



O 300 (D)

Active
Mid-Field Monitor

Operating Manual

O 300

O 300 D



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Language: English

Introduction

Thank-you for purchasing a Klein + Hummel loudspeaker. A Mathematically Modeled Dispersion™ waveguide (MMD™), flexible acoustical controls, various input options and an extensive mounting hardware range allow the loudspeaker to be used in diverse acoustical conditions, with any source equipment and in a wide variety of physical locations. The latest acoustical and electrical techniques and components have been used to ensure the most accurate sound reproduction possible. Klein + Hummel products are designed for longevity so we hope you enjoy many happy years of using this product.

Depending on the size, Klein + Hummel's three-way systems are designed for use as near field monitors through to large main control room monitors. They can be used in music, broadcast, and post production studios for tracking, mixing, and mastering. They may be positioned free-standing or flush mounted into a wall, and can be mixed freely in multichannel systems.

Before reading the rest of this operating manual, review the safety and warnings section towards the back of this book. Note that imperial dimensions are approximate.

Package Contents

The shipping carton contains:

- This operating manual
- A production calibration certificate
- Product guarantee
- The loudspeaker
- A mains power cable (Euro or USA)
- A trimmer and switch screwdriver

Signal cables are not included. Options and accessories are listed at the end of this operating manual.

Most Common Applications and Listening Distances

The minimum, recommended, and maximum listening distances are shown below, together with their most common application:

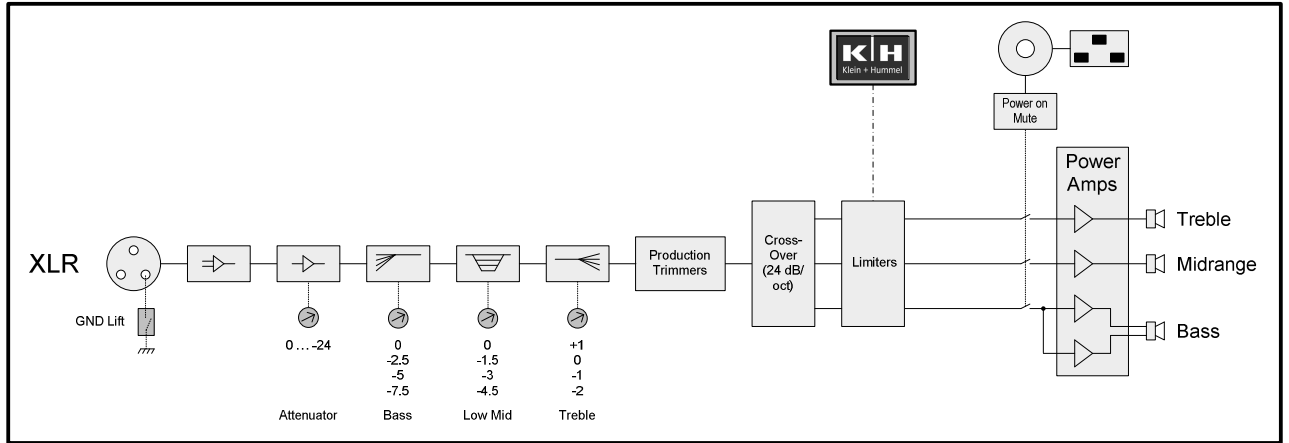
| Product | Most Common Application | Distances | | |
|-----------|-------------------------|---------------|-----------------------|-----------|
| | | Minimum | Recommended | Maximum |
| O 300 (D) | Near-field monitoring | 0.75 m (2.5') | 1.0 – 2.5 m (3' - 8') | 6 m (18') |

In multichannel systems, one should ideally use the same product for all main channels. However, as the rear channels often contain less bass and the signals are mixed at a lower level than the front channels, the rear loudspeakers can be smaller - table below for details. The center loudspeaker should always be of the same type as the left and right loudspeaker. The subwoofer should be sufficient to keep up with the main loudspeakers - see subwoofer operating manual for details.

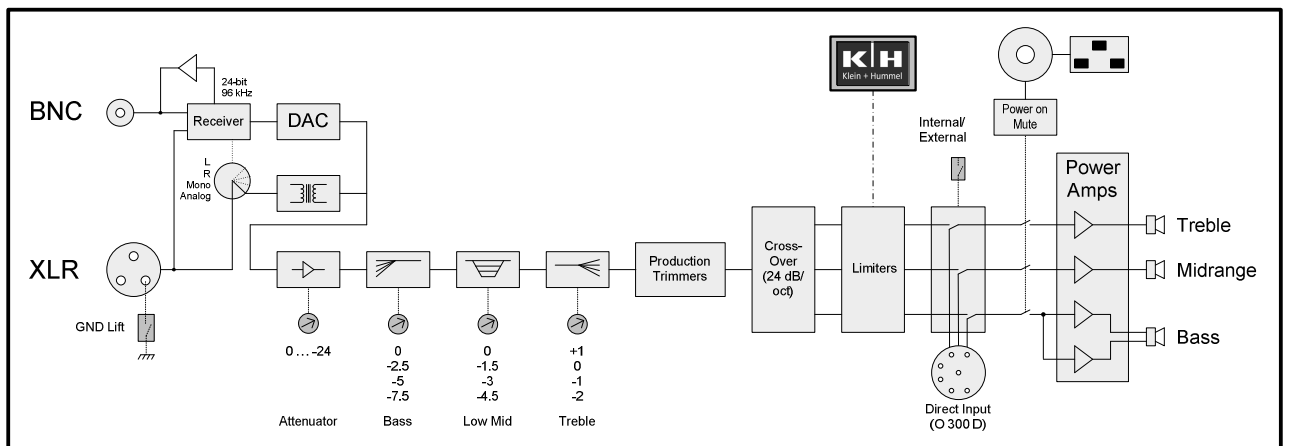
| Front | Ideal Rears | Smaller Rears | Subwoofer(s) |
|-----------|-------------|--------------------|--------------------------------------|
| O 410 | O 410 | O 300 (D) | Refer to subwoofer operating manuals |
| O 300 (D) | O 300 (D) | O 110 (D), M52 (D) | Refer to subwoofer operating manuals |

Please refer to the **Product Selection Guide** for more information about building systems using K+H products.

System Block Diagrams



O 300 Block Diagram



O 300 D Block Diagram

Refer to the detailed product specifications section for information on the crossover frequencies, amplifier power, and driver types. When the Pro C 28 external controller is used on an O 300 D, all internal limiters are bypassed, except the bass channel peak limiter.

Electronics Panel Picture



O 300 electronics panel



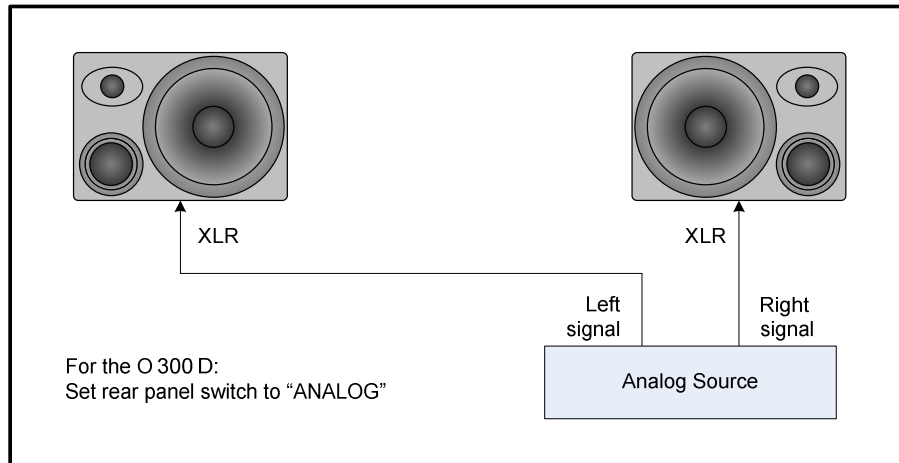
O 300 D electronics panel

Analog Input Stage

The **O 300 input stage** is a 14 k Ω electronically balanced type on a female XLR socket.

The **O 300 D input stage** is a 14 k Ω transformer balanced type on a female XLR socket.

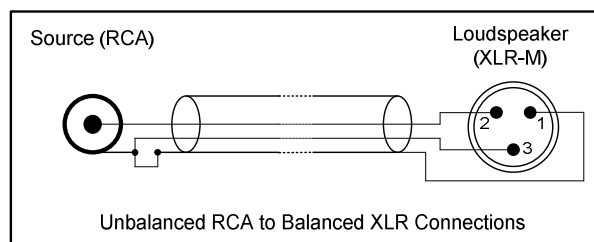
| Pin | Signal |
|-----|--------------|
| 1 | Audio Ground |
| 2 | Positive |
| 3 | Negative |



Analog connections on the O 300 and O 300 D

If there is a humming or buzzing sound coming from the loudspeaker, first check it is not the loudspeaker by disconnection the input signal cables. If the noise goes away it is not the loudspeaker itself and so the noises must be coming from the cabling or the source. There are various ways to increase the loudspeaker's immunity from these external noises:

- Use the **ground lift switch** to disconnect the audio ground from the electronics' chassis ground. For safety reasons, the electronics chassis ground is always connected to the mains power earth pin.
- Use an O 300 D which is fitted with a **transformer balanced input stage**. This is especially effective when combined with the ground lift switch.
- If unbalanced cables are used, they can be specially wired – see picture below. Disconnect the cable screen from the RCA sleeve if there are still humming or buzzing sounds, and/or use the ground lift switch on the loudspeaker.



Cable for connecting unbalanced sources to a balanced XLR input

Digital Input Stage (O 300 D only)

In the O 300D there is a **16...24-bit, 32...96 kHz digital input stage** that can accept AES3-2003 (commonly known as AES/EBU), AES3id-2001, and S/P-DIF (with a suitable connector converter) signals. De-emphasis is supported on 32, 44.1, 48, and 96 kHz sample rates. XLR and BNC connectors ensure good interconnectivity options.

Uncompressed PCM AES3, AES3id, and S/P-DIF digital signals generally contain two audio channels (called "subframe A" and "subframe B") on one cable (single-wire mode). A clock input is not required because loudspeakers are not audio sources and the clock signal is locally regenerated from data contained in the bit stream. The four-way **signal selector switch** on the rear panel allows selection of:

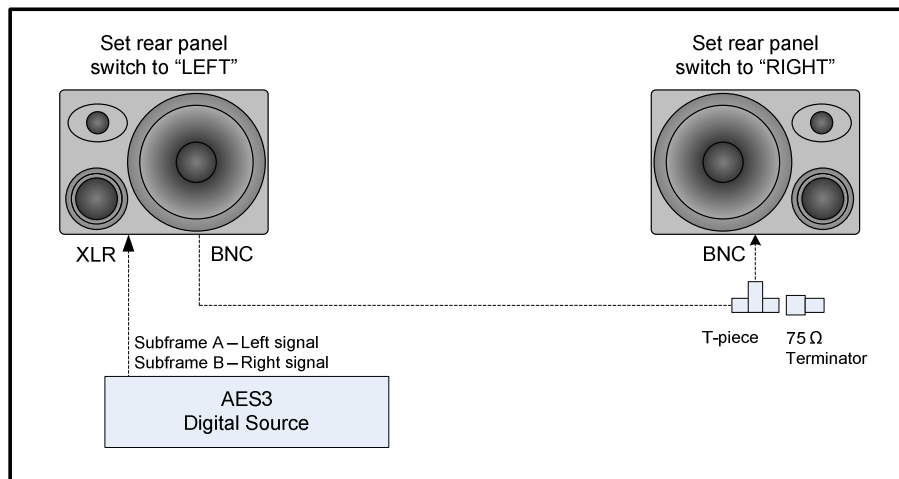
- "ANALOG" (XLR input connector only).
- "R" (digital subframe B)
- "L" (digital subframe A)
- "MONO" (mono sum of subframe A and subframe B with a 4.5 dB attenuation)

There is no digital output from the BNC connector when the XLR input is presented with an analog signal, therefore the O 300D cannot be used as an analogue-to-digital converter.

Always use good quality cables with the correct impedance and appropriate termination to achieve these maximum cable lengths:

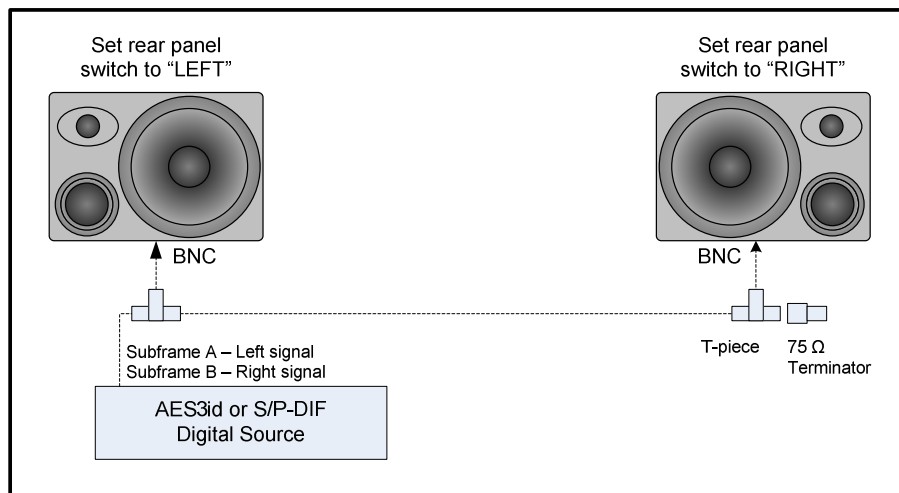
| Format (Connector) | Impedance | Cable Length |
|--------------------|-----------|----------------------|
| S/P-DIF (RCA) | 75 Ω | up to 10 m (30') |
| AES3 (XLR) | 110 Ω | up to 100 m (300') |
| AES3id (BNC) | 75 Ω | up to 1000 m (3000') |

An AES3 signal (applied to the XLR connector) is point-to-point and may not be looped, so the BNC connector is used to connect additional monitors to the AES3 signal. The signal selector switch on the first loudspeaker should be set to the "L", "R", or "MONO" setting. This outputs an AES3id signal from the BNC connector for connecting additional monitors to the original AES3 signal. The BNC connector is not internally terminated so a single 75 Ω termination is required at the end of the BNC transmission line. This can be realized using T-piece and a 75 Ω terminator (not supplied).



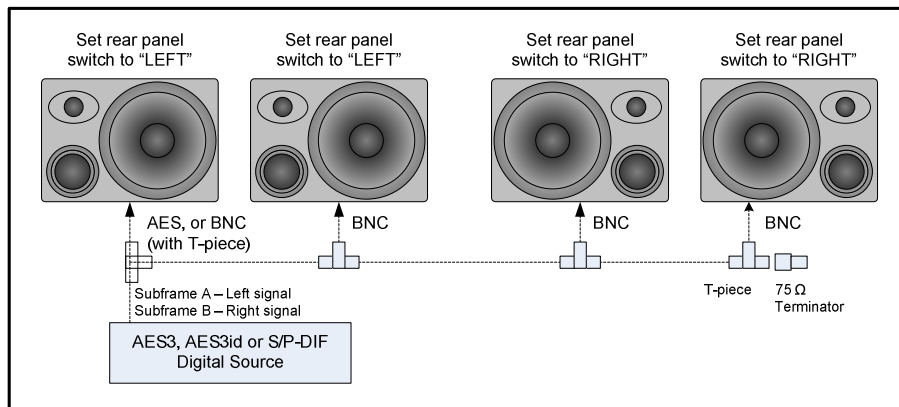
XLR digital input connections on the O 300 D

An AES3id or S/P-DIF signal (applied to the BNC connector) can be looped using a T-piece connector (not supplied) for connecting additional monitors to the input signal. The signal selector switch on the first loudspeaker should be set to "L", "R", or "MONO" setting. An appropriate setting should be made on the rear panel signal selector switch depending on the signal channel order and loudspeaker position. See picture below:



BNC digital input connections on the O 300 D

To connect multiple O 300 D monitors together, use BNC T-piece connectors (not supplied) - see picture below. In the digital input can be applied to either the XLR or BNC input of the first loudspeaker in the chain. BNC connectors should be used for the rest of the loudspeakers in the chain. An appropriate setting should be made on the rear panel signal selector switch depending on the location of the loudspeaker.



Multiple O 300 D connections using BNC

Note that the BNC connector has no output driver. When using the AES3 input, the output level is derived passively from the AES3 signal's input level. This has a wide tolerance, therefore the length of the interconnection cable and number of loudspeakers will depend on the level of the source signal and quality of the interconnecting cables.

It is not possible to have an analog XLR and a digital BNC cable simultaneously connected to the loudspeaker as the BNC connector is parallel connected to the XLR input.

Acoustical Response

When the **O 300 D** was developed it was tuned to have a response close to the O 198 it replaced. This had a flat response when located in its typical usage position, i.e. on a meter bridge. This is not flat when measured in anechoic conditions. The O 300 D has a good sound straight out of the box for the typical use of the product – near field monitoring. For other acoustical conditions, for example free standing in a large room, some adjustment of the acoustical control is recommended. For a flat pass band magnitude response in anechoic conditions, set the acoustical controls to bass 0 dB, mid -2 dB, and treble -1 dB.

When the **O 300** was designed, it was tuned to have a flat response in anechoic conditions when the switches are set to 0 dB. This works well when the monitor is free standing in a large room, but adjustments are required the loudspeaker is placed in other acoustical conditions, such as next to console.

In either case, when a loudspeaker is installed into a listening environment the response changes and thus should be corrected back to a flat response. It is therefore expected that the controls will need adjustment to improve

the in-situ response of the loudspeaker. It is possible to achieve the same response from the O 300 and O 300 D when the switches are set to the same physical position on the backplate.

Acoustical Controls

The acoustical controls are low-order analog filters designed to compensate for some of the acoustical issues commonly found in listening environments. The acoustical controls' settings will depend on the loudspeaker's location and will probably be different for the same loudspeaker type installed in different locations in the same room. In a symmetrical installation, left/right pairs (front or back) will probably have the same acoustical settings. Suggested settings are shown after this description of the controls:

The **bass** control is used to compensate for the effect of loading due to nearby large solid boundaries such as walls. Four settings are available: 0, -3, -6, and -9 dB.

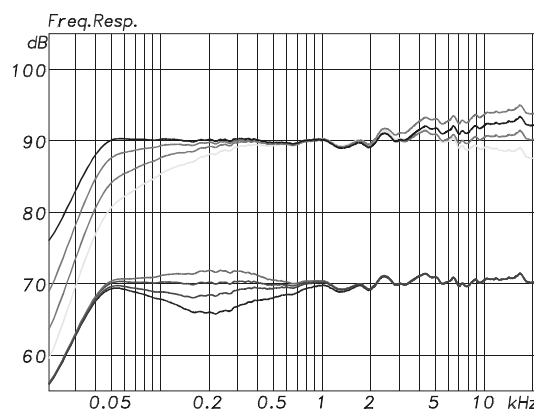
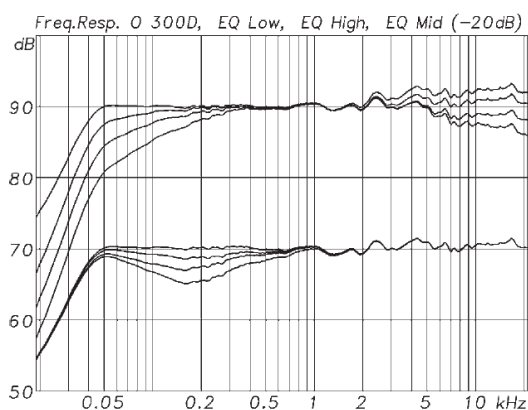
The **mid** control is used to compensate for the acoustical loading experienced when the loudspeaker cabinet is placed near a large reflecting surface, such as a mixing console. Four settings are available: +2, 0, -2, and -4 dB.

The **treble** control affects the treble driver output level and can be used to compensate for insufficient or excessive high frequency damping in the room. The treble control is often set to suit the listener's taste, although in well-controlled environments there should be little reason to adjust it away from 0 dB. Four settings are available: +2, +1, 0, and -1 dB.

It is advised that an acoustical measurement system be used to set these controls in the most appropriate way for the loudspeaker's location. This is especially true of the parametric equalizer's controls. In the absence of appropriate equipment the following settings are recommended as a good starting point for further adjustment:

| Loudspeaker Location | Acoustical Controls | | | | |
|--|---------------------|-------|--------|-------|--------|
| | Bass | Mid | Treble | Mid | Treble |
| In a corner | -9 dB | -2 dB | - | -4 dB | - |
| Next to or flush mounted in a solid wall | -6 dB | - | - | -2 dB | - |
| Next to or flush mounted in a soft wall | -3 dB | - | - | - | - |
| Free standing in an untreated room | -3 dB | -2 dB | -1 dB | -4 dB | -2 dB |
| Free standing in a well-treated room | - | - | - | -2 dB | -1 dB |
| Near a desktop or an a meter bridge ¹ | - | -2 dB | - | - | - |

1. Setting should be used in addition to the one of the top five settings.



Note: the parametric equalizer's response is not shown on the above graphs as it is freely adjustable within the stated parameter ranges.

The input **attenuator** control allows the loudspeaker to be matched to a wide range of equipment outputs whilst maintaining the desired acoustical output. In the O 300 D, the attenuator affects the output level as it is positioned after the DAC. As with any other component in the audio chain, it is best to use the lowest gain for the application so as to minimize amplification of the preceding equipment's source noise. To check this, if the noise drops dramatically when the input cable is unplugged, the noise is coming from the source not the loudspeaker. The default setting is "0 dB", and this gives an output level of 96 dB SPL at 1 m when the input signal is 0 dBu

(0.775 V), which is the same as 100 dB SPL at 1 m when the input signal is +4 dBu (1.23 V). Below are some examples of how to calculate the output level:

| | | | | |
|---|-------------|-------------|-------------|---------------|
| Input signal [dBu] | 0 (0.775 V) | 0 (0.775 V) | +4 (1.23 V) | -20 (77.5 mV) |
| Input attenuator setting [dB] | 0 | -24 | 0 | 0 |
| Loudspeaker output for 0 dBu input [dB SPL] | 96 | 96 | 96 | 96 |
| Sound output of loudspeaker [dB SPL at 1m] | 96 | 72 | 100 | 76 |

In Europe 0 dBu is -18 dBFS (EBU standard R68). In the US +4 dBu is -20 dBFS (SMPTE standard RP155). These dBu values should equate to 85 dB SPL at the listening position. It is typical in the broadcast industry to use a reference level of 79 dB SPL at the listening position. Near field loudspeakers can be as close as 1 m from the listening position, whereas loudspeakers in a Dolby certified movie mixing room should be at least 5 m from the listening position. In the examples below, it is assumed that the listener is inside the room radius and thus the sound field decays according to $20 \log_{10}(r)$, however this may not always be the case.

| | | |
|---|-------------|-------------|
| Input signal [dBu] | 0 (0.775 V) | +4 (1.23 V) |
| Loudspeaker output for 0 dBu input [dB SPL] | 96 | 96 |
| Input attenuator [dB] | -5 | -9 |
| Listening distance [m] (dB change) | 2 m (-6 dB) | 2 m (-6 dB) |
| Loudspeaker output level [dB SPL] | 85 | 85 |

The maximum level that the O 300 electronic balanced input stage can accept is +20 dBu (7.75 V). The maximum level that the O 300 D transformer balanced input stage can accept is +24 dBu (12.3 V). To avoid clipping the input stage, decrease the amount of input attenuation. The maximum acoustical output of the loudspeaker is limited by the protection system. In general, larger loudspeakers can play louder and for longer periods than smaller loudspeakers.

Other Controls

The **power On/Off** switch turns the mains power completely on and off. The applied mains power voltage should be within -15% and +10% of the value shown on the electronics panel. The mains fuse value depends on the mains voltage and should be:

| Mains Voltage | Fuse (250 V) |
|---------------|--------------|
| 220 - 240 V | T 1.6 |
| 120 V | T 3.15 |
| 100 V | T 4 |

Crossover

Using 4th order filters, the crossover divides the input signal into three bands for reproduction by the appropriate sized driver. Time alignment of drivers is accomplished with the physical position of the drivers on the front panel, therefore electronic alignment is necessary. In addition to this an extensive protection system ensures that the loudspeaker is not damaged if a large signal is applied to the input. The front panel K+H logo flashes when the protection system is active. If this happens, reduce the input signal. If this happens regularly, use a larger loudspeaker with a higher SPL output, or add a subwoofer to handle the high-level low-frequency energy. The protection system consists of: thermal and peak limiters for the amplifiers, thermal modeling of the drivers, and an excursion limiter for the drivers.

The protection system is not a compressor, it is designed to protect the loudspeaker from damage, and the flashing K+H logo tells the user it is active. The protection cannot protect against sustained abuse of the loudspeaker, i.e. consistently playing the loudspeaker for long periods of time with the protect light on, so avoid this to ensure a long life from this product.

There are also production trimmers in the crossover section which are hidden from view to avoid "accidental" adjustment. These should only be adjusted by qualified personnel with specialized measurement equipment. If a component critical for sound quality, e.g. bass driver, is changed, the loudspeaker should ideally be recalibrated in a Klein + Hummel Continental Service Center, i.e. one equipped with an anechoic chamber.

Amplifiers

Monolithic integrated circuit class AB amplifiers are used because, for full range loudspeakers, the overall performance is still better than any other solution. Harmonic and intermodulation distortions, and noise are all consistently low in well-designed class AB amplifiers. Some space (5 cm, 2") is required around the electronics panel.

It is recommended that the amplifier heatsink is checked for any build-up of dust and fluff at least every six months. The heatsinks can be cleaned by blowing clean compressed air across the external heatsink. Failure to do this may limit maximum SPL output.

As the electronics back panel seals the enclosure, it cannot be remote mounted. If the cabinet is to be flush mounted, care should be taken to ensure that there is adequate ventilation. Although no damage will result, insufficient cooling will cause the amplifier protection to activate prematurely thereby limiting the system's maximum output level.

On the O 300 D there is the facility to connect a Pro C 28 using the **power amplifier direct input**. This adds the possibility to compensate the response for amplitude and phase anomalies resulting from the monitor's placement in the room or the acoustic conditions of the room. In addition, a 10 band parametric equalizer and up to 1 second delay allow the monitor to be tuned in ways not possible using the built-in analog acoustical controls.

Drivers

The drivers are the best available for their application. Long throw, efficient, low distortion drivers ensure a clean sound quality even at high replay levels. The bass driver is loaded by the internal volume of the cabinet. The mid and treble drivers have their own self-contained back cavities. All drivers are magnetically shielded for use next to CRT screens and magnetic storage media. The system's SPL output and the cabinet volume can be seen in the specifications section below.

Waveguide

The midrange and treble drivers are mounted into a waveguide. The entire front panel is constructed using Low Resonance Integral Molding materials (LRIM™). It was computer simulated and then experimentally verified in an anechoic chamber to give optimum control of the directivity of the midrange and treble drivers. The benefits are increased driver loading, reduced edge diffraction and room reflections, a smoother power response, and a wide useable listening area. The result is a reduced audio distortion and a corresponding sound quality improvement. The waveguide has 90° x 60° dispersion and so it is generally recommended to mount the loudspeaker cabinet horizontally. An exception to this general rule is, for example, in OB vans where the listening position is fixed and strong side wall reflections need to be suppressed.

In all cabinet orientations, the acoustical axis should point towards the engineer's listening position, or the center of the listening area, in both the horizontal and vertical planes – see Cabinet section for a definition of the acoustical axis.

Cabinet

The wooden cabinet is painted using a standard RAL color. An appropriately colored pen can be used to touch up the paintwork if it is scratched during transport or use. The following RAL numbers correspond to K+H standard cabinet colors.

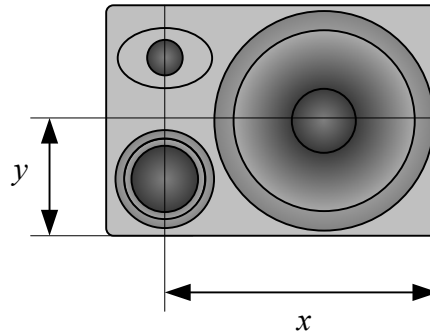
| K+H Color Name | RAL Number |
|----------------|------------|
| Anthracite | 7021 |
| Silver | 9006 |

User specified RAL colors may be specified, however there are some conditions attached to this. Contact the local distributor for details.

The acoustical axis is a line normal to the loudspeaker's front panel along which the microphone was placed when tuning the loudspeaker's crossover during design. Pointing the acoustical axis, in the horizontal and vertical

planes, towards the listening position or centre of the listening area will give the best measured and perceived sound quality. For three-way loudspeakers in the Klein + Hummel range, the acoustical axis is located on the mid-point of the midrange and tweeter drivers.

| Product | x dimension | y dimension |
|---------|---------------|--|
| O 300 | 30.5 cm (12") | 14.5 cm (5 ³ / ₄ " |
| O 300 D | 30.5 cm (12") | 14.5 cm (5 ³ / ₄ " |



O 300 (D) Acoustical Axis

An M8 thread is positioned on either side of the cabinet for attaching an LH 25 "U" bracket. The plastic plugs should be refitted if the LH 25 is later removed.

Angled metal brackets on the rear panel can be used to mount the cabinet on a wall or as handles to lift the loudspeaker. Note: Do not place the O 300 (D) face down on a flat surface as the midrange driver will be damaged.

System Use

Klein + Hummel loudspeakers should only be used indoors and in these ambient conditions:

- +10° C to +40° C (+50° F to +104° F), <90% relative humidity, non-condensing

During transport or storage the ambient conditions can be:

- -25° C to +70° C (-13° F to 158° F), <90% relative humidity, non-condensing

Before connecting the mains power cable, ensure that the correct mains voltage is indicated on the electronics panel (230, 120, or 100 V) and that the mains power switch is off. Next connect the input signal cable (analog, digital, or both as appropriate) and power up the loudspeaker. There will be a five second delay before sound can be heard from the loudspeaker so as to avoid noises (pops) from preceding equipment turned on at the same time. Conversely, turning off the loudspeaker immediately mutes the audio. The K+H logo should light up. If there are no lights, check the mains power supply.

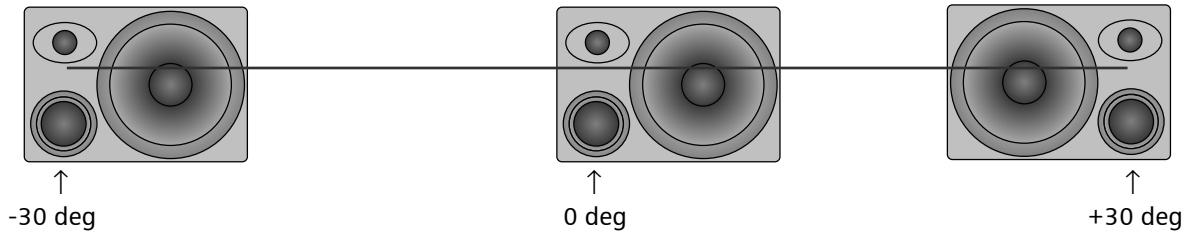
In a studio application, the loudspeakers should be placed according to the ITU-R BS.775-1 recommendations so there is consistency of reproduction when compared to other listening environments. For movie applications, ANSI/SMPTE 202M is the preferred standard for system setup. For home use, as materials are mixed in ITU style rooms, one should get as close as possible to this configuration to maximize replay authenticity.

For two-channel stereo, ±30° should be used. There are currently no internationally agreed standards for 6.1 or 7.1 formats. However common practice is to use one or two loudspeakers in the centre back location of a 6.1 system. In a 7.1 system common practice is to place side loudspeakers at ±90° and to push the surround loudspeakers back to ±150°.

For the best stereo imaging the loudspeakers should be placed symmetrical, in a symmetrical room, where objects have been placed symmetrically. This ensures the same response from each loudspeaker at the listening position and thus good imaging. Sound reflected back to the listening position should also be minimized using surface angling or acoustical treatment. The acoustical axis should point towards the listening position or centre of the listening area in both the horizontal and vertical planes.

| Loudspeaker Name | ITU-R BS.775-1 Angle | ANSI/SMPTE 202M Angle |
|------------------|----------------------|-----------------------|
| Left | -30° | -22.5° |
| Center | 0° | 0° |
| Right | 30° | 22.5° |
| Left Surround | -110°±10° | An array to the left |
| Right Surround | 110°±10° | An array to the right |

The O 300 (D) comes in two forms: named “left” and “right”. In a two-channel system, one of each type is used and the bass drivers, normally, positioned on the inside. In a multichannel system, “left”/“right” pairs can be used for rears and sides. For the center, either a “left” or “right” may be used, with the acoustical axis lined up along the centre line of the loudspeaker array – see picture below. Ideally, all front loudspeakers are positioned at the same height.



Using the O 300 (D) as a center loudspeaker

The loudspeaker should be placed on a circle to ensure equal time of arrival of the audio from all loudspeakers. Failing this, appropriate electronic time delays should be added to compensate for time of flight differences. This can either be a Pro C 28 inserted into the signal chain before an O 300 or a Pro C 28 attached to the power amplifier direct input on an O 300 D.

If the loudspeaker is used free standing, good quality loudspeaker stands and suitable accessories (see Accessories and Options section) are recommended.

The benefits of flush mounting are reduced cabinet edge diffraction (smoother midrange), increased bass driver loading (reduced bass distortion), and elimination of rear wall cancellations (smoother bass response). It is a good idea to employ an experienced acoustic engineer to design an effective flush mounting wall. Recommended acoustical control settings are shown in the Acoustical Controls section. If the loudspeaker must be covered, use a thin open weave cloth. Two layers of very thin material will improve opacity.

Before trimming the levels, calibrate each loudspeaker’s response:

- In studio applications, the response of each loudspeaker at the listening position should be flat.
- In movie applications, the response of each loudspeaker should be one of the X-curve shapes, depending on the size of the room (see ANSI/SMPTE 202M).
- In home applications, the response of each loudspeaker should be set for subjective audio quality. This is not necessarily a flat response, but generally, with time, a gently downward sloping response with increasing frequency is often preferred.

Absolute acoustic level calibration is achieved using a sound level meter set to ‘C’-weighting and a “slow” integration time. Play a broadband pink noise test signal set to -18 dBFS (Europe) or -20 dBFS (USA) on the console meters and measure the sound pressure level at the listening position. Then adjust each channel’s level (can also be adjusted on all loudspeakers for a specific channel) until the desired level is achieved:

| Application | SPL |
|-------------|-----------------------|
| Movie | 85 dB(C) |
| Broadcast | 79 dB(C) |
| Music | Engineer’s preference |

For information on setting up a subwoofer with these main loudspeakers, please refer to the operating manual supplied with the subwoofer.

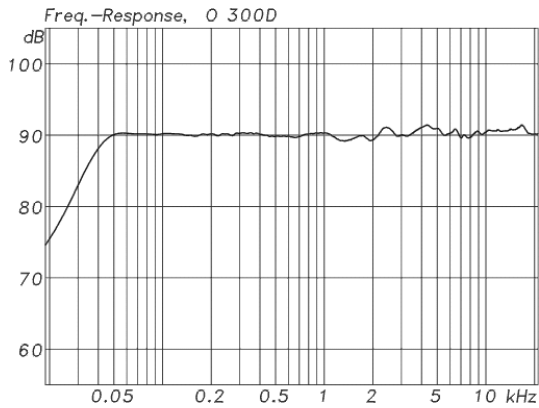
Technical Specifications

| | O 300 | O 300 D |
|--|---|---|
| Acoustics | | |
| -3 dB free field frequency response | 35 Hz ... 24 kHz, ± 3 dB | 35 Hz ... 24 kHz, ± 3 dB |
| Pass band free field frequency response | 40 Hz ... 20 kHz, ± 2 dB | 40 Hz ... 20 kHz, ± 2 dB |
| Self-generated noise | <20 dB(A) at 10 cm | <20 dB(A) at 10 cm |
| Sine wave output with a THD < 0.5 % at 1 m | 95 dB SPL (>100 Hz) | 95 dB SPL (>100 Hz) |
| Max. SPL in half space at 3% THD | 112.8 dB SPL | 112.8 dB SPL |
| Averaged between | 100 Hz and 6 kHz | 100 Hz and 6 kHz |
| Electronics | | |
| Woofer amplifier, cont.(peak) output power* | 150 W (250 W) | 150 W (250 W) |
| Mid amplifier, cont. (peak) output power* | 65 W (75 W) | 65 W (75 W) |
| Tweeter amplifier, cont.(peak) output power* | 65 W (110 W) | 65 W (110 W) |
| Controller design | analog, active | Internal active analog, or external DSP (K+H Pro C 28) |
| Crossover Frequency | 650 Hz/3.3 kHz | 650 Hz/3.3 kHz |
| Crossover Slope (dB/oct.) | 24 | 24 |
| Equalization: Low cut | - | - |
| Bass | 0, -3, -6, -9 dB | 0, -3, -6, -9 dB |
| Mid | +2, 0, -2, -4 dB | +2, 0, -2, -4 dB |
| High | +1, +2, 0, -1 dB | +1, +2, 0, -1 dB |
| Time of Flight adjustment delay | - | 8 ... 1000 ms using a Pro C 28 |
| Protection circuitry | Limiters: low, mid, high | Limiters: low, mid, high |
| Infrasonic filter frequency; slope | 30 Hz; 6 dB/oct. | 30 Hz; 6 dB/oct. |
| Analog Input | | |
| Impedance, electrically balanced | XLR, 14 k Ω | - |
| Impedance, transformer balanced | - | XLR, 14 k Ω |
| Input sensitivity | +6 dBu | +6 dBu |
| Attenuator | 0 ... -24 dB | 0 ... -24 dB |
| CMRR | >60 dB @ 15 kHz | >60 dB @ 15 kHz |
| Digital Input/Output | | |
| Format XLR (Format BNC) | - | AES3 (AES3id, S/P-DIF) |
| Impedance XLR, balanced | - | 110 Ω |
| Impedance BNC, unbalanced | - | 75 Ω (input/output) |
| Input switching | - | Analog / Digital L, R, Mono |
| Digital converter: resolution, design | - | 16 ... 24-bit DAC, $\Delta\Sigma$ |
| sampling rate | - | 32 ... 96 kHz |
| Digital sensitivity | - | -12.5 dBFS |
| D-A dynamic range | - | 120 dB |
| Displays and Mains Power | | |
| Displays and indicators: power on | K + H logo "Red" | K + H logo "Red" |
| limit/clip | K + H logo "Flashing" | K + H logo "Flashing" |
| Mains power | 230, 120, or 100 V AC | 230, 120, or 100 V AC |
| Power consumption - Idle | 18 VA | 19 VA |
| Power consumption - Full output AC | 240 VA | 241 VA |
| Mechanics | | |
| Height x width x depth, mm | 253 x 383 x 290 mm | 253 x 383 x 290 mm |
| inches | 10" x 15 ¹ / ₈ " x 11 ³ / ₈ " | 10" x 15 ¹ / ₈ " x 11 ³ / ₈ " |
| Internal net volume | 18.3 liters | 18.3 liters |
| External volume | 28 liters | 28 liters |
| Weight | 13.4 kg (29.5 lbs) | 13.4 kg (29.5lbs) |
| Drivers | Magnetically shielded | Magnetically shielded |
| Woofer | 210 mm (8") | 210 mm (8") |
| Midrange | 76 mm (3") | 76 mm (3") |
| Tweeter | 25 mm (1") | 25 mm (1") |
| Mounting points | 2 x M8 on sides | 2 x M8 on sides |
| Mounting hardware included | Rear panel bracket | Rear panel bracket |
| Cabinet surface finish | Painted | Painted |
| Color: standard | Anthracite (RAL 7021) or silver (RAL 9006) | Anthracite (RAL 7021) or silver (RAL 9006) |
| Color: custom | User specified RAL | User specified RAL |
| Baffle cover | Optional metal grille | Optional metal grille |

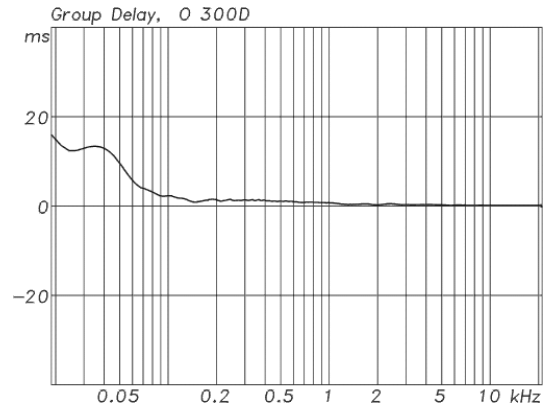
*THD+N < 0.1 % with limiter deactivated

Acoustical Measurements

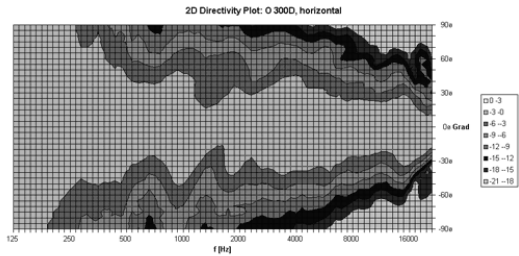
Below are acoustical measurements conducted in anechoic conditions at 1 m. Color versions of these graphs can be found on the appropriate product page of the klein-hummel.com web site.



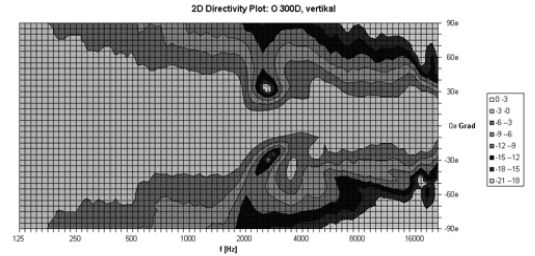
O 300 (D) free-field response



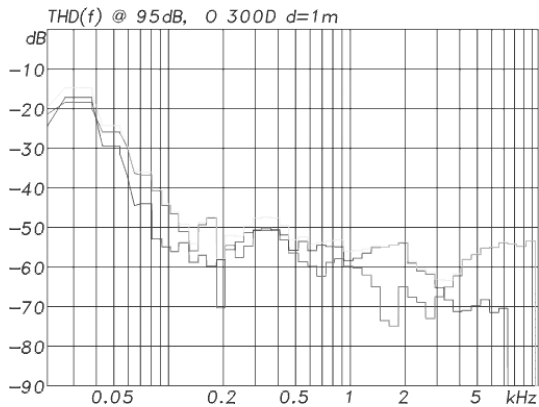
O 300 (D) group delay



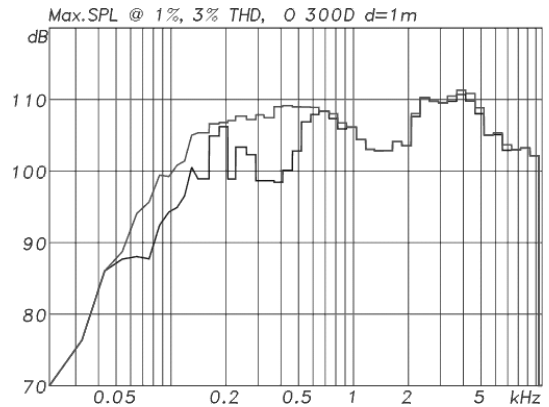
O 300 (D) horizontal directivity plot



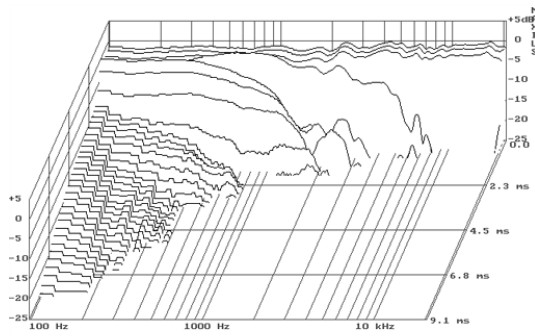
O 300 (D) vertical directivity plot



O 300 (D) distortion at 95 dB SPL



O 300 (D) Maximum SPL at 1 m



O 300 (D) cumulative spectral decay

Accessories and Options

In this section is a description of the options and accessories that are available for the products covered in the operating manual. Note that options and accessories are fitted at the user's own risk and that safety and warning instructions should be observed.

Mounting hardware

A collection of hardware for mounting the loudspeaker:

- LH 25 (W) **"U" bracket** – used to fit the loudspeaker onto a ceiling, wall, or other adapters. Also gives vertical adjustment of the cabinet. Available in white and black.
- LH 28 (W) **Tripod stand adapter** – used to fit the loudspeaker onto a standard 35 mm (1.4") tube tripod stand (external fit with screw thread). Available in white and black.
- LH 29 **TV spigot adapter** – used to fit the loudspeaker onto a standard TV spigot used in broadcast studios (internal fit).
- LH 37 **Tripod flange adapter** – used to fit the loudspeaker into a standard 35 mm (1.4") flange fitting.



LH 25 (W) – "U" bracket



LH 28 (W) – Tripod stand adapter



LH 29 – TV spigot adapter



LH 37 – Tripod flange adapter

Suitable combinations of the above hardware are:

| Location of Loudspeaker | Hardware Combinations |
|---|---|
| On a Floor Stand (tripod, TV spigot, or with a 5/8" thread) | LH 25 LH 25 + LH 28 LH 25 + LH 29 |
| On a Subwoofer (fitted with a flange) | LH 25 + LH 37 |
| On a meter bridge | No hardware required |
| On a Wall | LH 25 Included rear panel brackets |
| Off a Ceiling | LH 25 |
| Off a Lighting or Truss Bar | LH 25 + LH 29 |

Mechanical drawings of these accessories can be found on line at www.klein-hummel.com.

Controller multicore cable (CMK 5)

A cable used to connect a Pro C 28 to the O 300 D (pictured below).

Metal grille (GO 300)

A metal grille can be attached to the front of the loudspeaker to protect the drivers. It simply clips into the grooves on the long sides of the cabinet and adds 22 mm (7/8") to the depth and 3 mm (1/8") to the height of the cabinet. It is damped to avoid rattles and has been designed for acoustic transparency (black version pictured below). The grille is available in black and silver.

Flight case (FO 300)

As the original packing is primarily designed to get the loudspeaker from the factory to the end user, it is highly recommended that a flight case is used if the loudspeaker is regularly moved between locations. One O 300 (D) can be packed in the flight case.



CMK 5 – Multicore cable



GO 300 – Metal Grille

Safety and Warnings

In addition to specific warnings throughout this document, please observe these additional general instructions. The term "loudspeaker" includes the case when the electronics of an active loudspeaker is installed into a Remote Electronics Kit, or when it is still located in the back of the cabinet.



This symbol means that a high voltage is to be found nearby. Take appropriate precautions to avoid electric shocks.



This symbol means that hot parts of the product may be found nearby. Take appropriate precautions to avoid burns.

General

- Keep these instructions in a safe place for future reference.
- Failure to follow the safety and warning instructions contained in this document voids the warranty.
- This product should be used for the intention for which it was designed and as described in this document.

Environment

- Ensure that the room in which you use this product is wired in accordance with the local electrical code and checked by a qualified inspector.
- A correctly earthed mains power connection should always be used.
- If access to the interior electronics is required, disconnect it from the mains power and allow electrical energy storage devices, such as capacitors and transformers, to discharge.
- Other electronic products may generate sufficient heat to require ventilation.
- Do not block or cover heatsinks, fans, or vents.
- Unless otherwise stated, this product is designed to be used indoors only.
- Do not expose this product to water, any other liquids, moisture, or naked flames.
- Do not install this product into hot, humid, or excessively dusty locations, or into direct sunlight.
- Avoid installing this product into locations where it will experience externally generated vibrations or heat (e.g. radiators).
- If the product is moved from a cold environment into a warm one (such as from a vehicle into a building), it is possible that condensation will form. Please allow the product sufficient time for acclimatization to room temperature before using.
- Wherever an amplifier is located, a free flow of air should be maintained by leaving a gap of at least 5 cm (2") around it. A flush mounted cabinet with the electronics panel still installed should be well-ventilated to avoid heat build-up and possible risk of fire.

Use

- The equipment should be mounted by a suitably qualified professional in accordance with local, national, and international regulations and standards.
- Falling equipment can damage itself, people, and other objects, so do not place this unit on any unstable platform, cart, trolley, stand, table, or mounting hardware.
- Do not use accessories and options with this product that are not approved by Klein + Hummel.
- Mounting hardware must be attached to the appropriate hardware and attachment points rated and intended for such use.
- Ensure that the operating voltage of this product matches that of the local mains voltage.
- Use the power cable that came with this product as this has been manufactured to international safety standards. If it has been damaged obtain a similarly certified and specified mains power cable.
- This product should be unplugged from the mains power and the signal sources if it is not to be used for an extended period of time, or during lightning storms.
- The power switch on this product should be set to off before applying mains power via the mains power cable.
- Some parts of this product, particularly power amplifier components, can become hot to the touch. Do not touch these parts until they have cooled down.
- Never touch the loudspeaker's drivers.
- Loudspeakers are often capable of producing a sound pressure level in excess of 85 dB. This may cause permanent hearing damage so user caution is recommended. Noise exposure is a function of SPL and time, so observe local regulations when listening at high levels for a long time. Hearing protection may be required.

Servicing

- Repairs, maintenance, or other servicing of this product when its interior compartment is exposed should only be performed by Klein + Hummel authorized service engineers familiar with the equipment and risks involved in handling electronics.
- Servicing may be required in the event of exposure to unfavorable environmental conditions, such as liquids, excessive heat, or a lightning strike.
- Amplifier outputs may carry high voltages so take appropriate precautions, for example, connect the cables before powering up.
- When replacing a fuse, ensure that a brand new fuse is used. It must be exactly the same type, value, and voltage as the original, as stated in the product's technical specifications or on the circuit board.

Maintenance and Servicing

- There are no user serviceable parts inside the standard version of this product. Repairs should only be undertaken by Klein + Hummel certified service engineer.
- Options and accessories are fitted at the user's own risk.
- Products may be cleaned using a non-abrasive cloth lightly dampened with water. Disconnect the mains power cable when cleaning to avoid risk of electric shock. Do not use alcohol-based cleaners.
- The electronics should only be opened by non-"Klein + Hummel certified service engineer" for the installation of user installable options as described in the product's operating manual. The mains power cable should be disconnected whenever the electronics panel is opened.
- If the main fuse blows, the product should be checked by a Klein + Hummel certified service engineer.

Guarantee

This product comes with a guarantee, a copy of which is enclosed with this product.

Recycling

Attention to product quality in the design phase ensures, firstly, that products have a long life and that, secondly, all parts of a product may be reused or recycled at the end of that life. An extensive product servicing network ensures that products can be repaired in the event of the premature failure of a part, or as a way to prolong the life of a product that would otherwise be considered a candidate for landfill. Eventually there comes a time when a product is considered beyond repair (for economic reasons or lack of parts), so the parts must be disposed of in a suitable manner. The disposal should conform to local environmental regulations and be conducted in an authorized recycling facility.

Loudspeakers and electronic products consist of some or all of these components:

| Item | Material | Recycling Instructions |
|-----------------------------------|--|---|
| Loudspeaker Cabinets | Wood (MDF), steel, aluminum, polyurethane or a combination | Separate materials then recycle |
| Drivers | Aluminum, copper, paper and plastics | Separate materials then recycle |
| Damping Materials | Wool or polyester wool | Compost |
| Electronics Panel | Aluminum | Remove electronics and recycle |
| Electronics | Various | Recycle in an approved recycling facility |
| Remote Electronics Kits | Steel and some electronics | Separate materials then recycle |
| Cables and Connectors | Metals and/or plastic | Reuse or recycle |
| Packing Material | Cardboard, wood and/or plastics | Separate materials then recycle |
| User Manuals and Sales Literature | Paper and cardboard | Recycle |

EC Declaration of Conformity

This equipment is in compliance with the essential requirements and other relevant provisions of Directives 89/336/EC and 73/23/EC. The declaration is available on the internet site at www.klein-hummel.com. Before putting the device into operation, please observe any respective country-specific regulations.

For loudspeakers fitted with digital inputs: Compliance to FCC Rules

This device complies with part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This class B digital apparatus complies with the Canadian ICES-003

Changes or modifications to this equipment not expressly approved by Klein + Hummel may void the FCC authorization to operate this equipment.

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- "Low Resonance Integral Molding" and "LRIM"
- "Mathematically Modeled Dispersion" and "MMD"

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Klein + Hummel reserve the right to change product specifications without notice. Exceptions and omissions excluded.

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