Active Control Room
Monitor Loudspeaker

O 100

Installation
and Operation
Active Studio Monitor Loudspeaker O 100
KLEIN + HUMMEL O 100
Installation - Operation

Fig. 1: Front view of the O 100

Fig. 2: Rear panel input section of the O 100

Fig. 3: Mains socket, fuse, power switch and threaded bushings for mounting
1. Connections and Operation

It is absolutely essential that you read and observe the Safety Instructions in Section 4!

1.1 Operating Conditions

The K+H model O 100 active studio monitor is intended for use indoors within a temperature range of +10° C to +40° C (+50° to +104° F). During transport or storage, temperatures from -25° C to +70° C (-13° to 158° F) are permissible.

1.2 Installation

The loudspeaker chassis used in the O 100 is magnetically shielded, allowing these loudspeakers to be mounted side by side with a video or computer monitor without adversely affecting the screen. One of the finer features of the O 100 active studio monitor is its unusually uniform off-axis directivity, which results in a very wide “sweet spot.” Preferred placement of the cabinet is in the upright position, for the dispersion in the vertical plane was intentionally kept narrower than in the horizontal.

In certain cases, for example if there are hard, reflective surfaces both to the left and right of the loudspeakers, it would make sense to operate the loudspeakers on their side. The reduced horizontal directivity in this position would then be helpful in minimizing any phase cancellation caused by comb-filter effects.

When considering placement, please take into consideration the possibilities offered by both of the room compensation switches described in section 1.6.2. On the back of the unit you will find two M8-style threaded bushings for use with various mounting options. Figure 3 shows these holes labeled “Speaker mount option.” These bushings will accommodate either the LH 10 ball-clamp mounting adapter or the LH 31 mounting bracket for use with additional mounting accessories.

The plastic screws that occupy these threaded holes from the factory may not be used for the actual mounting of a loudspeaker under any circumstances.

Please ensure that these threaded holes are always plugged so that the volume of air sealed within the cabinet may only pass through the precisely calculated bass-reflex openings.

1.3 Connection to Mains Current

The amplifier electronics within the O 100 are set up for an AC line voltage of 230 volts, 50 or 60 cycles per second. For export, special versions with other AC voltages are also available. If it becomes necessary to use a different mains-cable plug, pay attention to proper grounding when wiring a replacement plug. If necessary, ground the amp chassis separately using a lead with a minimum cross section of 1.5 mm².

1.4 POWER Switch

When you switch power on, there is a three-second delay before the amplified signal is sent to the loudspeaker. This delay avoids the loud popping sounds that otherwise are generated by prior devices in the signal chain as they are switched on. You will find this arrangement particularly useful if your studio uses a master switch to power up all the equipment at once. When power on the O 100 is turned off, on the other hand, or if there is a general power failure in the area, the signal flow to the speaker is immediately stopped, preventing any loud pops.

1.5 Level / Room Compensation / Ground Lift

1.5.1 Input Level Adjustment

The sensitivity of the electronically balanced input is rated at +6 dBu (1.55 volts). The three-pole female XLR jack is wired in the standard fashion (1 = Ground, 2 = positive phase, 3 = negative). Directly beside this XLR jack you will find the ATTENUATOR pot which allows for smooth, gradual damping of the input signal by anywhere from 0 to 24 dB. As an option, you can order the O 100 with transformer-balanced inputs.

1.5.2 Equalization

1.5.2.1 Room Compensation

The four-position rotary switch labeled BASS (see Figure 2, Equalization section, lower left) serves to alter the frequency response of the loudspeaker to compensate for the overemphasis of low frequencies that may result from the specific location at which the speaker is placed within the room:

Position 0 = free standing
Position 1 = placement a short distance before a wall
Position 2 = placement flat against a wall
Position 3 = placement in a corner of the room
1.5.2.2 Placement on the Meter Bridge

If the loudspeakers are placed on the meter bridge, a certain overemphasis in the midrange will typically result. Next to the four-position switch for room compensation which we just described, there is another four-way rotary switch labeled MID. The four switch settings are intended for the following kinds of placement:

- **Position 0** = free standing
- **Position A** = placement on a table top
- **Position B** = free standing on the meter bridge
- **Position C** = on the meter bridge between other equipment directly on either side, or built into a wall.

**Note:** Since it is not possible to list every possible combination of room acoustics and speaker placement, we strongly recommend you perform a simple acoustic listening test to verify that the settings you select for these switches are best for your setup.

The frequency response curves of both equalizers are shown in Figures 12 and 13 in Section 2, Diagrams.

1.5.3 Groundlift

Since the input is balanced, a ground loop hum will rarely occur. In special cases or if the source signal is unbalanced, it can become necessary to separate the unit’s chassis ground from the mains socket ground. To do so, first unplug the mains cable from the mains socket, of course, then unscrew and remove the back panel, which has the amplifier electronics mounted directly to it. Figure 4 shows the amplifier circuit board at the upper corner near the power transformer. The arrow is pointing to a jumper which by default bridges the two lower pins (DISABLE). If you move the jumper to the upper two pins (ENABLE), then the chassis ground is lifted from the mains socket ground.

![Figure 4: Ground Lift Connection](image)

1.6 Power Fuse

Should you ever need to replace the power fuse, please ensure (first of all that the unit is unplugged from the mains and) that only the following type and value of fuse be used:

- 230 volts or higher,
- 1 A Slo-Blo (5 x 20 mm)

1.7 Display Functions

The illuminated K+H logo serves as a status display for the loudspeaker when the power switch is on and the fuse is intact:

- Continuous red: Normal operation, internal supply of power is in order
- Light off: Overload protection circuitry has been activated

The fact that the light goes out indicates the overload protection circuitry has triggered. Among the things that can trigger it are the “scrubbing” of analog tape in cue-mode, extremely bass-heavy signals, or the sine-wave signals that are used in performing measurements. The protection circuitry limits the output power of the amplifier to a level that is safe for the speaker. If the output level should drop as in one of these cases, check for the cause and, if necessary, reduce the monitoring volume level.

1.7.1 Overload Protection

As we just described above, the protection circuit limits the signal to safe levels. This occurs so gradually that under certain circumstances you may not even notice that the protection circuitry has been triggered and the signal is being limited in dynamic range. But by moving an internal jumper you can change how this circuit responds, so that when it is activated, it will cause a clearly audible drop in level (hard position). To access this jumper, unplug the mains cable from the mains socket and unscrew and remove the rear panel, on the other side of which you will find the amplifier electronics. In Figure 5, the arrow points to the spot on the input circuit board where the jumper is located, next to the XLR input jack. (Figure 5 on the left side)
1.8 Care of the Cabinet

The cabinet housing of the K+H O 100 active studio monitor comes standard with an anthracite-colored enamel finish (RAL color 7021). Handle the cabinet with care to avoid damaging the finish. To clean the cabinet, use a soft cloth with a mild cleaning agent only. Under no circumstances should you use chemical agents or any cleaners with abrasive action.

2. Diagrams

The outstanding sonic impression made by the O 100 studio reference monitor in listening tests is confirmed by modern technical test measurements. The following diagrams reflect but a small portion of these measurements.

Using a new material called LRIM (Low Resonance Integral Molding), waveguides intended to create optimal dispersion patterns could be integrated directly into the baffle. Hence the elliptical horn around the tweeter. Hence also the fact that the horizontal dispersion angle and vertical dispersion angle are different, as can be clearly seen in the plots above (Figures 6 and 7).
Figure 8: Frequency Response (free field)

Figure 9: Damping Distortion @95 dB / 1 m

Figure 10: Group Delay

Figure 11: Cumulative Spectral-Decay Plot

The loudspeaker's cumulative spectral-decay plot indicates a very clean decay without any major resonances or standing waves being evident.

Figure 12: Equalization for room compensation

Figure 13: Meterbridge Equalization
3. Warranty

K+H products undergo an extensive round of quality control tests before ever leaving the factory. The transistors are subjected to extremely thorough test conditions after they have been mounted on the circuit board. Every single loudspeaker is guaranteed to match its technical specifications within strict tolerance standards for the series.

Store the original cartons in a safe, dry place. If you should ever need warranty service, pack the loudspeaker in its original packing materials and carton, together with a detailed description of the problem, and ship it (with shipping charges prepaid) to:

KLEIN + HUMMEL GmbH
Abt. Kundendienst
Zeppelinstrasse 12
73760 Ostfildern/Germany

All parts of the amplifier except transistors are covered under this warranty for a period of twelve months from date of purchase. Parts will be replaced at no charge if their failure was due to a material defect. Not covered under this warranty are damages due to improper handling, operation or mounting, spikes or surges in the mains voltage, and failure to follow the installation and operating instructions contained in this manual.

Presenting a warranty card is unnecessary. Proof of purchase date can be made by way of appropriate documents (invoice, packing slip, delivery receipt).
Safety Instructions

It is absolutely essential that you read these safety instructions carefully before connecting and using this K+H product. Your safety depends on it. Furthermore, failure to follow these instructions voids the warranty.

To ensure safe operation for years to come, keep these instructions in a safe place for future reference. K+H has manufactured this product in accordance with IEC 1992 (SEC) 39 standards, then tested and delivered it in safe operating condition. To maintain it in this condition, you must:

- observe all safety instructions,
- use the product only as described herein, and
- have any maintenance, repairs, or modifications performed only by K+H or other authorized personnel.

Warning!

When the interior of the cabinet is exposed, touching some parts can lead to an electric shock. If you need to gain access to the interior electronics of the unit, always disconnect the unit from any and all power sources first. Any repairs, maintenance, or other service of the unit when its interior compartment is exposed may only be performed safely by authorized technicians familiar with all the risks involved. Even in an unplugged state, a fully charged capacitor in the unit can zap the unsuspecting. If you need to replace any fuses, ensure that the replacements are of exactly the same type and value as the originals, as spelled out in the technical specifications at the back of this manual.

Do not use “repaired” fuses.

If you do not have any fuses on hand of the specified size, type, and value, do not hot-wire the contacts in the holder by short-circuiting them.

Certain areas of the cabinet, cover, and rear panel can achieve extreme temperatures and are therefore marked with a “HOT” label. Refrain from touching any heat sink or ventilation grille.

High volume levels are known to cause permanent - i.e. irreversible - hearing damage, especially when listened to without sufficient breaks. The higher the levels, the more frequent and extended must be the breaks. Avoid standing too close to loudspeakers that are being driven at high levels. If you must be exposed to high sound pressure levels over an extended period of time, use hearing protection.

Mains Connection

This unit is designed for continuous operation.

Ensure that the operating voltage of the unit matches that of the local mains current (AC line voltage).

Always check before connecting the power cable to the mains socket that the power switch on the unit itself is set to off (“O”).

Use the power cable or power supply that came with the unit to connect to the mains socket (wall outlet).

Power supply: a damaged power cable may not be repaired. Use a new cable.

Avoid plugging the mains cable into a power strip that already has several other power-consuming devices connected to it.

Avoid using extension cables. The unit must be connected to a mains socket close to it, and that socket should be freely accessible.

Installation

Set the product only on a stable, clean, horizontal surface.

Do not expose the product to vibration.

Do not operate this product anywhere near water or other liquids. Do not use it near a sink, swimming pool, bathtub, or in any damp room or area. Electrical shocks carried through water can kill. Do not place any beverages whatsoever on or near this product, as liquids can kill electronic components.

Avoid dusty environments.

Ensure sufficient ventilation around the product to allow for adequate heat dissipation, especially near the rear panel and the sides of the cabinet. Do not block or cover any heat sink, fan, or vent.

Do not place the product where it will be in the path of direct sunlight, and keep it a safe distance away from radiators and other heaters of any kind.

If you bring this product from a cold environment into a warm one (such as from a vehicle into a studio), it is quite possible that condensation can form inside the cabinet. Please allow the unit sufficient time for full acclimation to room temperature (minimum thirty minutes) before connecting and powering up.

To avoid accidents, do not use any accessory equipment with this product which is not approved by the manufacturer, particularly mounting accessories.

To protect the product from lightning damage during a thunderstorm or from power surges during an extended absence, disconnect the power cable from the wall outlet.
**Specification O 100**

**Maximum SPL**
- Short term @ 1 m: 106 dB
- Long term @ 1m: 104 dB

**Free field frequency response**
60 Hz - 20 kHz (W2 dB)

**Self generated noise level**
< 2 dB(A)

**THD**
> 150 Hz / 1m: < 0.5 % above 90 dB

**Directivity**
- Horizontal: W 40° (-6 dB)
- Vertical: W 30° (-6 dB)

**Amplifier section**
- Power amplifier:
  - Bass amplifier: 50 W at 6 Ohm (THD ≤ 0,1 %)
  - Treble amplifier: 50 W at 6 Ohm (THD ≤ 0,1 %)
- Crossover section:
  - Crossover frequencies: 2,7 kHz
  - Crossover slopes: 24 dB / Octave
- Protection circuit:
  - against overload of both drivers

**Input**
- Impedance: >10 kOhm (balanced floating)
- Sensitivity: +6 dBu
- Volume control: 0 ... -24 dB
- CMRR: > 50 dB (15 kHz)

**Equalization**
- 0-4 position switch: positioning on mixing console
- 1-4 position switch: positioning on rear/side walls

**Drivers**
- Bass: 5 ½” Ø, 6 Ohm, Composite-Sandwich-Diaphragm
- Treble: 1” Ø, 6 Ohm, alloy dome tweeter

**Connectors**
- Mains: 3-terminal Euro connector NK 10
- Signal input: XLR 3-31 (female)

**Power consumption**
- Idle: 8 VA
- Full output: 70 VA

**Mains**
230 V, 50/60 Hz, other voltages on request

**Dimensions**
(W x H x D): 165 mm x 270 mm x 195 mm

**Volume**
7,5 liters

**Weight**
5,5 kgs

**Cabinet**
painted RAL 7021 dark grey

**Magnetical shielding**
standard

**Accessories**
- LH 31 mounting bracket
- LH 28 tripod bushing
- LH 29 TV-spigot
- LH 30 ball mounting bracket
- LH 11 simple wall mounting bracket