REFERENCE SERIES MODEL 105 (1977-79)

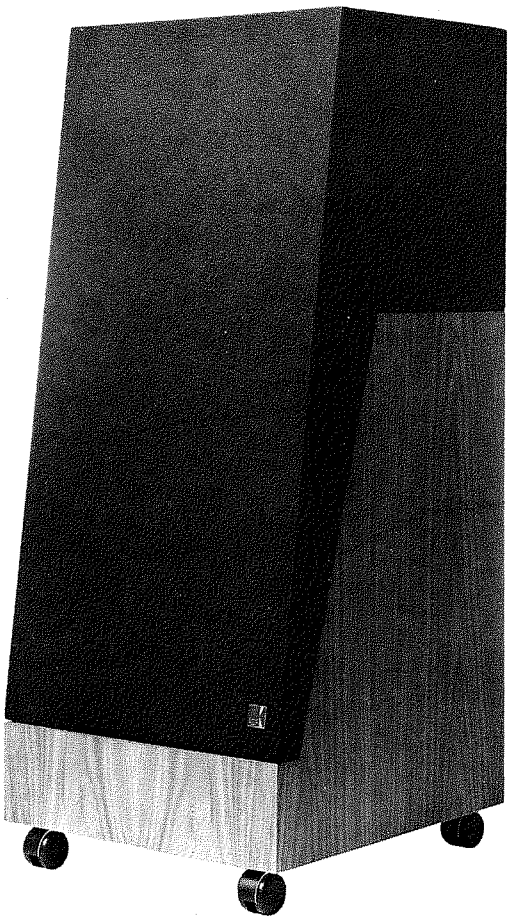
Model 105 was a landmark product - not just for KEF, but also for the loudspeaker industry as a whole. Physical form followed acoustical function in this radical looking system that set new standards for tonal accuracy and precise stereo imaging. Such was its performance and reputation that in its revised form it remained in production until 1987.

Continuing the lineage of KEF's high-end loudspeakers that started with the K1 Monitor, Model 105 was a three-way system of modular design, allowing the enclosure of each unit to be optimised for its respective frequency operating range. The result was a smooth and continuous dispersion pattern that gave superior imaging not only in the central position, but over a wide listening area.

The bass section comprised a 12 inch bextrene coned bass driver, housed in a 70 litre closed box enclosure, fed by a filter section that included a novel topology to convert the bass roll-off to a third order characteristic, allowing a low –3dB cut-off frequency but with useful attenuation of the subsonic frequencies typical of the analogue sources at the time. The B110 midrange and T52 high frequency drivers were housed in a separate, heavily damped, enclosure, which could be directed towards the listening position independently of the bass section.

The acoustic response was precisely tailored for a neutral tonal balance, assisted by the adoption of the newly derived Linkwitz-Riley fourth order crossover alignment, and to minimize the risk of driver damage due to amplifier clipping, an indicator light could be set to trigger at specific peak power levels.

Specification	Model 105
System type	Three-way, floor standing
Enclosure type	Closed box
Size	965 x 415 x 455 mm (38 x 16.3 x 17.9 inches)
Weight	36kg (80 lb)
Input impedance	8 ohms
Rated maximum power	200W programme
Amplifier Requirements	40-200 watts per channel into 8 ohms
Frequency response	38-22,000Hz +/-2dB at 2m on measuring axis
Sensitivity	86dB at 1m for 1W, anechoic conditions
Crossover Frequencies	400, 2500Hz
Maximum output	107dB on programme peaks under typical listening conditions
Finishes	Walnut
Grille	Black cloth
System	SP1059
Drive units	B300 bass unit (SP1060), B110 midrange unit (SP1057), T52 tweeter (SP1049)
Crossover	SP1062 (peak level indicator circuit), SP1100



KEF REFERENCE SERIES

MODEL 105

Installation instructions

Contents

1 Introduction

KEF Model 105 is a three way loudspeaker system embodying a number of new and original features which combine to make a system of unusual flexibility with an outstanding performance.

Model 105 is produced in pairs using closely matched drive units which have been selected by computer to tolerances previously unattainable. This close matching contributes significantly to the creation of astonishingly clear stereo images and depth perspective.

The overall frequency response of the system is ± 2dB from 38Hz to 20 kHz.

The enclosures and cross over networks are designed to ensure that this response is maintained anywhere within a window of ±20° horizontally and ±5° vertically from the design axis. A visual indicator is fitted to assist the setting up procedure.

The middle and high frequency enclosure can be turned and elevated, to provide the listener with a wide choice of listening area independent of bass cabinet orientation.

The loudspeaker drive units are positioned so as to retain the subjectively important time relationship of the original sound and the enclosures are contoured to reduce sound field disturbances. These features assist in creating realistic depth perspective.

Model 105 is designed to produce concert hall sound pressure levels, and is fitted with a visual peak level indicator. The middle and high frequency units are fused to give protection against fault conditions.

A detailed explanation of the design principles is given in KEF Topics Volume 3 No. 1.

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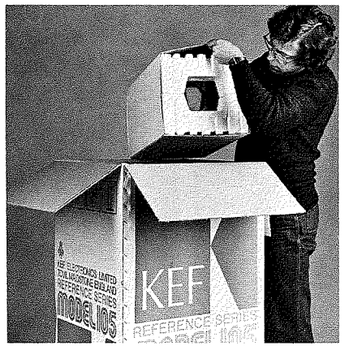

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2 Unpacking

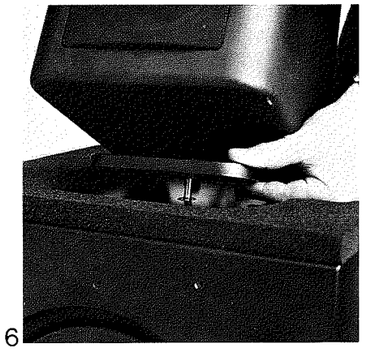
Each Model 105 is delivered in three separate parts to ensure transit safety : low frequency section, middle and high frequency head assembly and grille frame. The head assembly is packed together with its matching low frequency section in one carton. The grille frames are packed in pairs in a separate carton.

Stand system pack upright and open the carton.
Remove carton containing head assembly (1).
Remove head assembly from protective packing (2).

Lay carton on its back or side, and open the bottom of the carton.
Return the package to an upright position and lift the carton from the loudspeaker (3 and 4).
Remove the polystyrene trays and the polythene bag from the low frequency enclosure.

N.B. The bottom tray contains spare fuses, connecting cables, grille retaining screws and washers (5).

The carton and polystyrene should be retained for future shipping.



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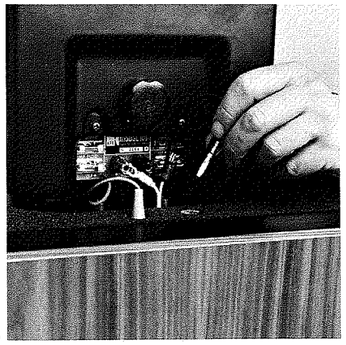

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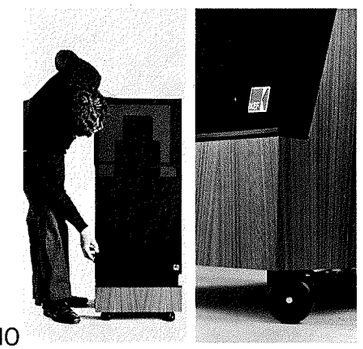

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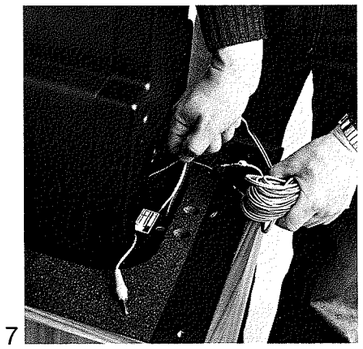

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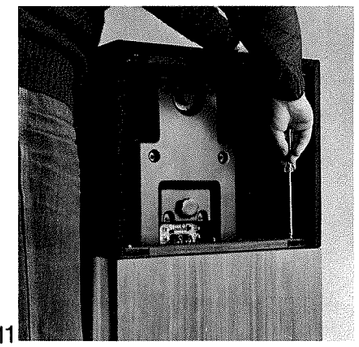

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3 Assembly and wiring

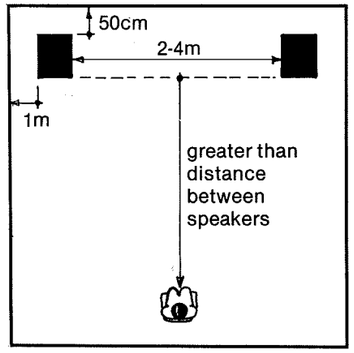
In its assembled form the Model 105 consists of a head enclosure mounted above a low frequency section and covered by a two-piece grille assembly. The signal input lead passes through a vertical tube located towards the rear of the bass enclosure and is connected to the main input terminals on the back of the head assembly. The inputs to both enclosures are connected in parallel.

The systems should be assembled as follows:-

Place head assembly on top of the low frequency section. Locate metal spigot on head assembly base into metal socket on top of the low frequency section (6).
Pass the free end (tinned) of the 10m connecting cable down the cable tube which runs from the top to the bottom of the bass enclosure (7).

Fit the red and black 4 mm plugs into their corresponding sockets in the top of the bass enclosure. The two spade connectors should then be secured to the binding posts on the rear of the head assembly, observing colour coding (8).
When both systems have been assembled and connected, the free ends of the 10m signal cable should be connected to the corresponding amplifier/receiver loudspeaker terminals.
Do not switch on the amplifier until all connections have been completed and secured.
Cable polarity is indicated by a black stripe running along the sheath of one wire. The plain wire sheath should be connected to the positive terminal and the black striped wire to the negative terminal.
To check polarity, bring the loudspeakers close together and facing each other. Play a mono signal through both simultaneously. Reverse the polarity of the leads to one of the loudspeakers and repeat the test. The bass will be much fuller and rounder when the polarity is correct. An organ recording is usually best suited for this purpose.

The loudspeaker systems can be operated with or without the grilles.
Connection and adjustment of the system will be simplified if the grille assembly is fitted after the final listening window adjustments have been made. (See Section 5).
The grille is in two parts: the main cloth covered frame, which covers the loudspeaker system assembly, and a removable rear panel (9). The rear panel permits access to the head assembly without the need to remove the main grille frame.
The rear panel is retained by Velcro strip and should be removed before fitting the main grille frame.
The main grille frame should be lowered onto the low frequency section, taking care not to disturb the head assembly. Press down firmly, locating the lower front edge of the grille behind the black metal retaining strip on the front of the low frequency section (10).
The grille frame can then be secured by two screws and washers provided (11). Before relocating the rear panel, the listening window adjustment should be completed.



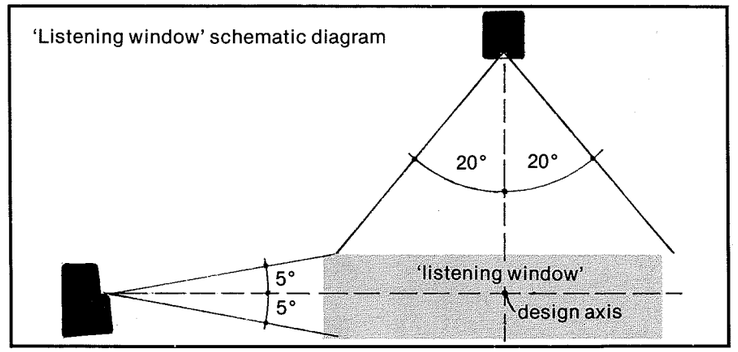
4 Speaker location

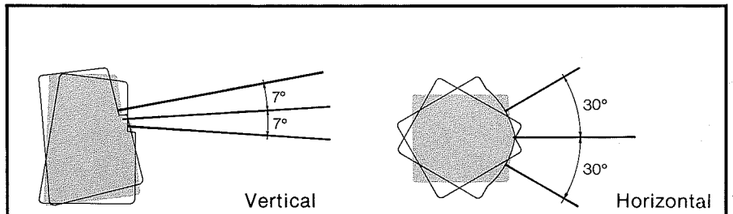
Model 105 is capable of giving a stable stereo image over a wide listening area with an unusually vivid sense of depth perspective. Since this is achieved in part by the shaping and proportioning of the enclosures to permit sound to diffract smoothly, these benefits may be impaired by reflections from nearby walls.

The loudspeakers should therefore be stationed at least 1 m from side walls and a minimum of 50 cm from any back wall.

The spacing between the two speakers, and the listening distance from the speakers is important.

If the speakers are placed too close together, the stereo image will not be developed. For normal listening, placement will usually be between 2 m and 4 m apart depending upon the listening distance and the room size. The listeners'distance from the speakers should be equal to, or greater than, the distance between the loudspeakers. Tests should be made with both music and speech before deciding upon the final location for the speakers.





Range of 'listening window' adjustments

5 Operating adjustments

a THE LISTENING WINDOW

The tonal quality and clarity of the reproduction, and above all, the sharpness of the stereo image, are determined by the sound that reaches the listener directly, without reflection from walls, floor or ceiling. Ideally, therefore, the frequency response of the loudspeaker, and hence the spectral content of the programme, should be constant over an area covering all the listeners.

In a multi-unit loudspeaker, the polar characteristics, i.e. the variation in response with the direction of radiation, depend on the size, shape and positioning of the drive units and of their enclosures, together with the electrical characteristics of the crossover filters. Attention to all these factors in the design of the Model 105 has produced striking results; the variation in frequency response with direction has been held, up to very high frequencies, within ± 2dB for angles up to 20° on either side of the 'design axis', and within ± 1dB for angles up to 5° above and below it. The design axis is tilted up by 4° from the horizontal, and is arranged to pass through a point 1.2 m (4′) above the floor level (a typical height for the ears of a seated listener) and 3 m (10′) in front of the loudspeaker the area enclosed by the ± 20° horizontal and ± 5° vertical limits constitutes a 'listening window' which, even at 3 m distance, is 2 m (6′ 6″) wide and 0.52 m (20″) high — sufficient to provide optimum conditions for a small group.

To make the Model 105 still more flexible, the separate head assembly, which houses the middle and high frequency drive units, is designed to be rotated by ± 30° horizontally and tilted by ± 7° vertically, so that the listening window can be placed to suit the convenience of the listeners without altering the position or outward appearance of the loudspeaker as a whole. The orientation of the head assembly is indicated by a light-emitting diode (LED) energised by the audio signal fed to the loudspeaker. The LED is masked so that the glow, which can be seen through the cloth cover, is visible only within the optimum listening area. As long as every listener can see both lights of a stereo pair, there will be no blurring or instability of the images through differences in

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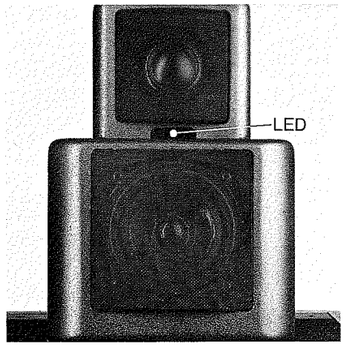

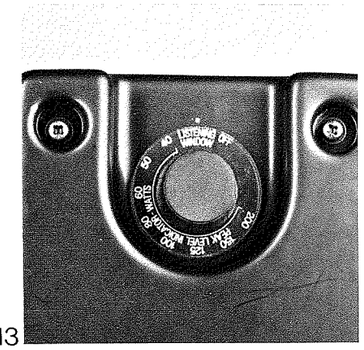

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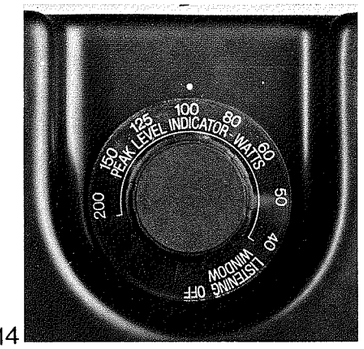

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response of left and right hand loudspeakers.

Set up as follows:—
Remove rear panel from grille assembly (12).
Set rotary switch on rear of head assembly to 'listening window' (13).
Direct head assembly towards the listening position.
Select programme signal with low dynamic range. Interstation noise or 'hash' from an FM receiver is convenient for this purpose.
Increase level of volume until LED is continuously illuminated.
Sit in the centre of the proposed listening area and adjust the rotation and elevation of the head assembly until LED appears central in the rectangular aperture.
It is important to reset the rotary switch on the rear of the MF/HF enclosure before starting serious listening.
Reset the rotary switch to either the off position or for use as a peak level indicator (See Section 5B). If the rotary switch remains in the listening window position, the sound quality will be impaired (14).
Replace grille rear panel.

b PEAK LEVEL INDICATOR

Under programme conditions, amplifier peak clipping can occur even when the average power into the loudspeaker (which is directly related to sound level) appears quite low. This causes audible distortion.

So that the listener may know when audible distortion is a result of amplifier overload, Model 105 is fitted with a peak level indicator.

This function is provided by the same LED which is used for setting up the listening window. The rotary switch at the rear of the head assembly is graduated from 40 to 200 watts in 8 stages and should be set to correspond with the amplifier power rating.

The indicator will glow when the peak-to-peak voltage which an amplifier of that rating could deliver into a load of 8 ohms, is exceeded. The time constant associated with the overload indicator has been chosen so that the visual indication corresponds to the onset of audible distortion.

A 150 watt amplifier rating is ideal because it is impossible, under normal operating conditions, to cause damage to the loudspeaker system. The Model 105 will operate perfectly on normal programme material with larger amplifiers, but **under no circumstances should amplifiers above 150 watts be run into clipping.**

Specification

Dimensions	965 x 415 x 455 mm (38 x 16.3 x 17.9 in)
Weight	36 kg (80 lb)
Drive units	300 mm (12″) low-frequency unit with 50 mm (2″) high-temperature voice coil. Visco-elastic damped Bextrene diaphragm with PVC surround. 110 mm (5″) middle-frequency unit with 25 mm (1″) high-temperature voice coil. Visco-elastic damped Bextrene diaphragm with PVC roll surround. 50 mm (2″) high-frequency unit with 38 mm (1½″) voice coil. Mylar domed diaphragm with integral damped roll surround.
Enclosures	Low-frequency enclosure, 70 litres (4 270 cu in) Middle-frequency enclosure, 7 litres (427 cu in)
Crossover frequencies	400 Hz and 2 500 Hz
Nominal impedance	8 ohms
Programme rating	200 watts
Characteristic sensitivity	86 dB spl at 1 m on axis for 1 watt (anechoic conditions)
Maximum continuous sinusoidal input	35 V rms, 100 Hz to 400 Hz 28 V rms, 400 Hz to 2 500 Hz 11 V rms, 2 500 to 20 000 Hz
Maximum output	107 dB spl on programme peaks under typical listening conditions
Frequency response	38 Hz to 22 000 Hz ± 2 dB at 2 m on axis
Directional characteristics	Horizontal: within ± 2 dB of axial response up to 13 000 Hz for ± 20° Vertical: within ± 1 dB of axial response up to 20 000 Hz for ± 5°
Peak level indicator	Switchable (a) to indicate power levels of 40, 50, 60, 80, 100, 125 and 200 watts (b) to operate at low power levels while orientation of head assembly is being adjusted

6 Test Records

The full potential of Model 105 to produce stable stereo images and realistic depth perspective will only be realised on recordings which have faithfully captured the original sound fields. Usually these will have been recorded by simple microphone techniques.

Three commercially available disc recordings are particularly recommended:

DGG 2707 088 Strauss:
Die Fledermaus.
DGG 2530 405 Strauss:
Also Sprach Zarathustra.
Sheffield Lab-3 SL21/SL22
Harry James: The King James Version.

Model 105 has extended bass response which may be over-emphasized by the shape and construction of the listening room, or indeed by the balance of the recordings. Where this is a problem, tone controls on the pre-amplifier should be adjusted to compensate accordingly. Over-emphasized bass can often be caused by pick-up/arm cartridge combinations having a large undamped resonance, which can be readily excited by direct acoustic feedback. This can be investigated by stopping the turntable, while leaving the stylus in the record groove with the volume control set to a normal listening level. If upon tapping the turntable plinth, a loud boomy sound is heard, then the turntable should be mechanically and acoustically isolated.

Service information

FAULT FINDING

Loudspeakers are inherently reliable and rarely give trouble.

It is important to remember that faults arising in any part of the reproducing system will be heard via the speakers and when faults occur, careful and analytical diagnosis will be required to locate the source of the trouble.

It is important to realise that:—

1 Loudspeakers cannot generate hiss or hum. Spurious noise of this type originates in the electronic sections of the equipment or even in the programme source itself.
2 A loudspeaker fault will affect all programme sources to the same extent. A fault which is merely evident when using disc but not when using radio or tape cannot be attributed to the loudspeaker.

Operational and service problems should be discussed with the dealer from whom the goods were originally purchased particularly as all necessary service and warranty claims are most effectively processed through the retailer.

The most likely fault in a multi-way speaker system will be poor balance caused by one or more of the drive units becoming inoperative.

Before reporting a fault of this type to KEF or one of its appointed distributors, please check:—

1 **That all fuses are intact and are of the correct type.**

Under normal conditions it is extremely unlikely that fuses will blow. If they do, it is important to discover whether there was any audible indication of overload because this may give a clue to the nature of the fault.

Likely causes of fuse failure include high frequency instability in amplifiers, hum loops, high speed tape winding, dropped pickups, faulty connections, and switching transients.

The fuses are thermally matched to the drive units so that they allow programme peaks to pass unattenuated whilst protecting the units against fault conditions.

It is most important that KEF specified fuses are used as replacements (4 spare ones supplied with each system). If incorrect fuses are used, the loudspeakers may be damaged or fuses may blow at low listening levels.

Additional replacements are available from KEF international distributors (see separate list) and most KEF dealers will have them in stock, in case of difficulty please contact:

Customer Service Department,
KEF Electronics Limited
Tovil, Maidstone, Kent
ME15 6QP, England
Telex: 96140

The fuse types are:

Mid-range	**KEF part No.**
800mA	P100379 Fusepak 1
High Frequency	
500mA	P100378 Fusepak 2

Each KEF fusepak contains four fuses.

Ask for the fusepak required and send £1 per pack in the form of an International Money Order or other negotiable instrument and give your full mailing address.

Note that high frequency instability of amplifiers often depends on the load including connecting cables and this should be checked while the amplifier is operating with the loudspeaker systems.

2 That the problem can be isolated and related to the loudspeaker on that channel.

This is simply achieved by changing over the loudspeaker connections, i.e. connect the left hand speaker to the right hand output, and the right hand speaker to the left hand output, to establish if the symptom is transferred with the loudspeaker.

If one drive unit becomes faulty, it will be necessary to replace it together with the corresponding unit in its twin system, to maintain precise matching.

Your dealer can obtain factory matched pairs of replacement units on notifying the serial number given on the Service Information Sheet located in the back cover of the Installation Manual.

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