PHILIPS

HIGH FIDELITY INTERNATIONAL

PHILIPS 22RH 545

The model and serial number of your PHILIPS High Fidelity Laboratories MFB loudspeaker system will be found on the rear of the instrument. Please record this model and serial number in the space below.

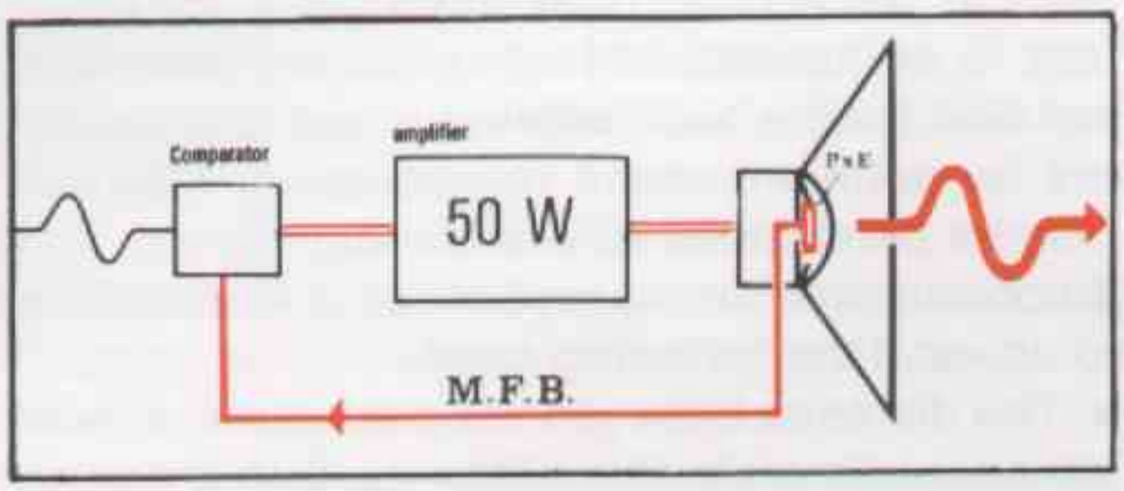
Model number
Serial number

WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

Introduction

This electronic three-way loudspeaker system design is based on the motional feedback (MFB) principle.
The enclosure, which has a total volume of 70 litres, incorporates three loudspeaker drive units, an electronic regulator and control system and three power amplifiers: one 50 W amplifier for the woofer, one 35 W amplifier for the mid-range and one 15 W amplifier for the treble.
Bass and treble reproduction are separately variable and three correction filters make the arrangement of the boxes independent of the distance to walls and floor.



The heart of the control system is a piezo-electric element incorporated in the apex of the woofer cone, which monitors the cone acceleration and converts it into an electrical voltage. This voltage, which is proportional to the cone acceleration, is fed into a comparator circuit where it is accurately compared with the original amplifier input signal.
Despite some fine loudspeaker designs, it has never been possible to achieve ideal cone movement, since both the homogeneity of the magnetic field in which the voice coil moves and the freedom of movement of the cone have absolute limits. These imperfections, which are very difficult to eliminate, result in distortion of the bass reproduction.
However, by utilizing motional feedback the loudspeaker is literally forced to faithfully reproduce the low frequencies naturally and powerfully.
Not only is the inherent bass distortion corrected by MFB, but in addition the low frequencies present in the original signal are reproduced with the correct relative amplitude.
Although the continuously variable input sensitivity makes it possible to connect the RH 545 to any preamplifier or power amplifier, it is advisable to use it only in combination with amplifiers having equivalent specifications.
Accurate, active cross-over filters and the adjusting facilities of the separate amplifiers ensure a smooth and flat frequency characteristic.
The specifications of the MFB loudspeaker box surpasses by far the requirements laid down in Standard DIN 45500.

Controls *(on the front)*

The following controls are accessible after opening or removal of the front cover.
(1) Automatic on/off switch
(2) Input sensitivity control
(3) Bass control
(4) Selector switch for left and right channel
(5) Selector switch for roll-off frequency 7 kHz/10 kHz
(6) Treble roll-off control
(7) On/off switch for 'SIDE TO WALL' correction filter
(8) On/off switch for 'REAR TO WALL' correction filter
(9) On/off switch for 'STANDING ON FLOOR' correction filter

Indicators *(on the front)*

(10) Power on/off
(11) Automatic system on/off
(12) Roll-off frequencies 7 kHz/10 kHz on/off

Connections, mains switch, etc. *(at the rear)*

(13) Fuses
(14) Power on/off switch
(15) Mains input
(16) Mains output
(17) Signal input symmetrical (for professional applications)
(18) Signal inputs asymmetrical
(19) Signal outputs asymmetrical

Before connecting up . . . . .

Before connecting the MFB enclosures to the mains or driver unit, pay careful attention to the following points.
Mains voltage. Do not connect the enclosures to the mains before making sure that the operating voltage, indicated on the type plate at the rear of the box, corresponds to the local mains voltage. If it does not, consult your dealer.
Input sensitivity. The correct setting of this control is important, and depends upon the output voltage produced by the preamplifier or power amplifier used.
The line output voltage, usually specified for

preamplifiers, gives the correct setting for control (2) directly (e.g. 1.2 V).
The output of power amplifiers, however, is normally specified in watts/channel.
To relate the output power (in watts) to the input sensitivity (in volts) use the conversion table given on page 8.
Take care to use the correct column, according to whether the power rating is specified for 4 ohms or 8 ohms.
The calibration up to '3 V' is for preamplifiers, that above '3 V' is for low, medium or high power amplifiers.

Connecting the enclosures to the mains

Connect each enclosure to the mains with its separate mains cable (C) and socket (15). If desired the mains cable of one of the enclosures can be connected to the mains output socket (16) of the other enclosure. For safety reasons do not interconnect more than two enclosures in this manner.

Connecting the enclosures to the driver unit

Asymmetric connection. This method of connection is for non-professional use. Irrespective of the type amplifier or preamplifier (e.g. mono, stereo or 4-channel) the connection is always as follows: the output sockets of the driver unit are connected by one of the audio cables (A) to the signal input sockets (18) of one of the MFB enclosures. For connection to a power amplifier, the adaptor cable (B) may be required.
This connection having been established, the signal output sockets (19) of this enclosure are connected by the second audio cable (A) to the signal input sockets (18) of the other enclosure.
In case of ambiophonic reproduction (double stereo, Stereo-4 or 4-channel) this method of connection also applies to the enclosures which are connected to the two rear channels of the amplifier.

Note: Make always sure that the connections for LEFT and RIGHT and in case of Stereo-4 or 4-channel reproduction, those for FRONT and REAR, are not changed.

Symmetric connection. This method of connection, for which socket (17) is used, is entirely optional.

Increasing the power

If an even higher power per channel is required, several enclosures can be coupled to one another in the way described in chapter *'Asymmetric connection'*. The selector switches for the left and right channel (4) should be set to the position 'LEFT' for the enclosures connected to the left channel, and those for the enclosures connected to the right channel should be set to the position 'RIGHT'.

Location of the MFB enclosures

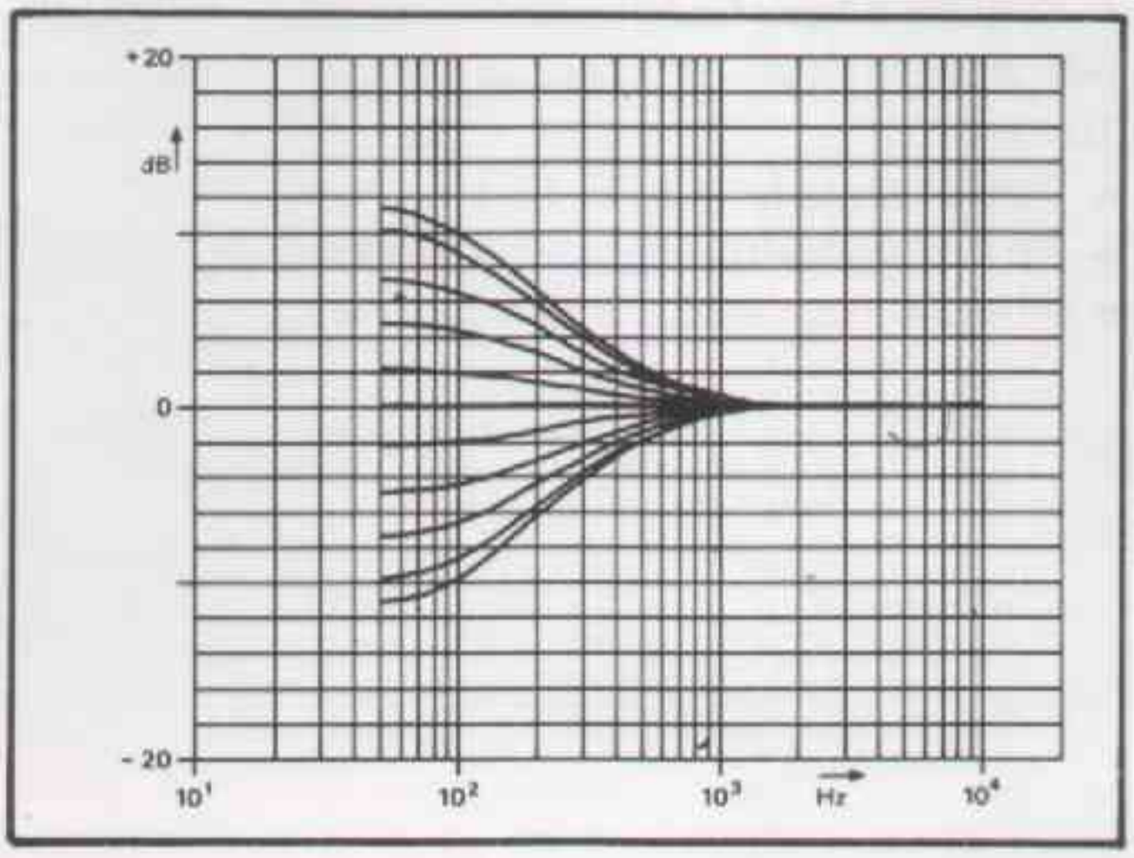
The acoustic properties of a room largely depend upon its size, shape, upholstery and furniture. As these conditions differ for every situation, it is impossible to provide any standard solution for the best location of the loudspeakers for optimum sound reproduction. This can only be determined by experimenting.
To obtain optimum reproduction it is advisable to observe the following rules.

- The distance between the enclosures should be approximately the same as that between the listener and the enclosures.
- If the enclosures are placed in corners, against the wall or on the floor, the bass reproduction is reinforced. In this connection, consult the instructions under *'Switches for bass filters* (7), (8) and (9)'.
- Location of the loudspeaker enclosures behind furniture, curtains or heavy textiles should be avoided, as this has an adverse effect on the reproduction of the treble notes. See also chapter *'Treble roll-off control* (6)'.
- Keep the arrangement as symmetrical as possible. A certain degree of asymmetry can be corrected by adjusting the stereo balance control on the driver unit.
- In the case of ambiophonic reproduction the above rules apply equally to the loudspeaker enclosures behind the listener.

Position of switches

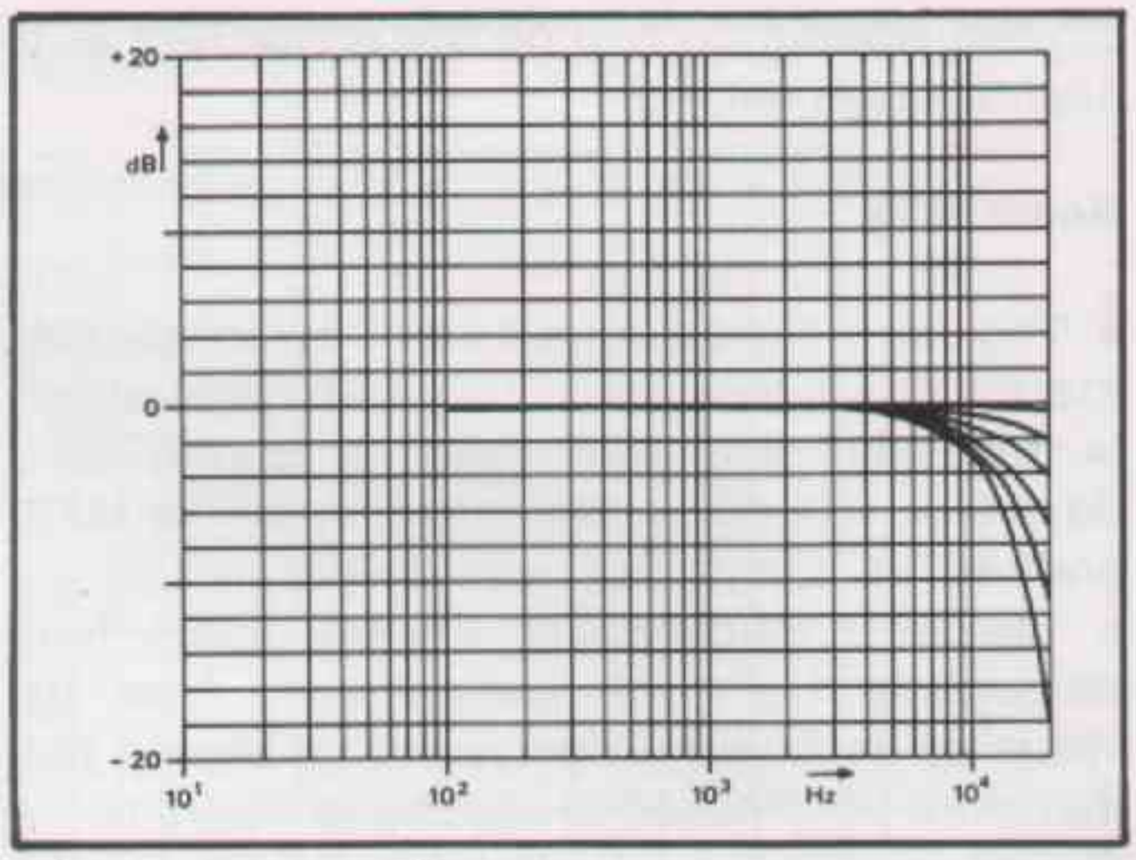
To find the optimum setting of some controls on the box it is useful, during adjustment, to eliminate the effect of some controls of the driver unit. To do this, set the stereo balance, treble and bass controls to the neutral centre position. Where appropriate, other forms of tone control (contour, presence) and filters (scratch, rumble, etc) should be switched off.
Power on/off switch (14). The enclosure is switched on when this switch is depressed. Indi-

cator (10) then lights up.
Automatic on/off switch (1). After the power switch (14) has been depressed, the automatic on/off switch can be put into operation by setting switch (1) to the position 'ON ASYMM'. This switches on the enclosure automatically within one second after reception of an input signal from the driver unit. In addition to indicator (10), indicator (11) then lights up. Approximately two minutes after interruption of the signal the enclosure is automatically switched off, and the indicator lights then go out.
If this automatic facility is not required, control (1) should be turned to the position 'OFF ASYMM'.
Note: In the case of symmetrically connected boxes the position 'OFF SYMM' should always be selected, ruling out the possibility of the enclosures being automatically switched on and off.
Bass control (3): With this control the reproduction of frequencies below 350 Hz can be boosted or attenuated up to +10 dB or —10 dB at 60 Hz.

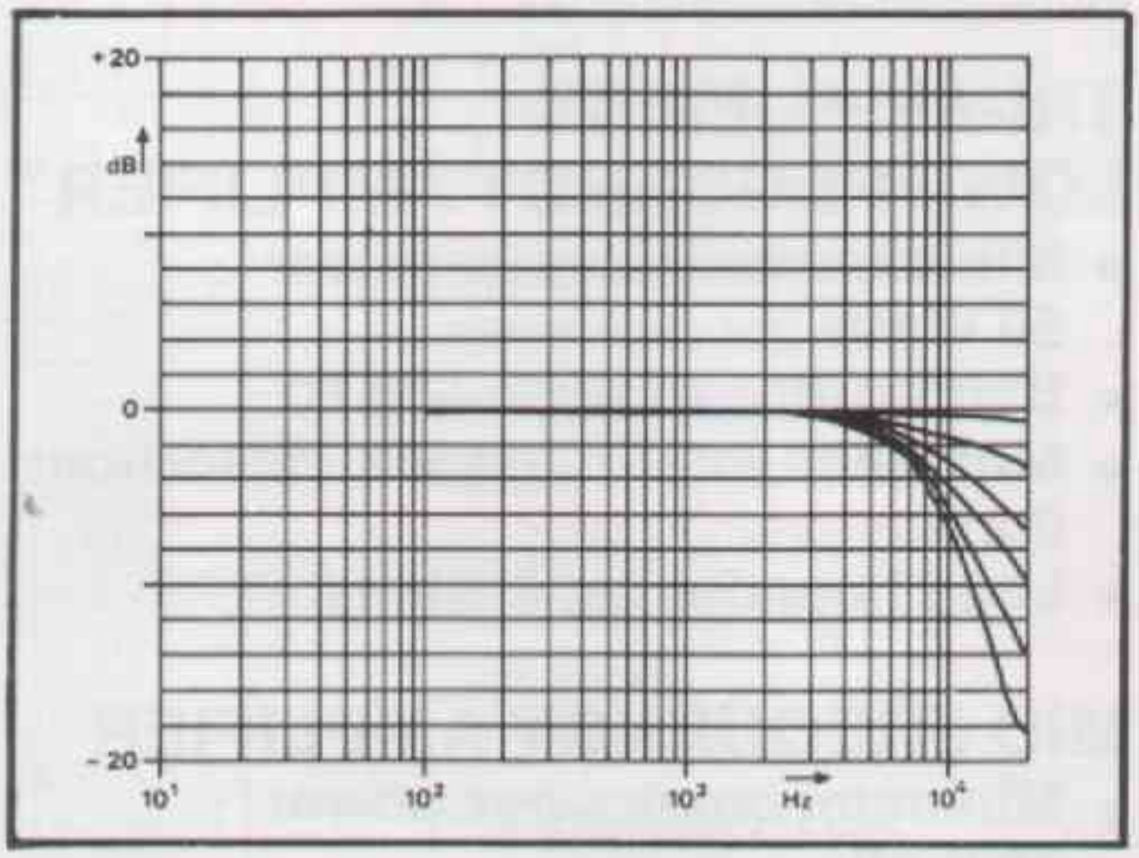


Low-frequency filter

Selector switch for left and right channel (4). The switch on the left channel enclosure(s) should be set to the 'LEFT' position and that on the right channel enclosure(s) to the 'RIGHT' position.
Selector switch for roll-off frequency 7 kHz/10 kHz (5) and *Treble roll-off control* (6).
Excessive treble reproduction can be improved by attenuating the reproduction of the high frequencies from a particular frequency called the roll-off frequency. This frequency, 7 kHz or 10 kHz, can be set with switch (5). When this has been done, indicator (12) lights up.
The degree of attenuation, from 0 to 20 dB per octave, can be set with control (6).



High-frequency filter
cut-off frequency 10 kHz



High-frequency filter
cut-off frequency 7 kHz

Switches for bass filters (7), (8) and (9). The location of loudspeaker enclosures on the floor, against the wall or in corners considerably reinforces the bass reproduction.
This situation can be corrected by setting one or more of the filter switches to the position 'ON'.
According to the positioning of the enclosures, the switch 'SIDE TO WALL', 'REAR TO WALL' or 'STANDING ON FLOOR' can be chosen.

Electronic protection

To safeguard the MFB loudspeakers in the event of overloading, the box incorporates an electronic protective circuit.
Should overload occur, the reproduction volume alternates between loud and soft. This is a warning signal and is not itself cause for alarm, as it implies that the protective system is in operation.
Normal reproduction can be restored by plac-

ing the volume control on the driver unit at a slightly lower setting.

Some hints

• The use of the automatic on/off switch means that the box is constantly in 'stand-by' operation. In the event of lengthy absence, during holidays etc., it is advisable to switch off the MFB enclosures completely with power switch (14).
• The MFB loudspeaker system differs fundamentally from the conventional type by virtue of its built-in electronics. It should not therefore be exposed to excessive humidity.

Technical data
(subject to modification)

TRI-AMPLIFIERS

LOW FREQUENCY AMPLIFIER

- **Minimum continuous power*: 50 Watts**
- **Bandwidth: 10 Hz to 500 Hz**
- **Maximum total harmonic distortion: 0.2%**
- **Load impedance: 4 Ohms**

MID FREQUENCY AMPLIFIER

- **Minimum continuous power*: 35 Watts**
- **Bandwidth: 500 Hz to 3500 Hz**
- **Maximum total harmonic distortion: 0.2%**
- **Load impedance: 4 Ohms**

HIGH FREQUENCY AMPLIFIER

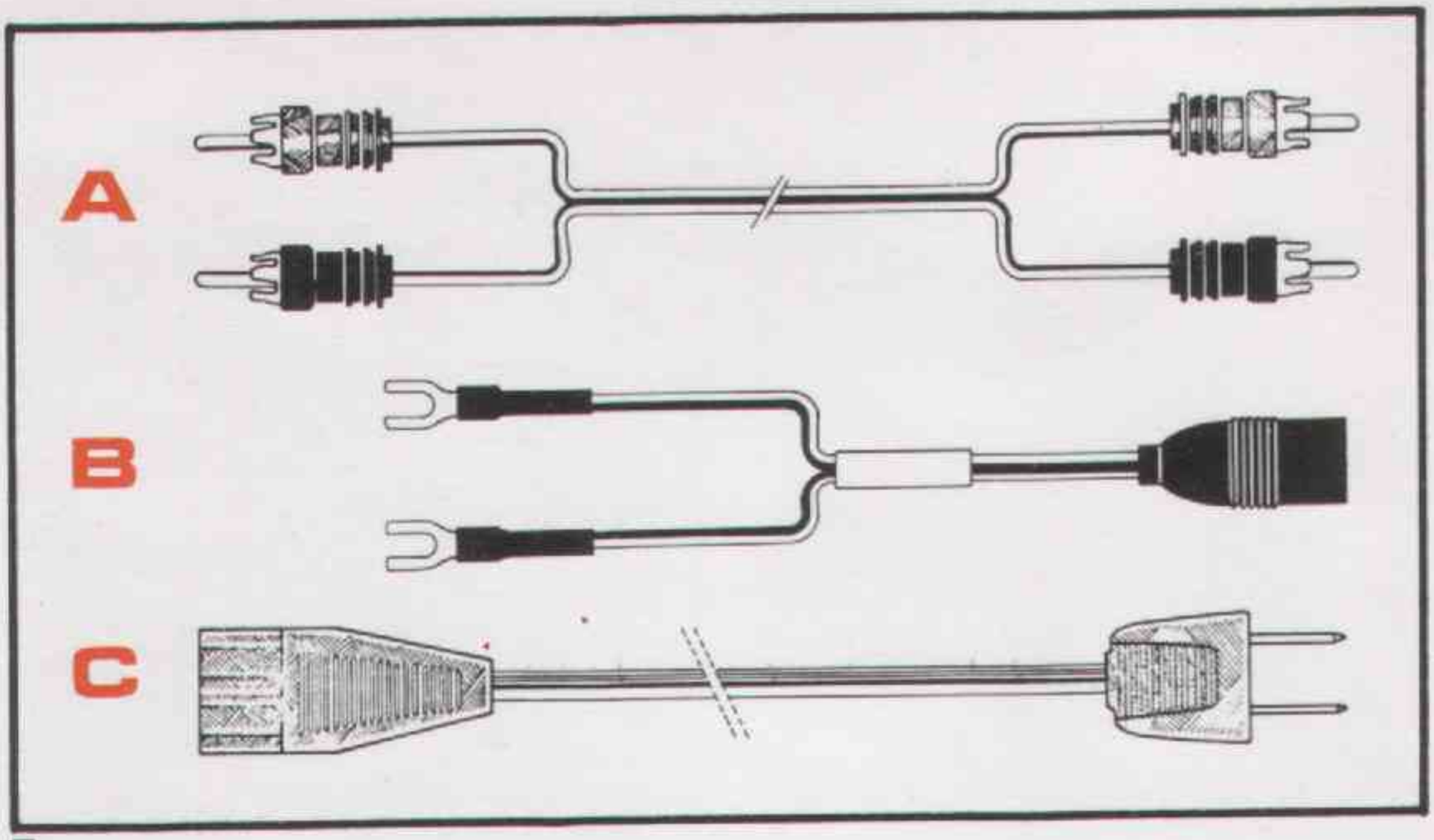
- **Minimum continuous power*: 15 Watts**
- **Bandwidth: 3 kHz to 25 kHz**
- **Maximum total harmonic distortion: 0.2%**
- **Load impedance: 8 Ohms**

* *Measured pursuant to Federal Trade Commissions (FTC) Trade Regulation rule on Power Output Claims for Amplifiers.*

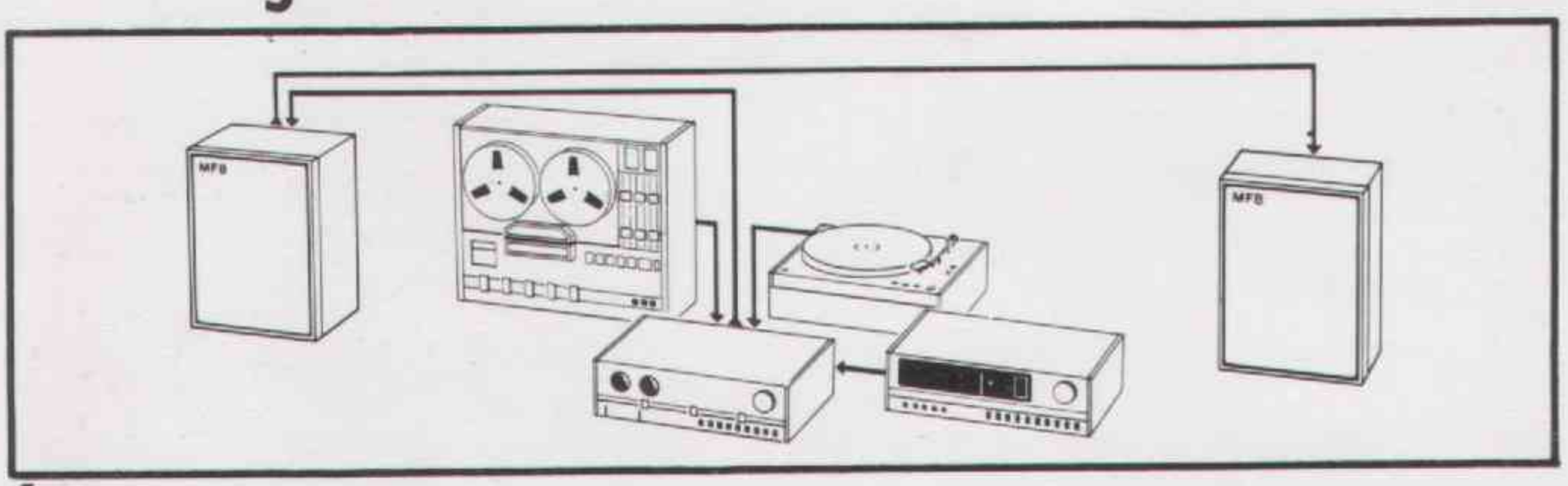
• Volume: 70 litres (50 litres acoustic).
• Frequency response: 20-20000 Hz.
• Loudspeakers:
AD 12100/MFB4, 12″ woofer,
AD 0210/Sq4, 2″ dome mid-range,
AD 0162/T8, 1″ dome tweeter.
• Cross-over frequencies: 500 and 3000 Hz.
• Connections:
sockets for mains in/out, PHONO sockets for signal in/out (asymmetrical), CANNON studio input connector (symmetr.)
• Input sensitivity, continuously variable 1-23 V:
symmetrical 1-23 V/10kΩ,
asymmetrical 1-3 V/100kΩ, 3-23 V/1kΩ.
• Electronic on/off switch:
rise time ≤ 1 s at input signal ≥ 1.5 mV,
fall-off time ≥ 2 minutes.
• Low-note filters:
—5 dB at 200 Hz,
—5 dB at 60 Hz,
—3 dB at 55-160 Hz.
• Bass control: from +10 dB to —10 dB at 60 Hz; turnover frequency 350 Hz.
• Treble filter: continuously variable, 0-20 dB per octave; roll-off frequencies at 7 kHz and 10 kHz.
• Power supply: 120 V, 60 Hz.
• Power consumption: max. 200 W.
• Dimensions: 436 x 650 x 320 mm.

3

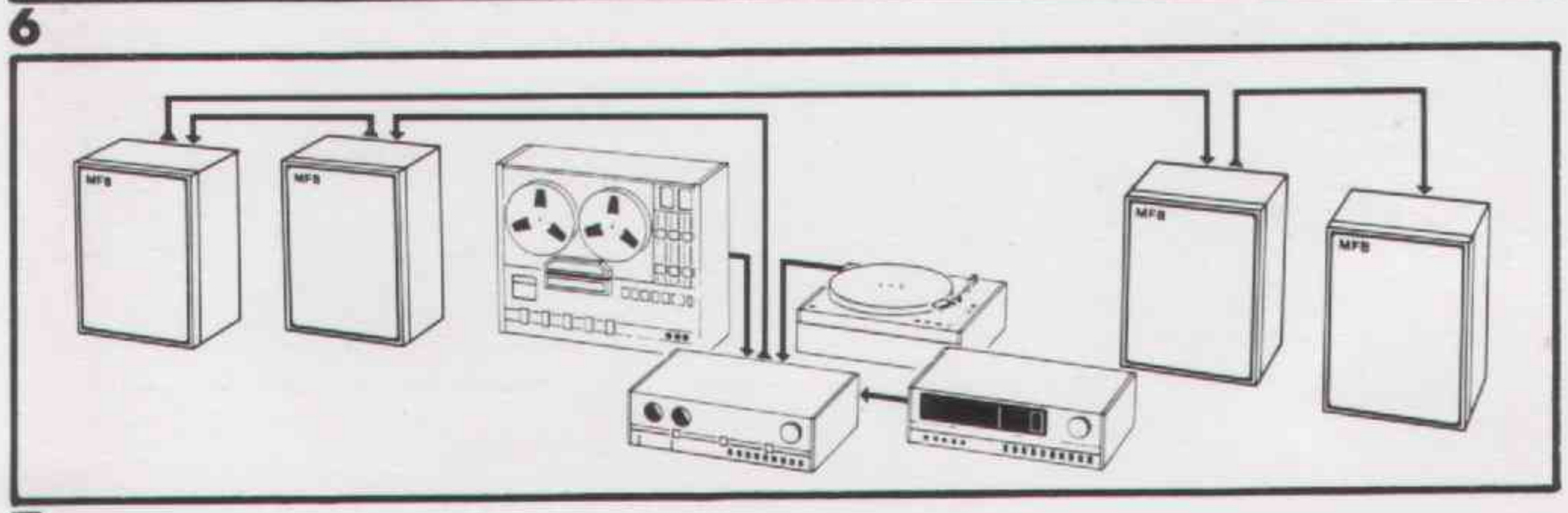
4



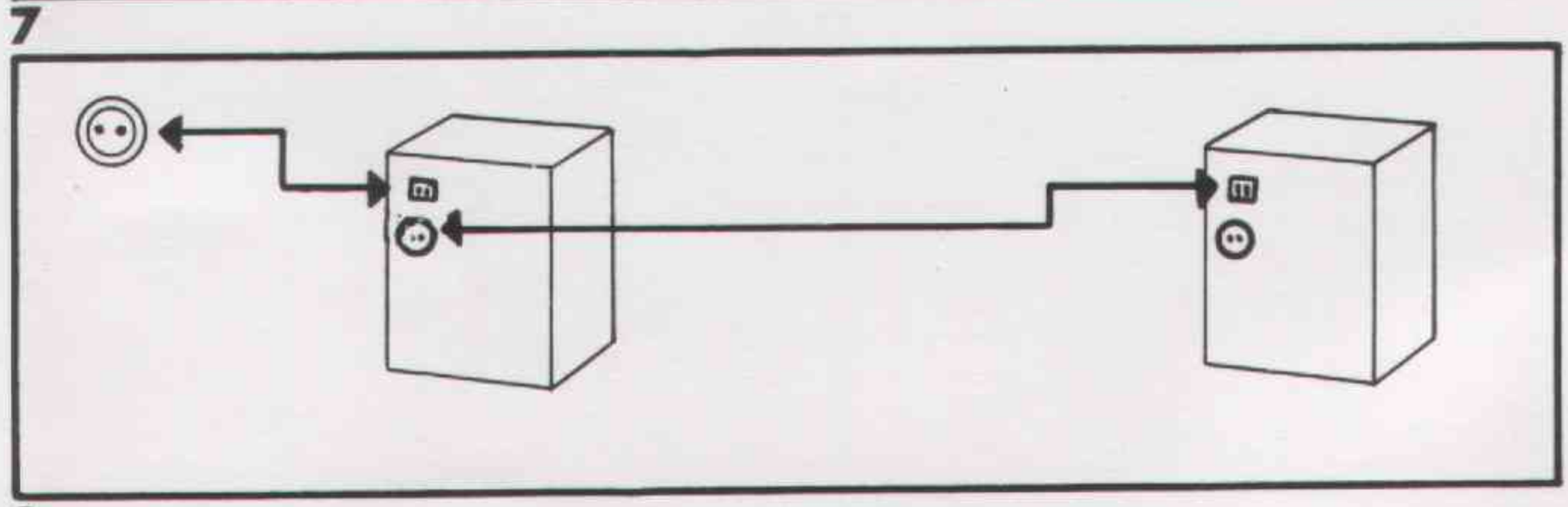
5



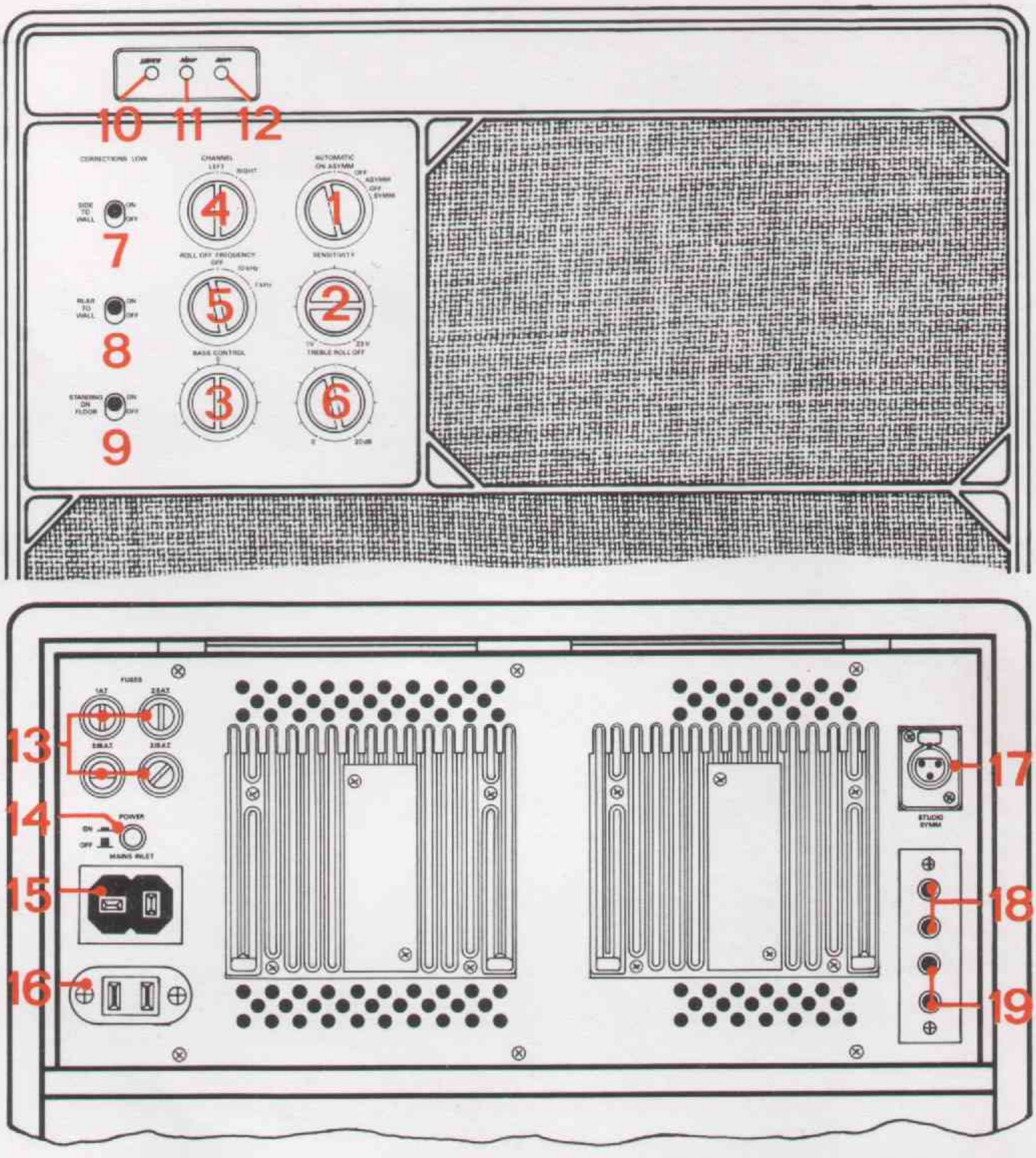
6



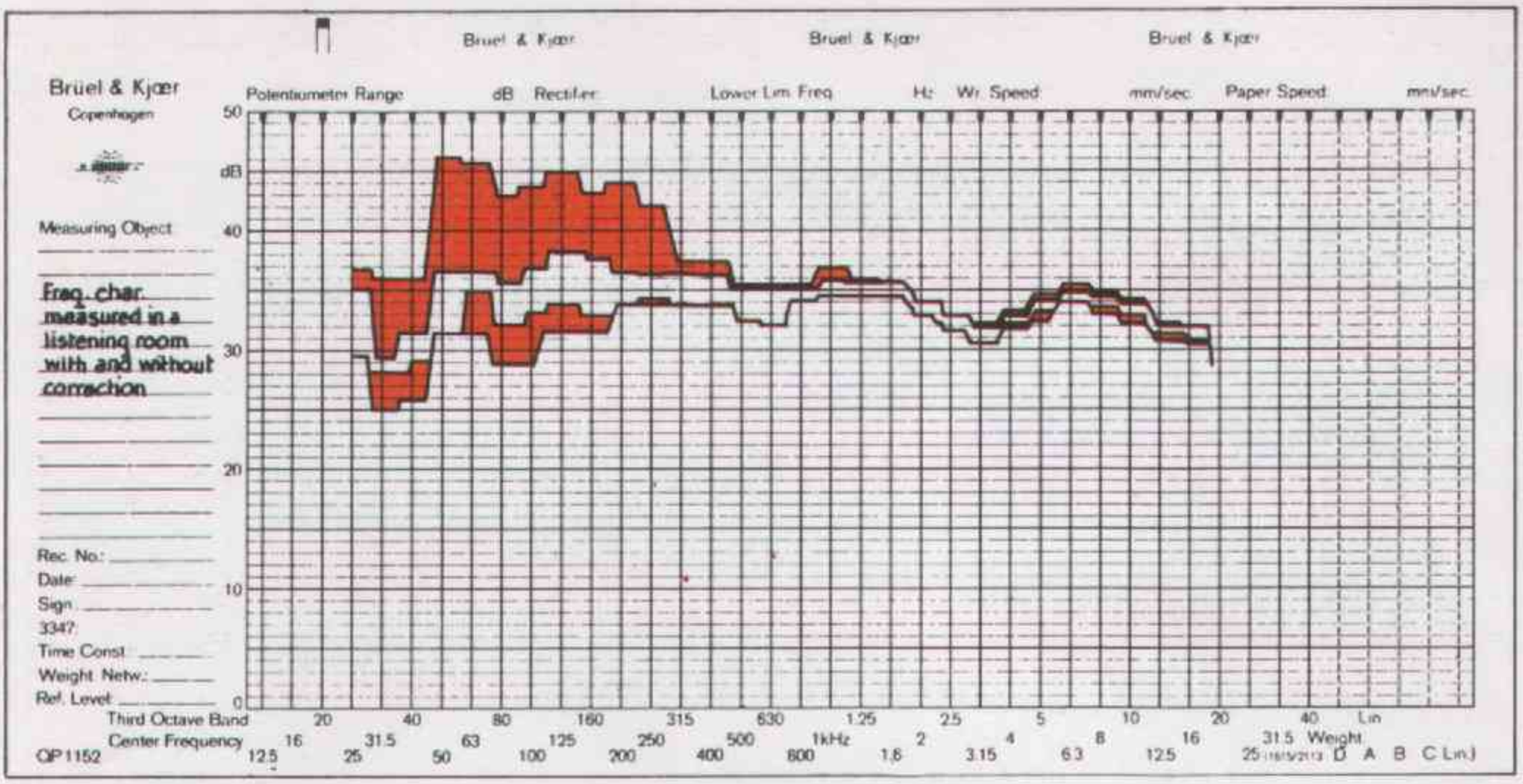
7

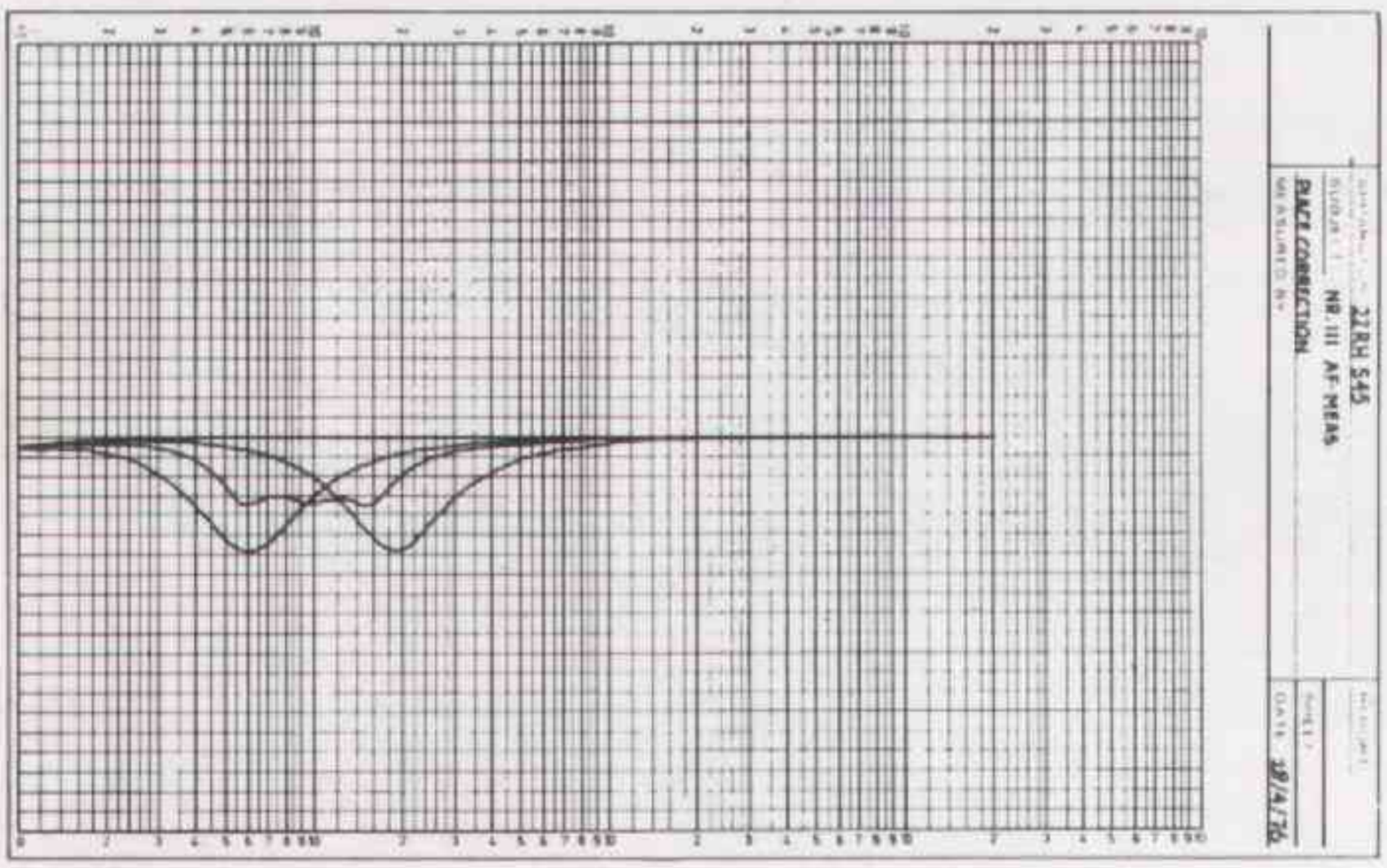


8



2 ↓	4 Ω	8 Ω
3 V	< 5 W	< 2,5 W
4 V	5 - 10 W	2, 5 - 5 W
6 V	10 - 30 W	5 - 15 W
11 V	30 - 100 W	15 - 50 W
23 V	>100 W	> 50 W





Sound-pressure curves with and without positional matching filter, with the boxes at various places in the play-back room.

The damping curves of the three positional matching filters, which can be used in any desired combination.

3122 115 32381 Printed in the Netherlands 2/1.78 5243 PR.