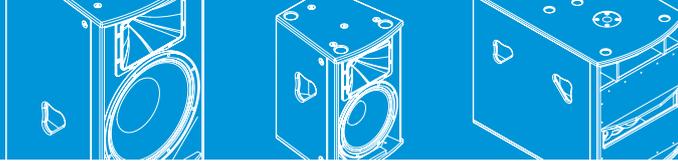


Figure 5. The 4030MH loudspeaker system with Modelled Horn and related amplifier

The **40SW15** and **40SW18** subwoofers (like the 40SW15/A and 40SW18/A active versions) have 15"- 600W and 18"- 700W woofers respectively. These subwoofers can produce a maximum SPL peak of 133dB and 134dB respectively.



Figure 6. The 40SW15 e 40SW18 subwoofers



6. SYSTEM INSTALLATION

6.1 Floor stacked or suspended installation?

There are some arguments in favour of floor-standing installation and some in favour of suspended installation, depending on the situation in hand. Without taking into account possible logistical or visual issues, which have to be assessed individually, the positive aspects of **floor stacking** are mainly associated with stronger overall coupling of low frequencies with the floor, which boosts efficiency at the lower end of the sound spectrum and increases the effectiveness and speed of the response to low transients. This is partly because, in the case of floor-stacking, the speaker cabinets are generally more physically constrained than in suspended systems and are consequently more stable and firmly anchored to the ground, which prevents part of the acoustic energy from being transformed into structural motion and effectively being lost. Another point in favour of floor stacking is the fact that, from a "spatial" and "psycho-acoustic" perspective, the sound physically comes from points close to the stage and thus close to the music scene.

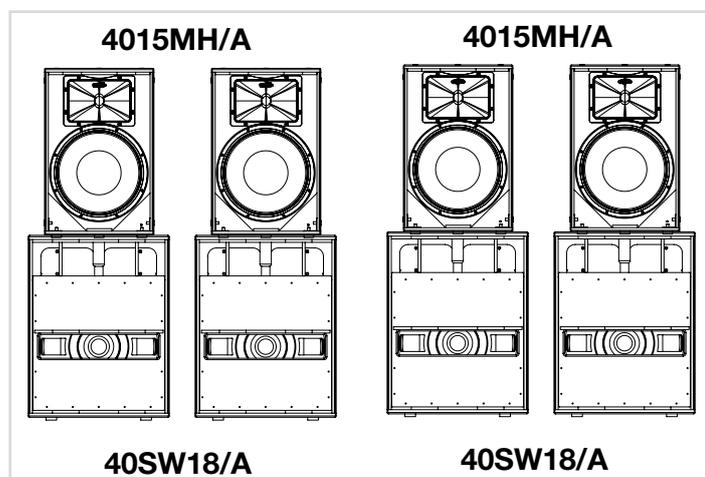


Figure 7. Stack installation of Forty speakers

The choice of suspended speakers (**flying system**), on the other hand, is obligatory in all cases where floor stacking fails to provide the required sound coverage. When the mid-high frequency transducers are not high enough above the listeners' heads, high frequencies will be poor even at short distances due to both the "friction" of sound on the audience (since it is a sound absorption factor) and sound refraction phenomena caused by the vertical temperature gradient created by the audience itself.

Therefore, floor installation is not generally very suitable for covering substantial distances (the problem is reduced when the audience is arranged on a sloping plane and the level of the listeners furthest away is considerably higher than those in the front rows). Moreover, for long distance coverage, providing sufficient SPL (*Sound Pressure Level*) to the rows at the back may result in excessive SPL on the front rows. In this case, flying installation is to be preferred since, reducing the difference in distance from the system of close and long range listeners, it will reduce the SPL gap and spread the sound more evenly.

6.2 Positioning angles

When installing more than one Forty Series speaker at the sides of the stage, particular care must be taken to position them at the correct angles. The high frequencies delivered by the horns of each speaker can in fact cause negative interferences with those of the others at certain points or in particular spatial directions. One way of containing this phenomenon is to tilt the speakers in relation to each other by specific angles related to the dispersion angle of the sound beam delivered by their individual horns - this is correct for both vertical and horizontal tilting.

One specific technique is to tilt the two speakers by an angle close to, or not excessively lower than, *the horn's dispersion half-angle*. In this way, by shifting slightly away from the axis of the system made up of the two coupled speakers, the contribution of one of the two will become negligible compared to that of the other, thereby avoiding any harmful interferences. Conversely, a narrower dispersion angle can be achieved by bringing the long sides of the speakers closer together, resulting in a narrower coverage and a longer throw, but with a less even spread at close range.

The choice will therefore be guided by the shape and size of the area requiring sound coverage.

7. PASSIVE LOUDSPEAKER SYSTEMS

The Forty Series comes in both passive and amplified versions.

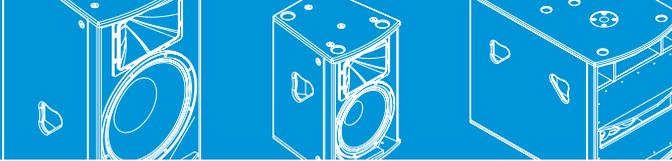
The **passive** loudspeaker systems have particularly selective crossover filters to achieve the most natural timbre quality at mid frequencies, which are important for the intelligibility of speech and vocals and to deliver the clearest possible sound and music. This is particularly useful since it makes it possible to obtain top quality sound from the 4008, 4010MH, 4012MH, 4015MH, and 4030MH speakers without the need for an external processor: all *plug and go!* The use of a processor is clearly essential for the active crossover function in cases of multi-amplification, e.g. with all the complete subwoofer systems. In the latter case, the delay function will allow the correct sound alignment between the subwoofers and the upper modules. The processor is useful in all cases requiring not only top quality sound but also speaker protection whilst taking full advantage of its maximum output, which is a key concern in professional sound installation. It is important, in fact, to control the amplifier input voltage so as not to damage the speaker passive components with signals that are too powerful or otherwise unsuitable for acoustic transducers. The following paragraph explains how and why this is the case.

Upstream, i.e. acting on the amplifier's input audio signal, it is clearly not possible to protect the speakers from harmful phenomena originating from the amplifier itself. If an amplifier malfunction generates constant or extremely low frequency voltage (DC), this will damage the transducers regardless of the input signal. Similarly, high voltage peaks due to switching on and off devices upstream from the amplifiers when the amplifiers are operating can also damage the transducers. Therefore, to power an electro-acoustic system, it is important to *switch on the amplifiers only after the power supply to the mixer and control electronics has been turned on and has stabilized*. To turn off the system, the reverse sequence applies, so *the power amplifier should be switched off first*. We strongly recommend control and maintenance of the sound system and strict adherence to the correct power on/off sequence of the devices making up the audio chain.

7.1 Amplification and limitation

Generally speaking, excessive power can easily damage transducer coils due to the overheating it causes (high RMS values for long periods of time), while in rare cases it can damage the mechanical parts of the cone (membrane or suspensions). In this specific case, frequencies lower than the reflex tuning frequency can cause excessive excursions (that are also pointless since the efficiency value of these frequencies is virtually nil) and consequent damage. It is therefore advisable to always use external processors which, with the due frequency cuts and limitations, will protect the woofer and optimize its efficiency.

The signal sent to the high frequency drivers of the Forty Series, however, is passively protected by a special filament device. It is the user's responsibility not to supply a passive speaker with signals that are damaging to the transducers. To control these signals, Peecker Sound recommends using the **PS266** processor. Using the appropriate selection of amplifiers and limiters allows speakers to achieve maximum performance without the risk of damage. For maximum performance - i.e. exploiting transducers to the full in relation to signal peaks - a good practical rule is to have a *double-powered* ("oversized", as we call it) *amplification channel as compared with the transducer's RMS power tolerance*. To protect the transducer coil, moreover, a limiter also needs to be used to avoid exceeding RMS power levels for prolonged periods of time. This is the function performed by the limiters in the Forty Series amplified models and in the PS266 external processors.



Generally speaking, an amplifier whose power is lower than the transducer's power tolerance ("undersized" amplifier) does not guarantee transducer protection unless a limiter is used. In fact, when input signals are high, even an undersized amplifier can "square" the output signal, resulting in the delivery of power exceeding the nominal rating of the amplifier and the presence of time lapses with constant voltage which are particularly damaging to acoustic transducers. The recommended Peecker Sound amplifiers for amplifying passive models are equipped with an internal limiter (*anti-clip*) which prevents the signal from being squared. If they are undersized, they thus provide a strong guarantee against transducer breakage. To achieve maximum dynamic performance, however, as explained above, we recommend using oversized amplifiers and a PS266 processor whose limiter functions will limit the input.

7.2 Amplifier-speaker connections

The table below provides a summary of the wiring between the *Neutrik® SpeakOn NL4* connector and the transducers inside the cabinet.

	PIN 1-	PIN 1+	PIN 2-	PIN 2+
4008	Full Range Negative	Full Range Positive	---	---
4010MH	Full Range Negative	Full Range Positive	---	---
4012MH	Full Range Negative	Full Range Positive	---	---
4015MH	Full Range Negative	Full Range Positive	---	---
4030MH	Full Range Negative	Full Range Positive	---	---

Table 2: Wiring with Neutrik® SpeakOn NL4 connectors

7.3 Power cables

It is very important to use power cables of the appropriate length. The length of the cable can cause significant impedance and, as a result, lower the quality of the audio signal as well as alter the *damping factor* of the amplifier-speaker coupling.

The table below shows the recommended power cable lengths for different transducer impedance levels.

	Maximum length	
CSA duct	4 Ω	8 Ω
1.0 mm ²	11 m	22 m
1.5 mm ²	17 m	34 m
2.0 mm ²	22 m	44 m
2.5 mm ²	29 m	58 m
4.0 mm ²	44 m	88 m
6.0 mm ²	66 m	132 m

Table 3: Comparison between CSA duct size and maximum cable length with different loads

8. ACTIVE LOUDSPEAKER SYSTEMS

All the *self-powered* versions of the Forty Series contain a 500 W (@8 Ω) class D amplifier with switching technology as well as on-board DSP (*Digital Signal Processor*) with 24-bit of word code and sampling frequency of 96 kHz. The DSP has 2 *presets*, selectable through a switch located on the rear panel. In the DSP of every single model, the equalization and limiters of each of the presets selectable by the user are factory-set according to the frequency.

Everything is designed to produce the best possible sound with the maximum SPL value, in complete confidence that the speakers or amplifiers themselves will not be damaged.

Through the connection panel it is possible to link the signal connected to the speaker input (signal Link), and *three* LED lights indicate system operation (POWER), signal presence (SIGNAL) and limiter operation (LIMIT - a single LED indicates clipping of both the converters and the power module) in turn. Volume control (LEVEL) is through a potentiometer. Connection to the power supply is through a *Neutrik® powerCON* connector and a fuse located above it provides additional protection.



Figure 8. Active speaker rear panel

8.1 On board amplifier technical data

4012MH/A - 4015MH/A - 4030MH/A	
Input connectors	max +10 dBu - XLR
Rear panel indicators	LED - power, signal, limit
Input impedance	12k Ω unbal., 24k Ω bal.
DSP processing	24 bit/96 kHz; 2 selectable preset
Output power rating	500 W (@8 Ω)
AC power connector	Neutrik® powerCON
AC voltage	115 or 230V ~ 45/65 Hz ± 10%

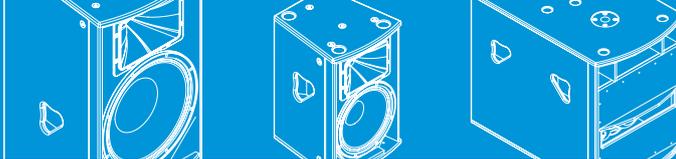
Table 4: Active speakers technical data

8.2 Presets

Amplified speakers can operate in two different modes - *Mode A* and *Mode B*.

As far as full-range upper modules are concerned, the two operating modes are related to whether or not there is a subwoofer. In *Mode A*, the high-pass filter frequency (HPF) cut is around 40 Hz. This mode should be used when there is no subwoofer. *Mode B* should be selected if the full-range speaker is complemented by a subwoofer for the reproduction of low frequencies. In this mode, the high-pass filter frequency is around 90 Hz.

As far as subwoofers are concerned, the two operating modes allow a choice, according to "taste" or to the type of installation, between two different low-pass filter frequency cuts, so that the low frequency band can have an extension of up to 86 Hz or up to 106 Hz.



9. FREQUENCY CUTS (ACTIVE MODELS)

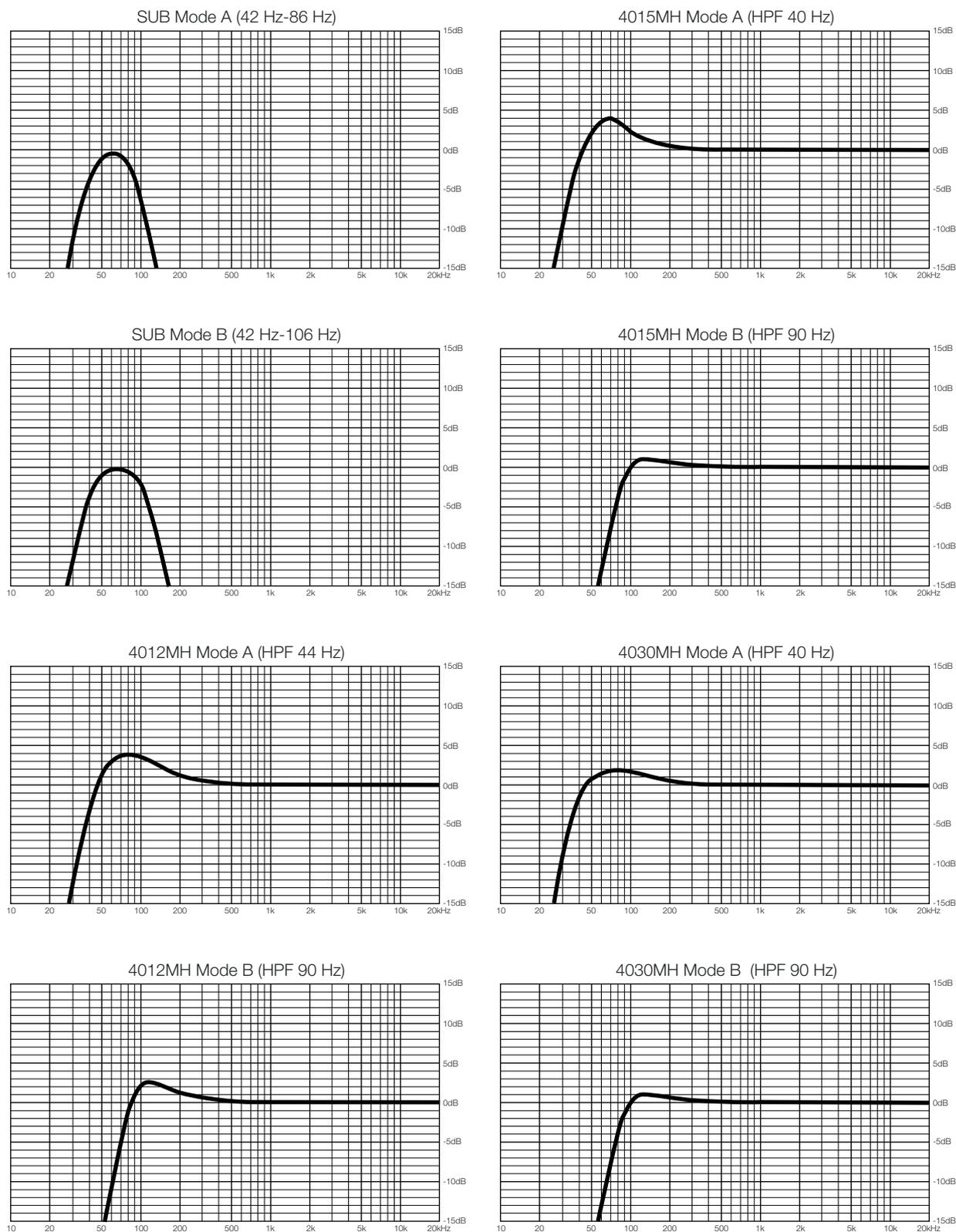
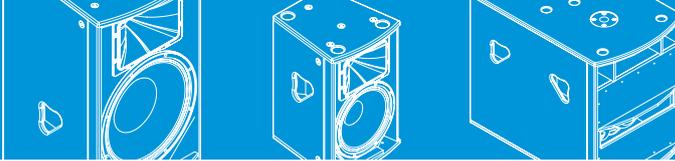


Figure. 9 Frequency cuts of active models for different use typologies



9. WARRANTY

Peecker Sound products are guaranteed against malfunction due to defective materials or workmanship for a specified period of time, starting from the date of original purchase. Should a malfunction occur during the warranty period, the product will be repaired or replaced (at the manufacturer's discretion) free of charge. The shipping costs and related risks, and any loss during shipment to authorized service centres are the responsibility of the customer. The product will be returned to the customer with a carriage forward shipment.

Warranty terms

The warranty covers the appliance under its initial purchase in compliance with the laws in force. The warranty is valid for five years, starting from the date of receipt of the product. Peecker Sound reserves the right, in certain cases, to decide to replace the appliance with another identical or similar product. The warranty is not extended following a product failure. The warranty does not pay for incidental or consequential damages, without limitation, caused to persons or property during any period of inefficiency of the appliance.

Exclusions and limitations

The warranty does not apply to:

- any damage to exterior finishings or surfaces, aesthetic elements, or electric/electronic parts resulting from negligent use of the product;
- malfunction resulting from incorrect or improper use of the product or from transport without due care;
- malfunction resulting from repairs carried out by unauthorized persons or service centres;
- malfunction due to circumstances that cannot be ascribed to manufacturing defects of the appliance;
- plastic or glass parts, bulbs and the like, as well as all that can be regarded as normal wear and tear. As regards circuit components (transistors, diodes, etc.) the general terms set by the original manufacturers apply.

The following are also not covered by the warranty:

- damage caused by accidents, product modifications, negligence or incorrect connection;
- damage that occurred during transport;
- damage resulting from failure to comply with the instructions contained in the user's manual;
- claims based on misrepresentations by the seller and any product whose serial number has been rubbed off, modified or removed.

Receiving warranty service

To receive repair or replacement of the product under warranty, the customer must deliver the product in its original packaging carriage paid to an authorized Peecker Sound service centre together with the relevant proof of purchase, i.e. bill of sale, receipt or invoice.

The warranty service and list of authorized service centres is available at the address below:

Peecker Sound - After-Sales Service

Via Monti Urali, 29
42100 Reggio Emilia – Italy
Tel: +39 0522 557735
Fax: +39 0522 391268
E-mail: info@peeckersound.com

Repair or replacement of the product and its return to the customer are the only services provided to the customer. Peecker Sound shall not be held liable to pay incidental or consequential damages including, without limitation, injury to persons or property or loss of use.

Costs paid by Peecker Sound

Peecker Sound will pay for all labour and material expenses necessary for the repairs covered by the warranty.

Make sure you keep the original packaging; otherwise, the cost of replacing it will be charged to you if necessary.

Produce the original invoice to establish the date of purchase. Do not send the product to the factory without prior authorization.

Should shipment of the product be a problem, please contact the service centre, who will deal with it promptly. Otherwise, the customer is responsible for shipment and handling of the product to be repaired and payment of all shipping costs.

Limitation of implicit warranties

All implicit warranties, including guarantee of merchantability and suitability to specific purposes, are limited to the duration of the present warranty. With the exception of certain types of damage, Peecker Sound liability is limited to repairing or replacing, at its discretion, any defective products, with no obligation of compensation for any kind of incidental or consequential damages. In case of any controversy, the court of jurisdiction will be exclusively the Court of Reggio Emilia (RE) – Italy.

