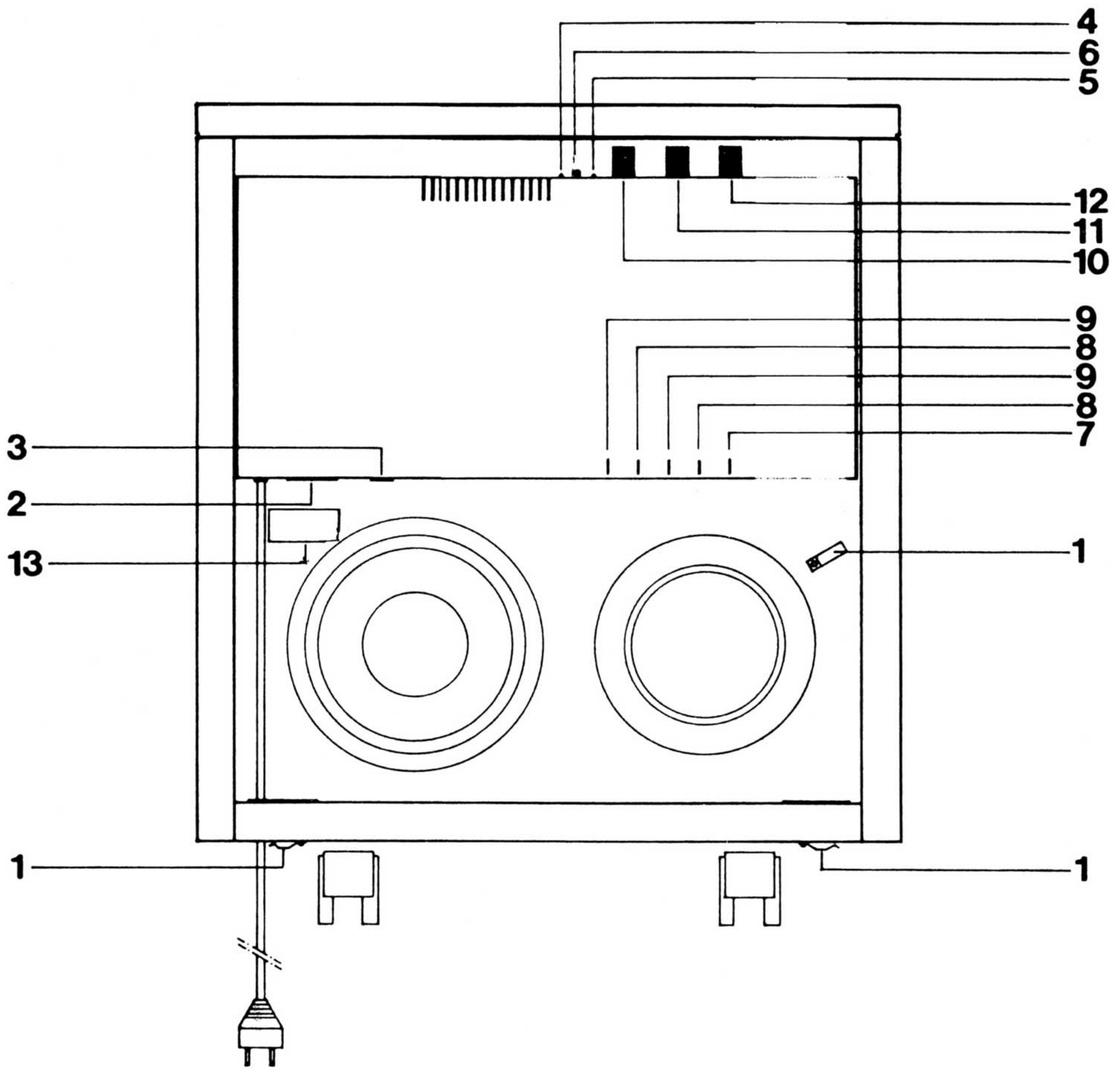




B2-70 ACE-BASS SUBWOOFER



1 Kabelklammer
Cable clips
Kabelhalterungen

2 Nätspanningsomkopplare
Voltage Selector
Netzspannungsumschalter

3 Säkringshållare
Fuseholder
Sicherungshalter

4 "Stand-by" indikering
"Stand-by" indicator
Anzeige für den Betriebszustand "Stand by"

5 "On" indikering
"On" indicator
Anzeige für den Betriebszustand "On"

6 Omkopplare "Auto" — "On"
Switch "Auto" — "On"
Umschalter "Auto" — "On"

7 Förförstärkaringång — utgång
Terminal for connecting main
system preamplifier
Vorverstärker Ein-/Ausgang

8 Effektförstärkaringångar
Terminals for signals from main
system poweramplifier
Eingänge für Endverstärker

9 Sidohögtalarutgångar
Terminals for satellite speaker
connection
Ausgänge für Satelliten-
lautsprecher

10 Känslighetskontroll
Sensitivity control knob
Empfindlichkeitsregler

11 Kontroll för Subwoofers övre
gränsfrekvens
Control knob for Subwoofer
upper crossover frequency
Regler für die obere Grenz-
frequenz des Subwoofers

12 Kontroll för sidohögtalarnas
undre gränsfrekvens
Control knob for satellite speaker
lower crossover frequency
Regler für die untere Grenzfre-
quenz der Satellitenlautsprecher

13 Märkskylt
Manufacturers plate
Typenschild

Audio Pro B2-70 is a unique product, based on new technology. It is very simple to install and operate and possesses excellent performance data and great flexibility.

In order to avoid risk of damage and insure optimum performance from your Audio Pro Subwoofer, you should take time to read this manual before you proceed to unpack and install it.

1. Unpacking

Before you remove the Subwoofer from the carton, note carefully how it was packed, so you will be able to repack it later.

Be careful not to touch the cloth grille when lifting the Subwoofer out of the carton – the cloth can easily be punctured by a finger.

Do not forget the cables packed in the carton.

If possible keep the carton for later use.

Remove the grille by carefully pulling its frame outwards. This gives access to all connectors and controls. Cable clips ① are provided for fastening signal cables and power cord on the front and at the bottom.

If any damage is observed contact your Audio Pro dealer without delay.

2. Power connection

Subwoofer B2-70 contains its own power amplifier, so it must be connected to a power outlet. Before plugging it in, *check that the voltage selector is set to the correct voltage.* The voltage selector ② is located on the amplifier, next to the power cord. Place a small coin in the slot to turn the selector to the desired voltage shown next to the index mark.

A fuse holder ③ is located next to the voltage selector. The fuse should be 4,0 Amp slow for 117 V power supply, 2,0 Amp slow for other voltages.

3. Automatic on/off

A toggle switch ⑥ has two positions: "auto" and "on".

When the switch is in position "auto", Subwoofer B2-70 will turn itself on and off automatically, because it contains a device that senses when audio signals enter the left channel input. You can therefore leave it plugged in to a wall outlet at all times.

A small green indicator light ④ (visible through the grille) indicates that your Subwoofer is in "stand by". In the presence of an audio signal, the power amplifier in your Subwoofer will automatically be switched on, and a small red indicator lights up. When the audio signal finishes, the Subwoofer amplifier remains on for about 5 minutes before it is automatically disconnected. This time delay covers normal interruptions for record changing etc.

The power consumption in "stand by" is negligible, so Subwoofer B2-70 should be left connected to mains supply in Automatic mode, except when it is to be left unused for a long period of time.

When the switch is in "on" position, the power amplifier turns on as soon as power is supplied to the power cord. This mode should be used if the Subwoofer is plugged in to a switched power outlet controlled by the main amplifier in your stereo system.

4. Connecting to main amplifier and satellite speakers

Subwoofer B2-70 can be connected to your stereo system in two different ways:

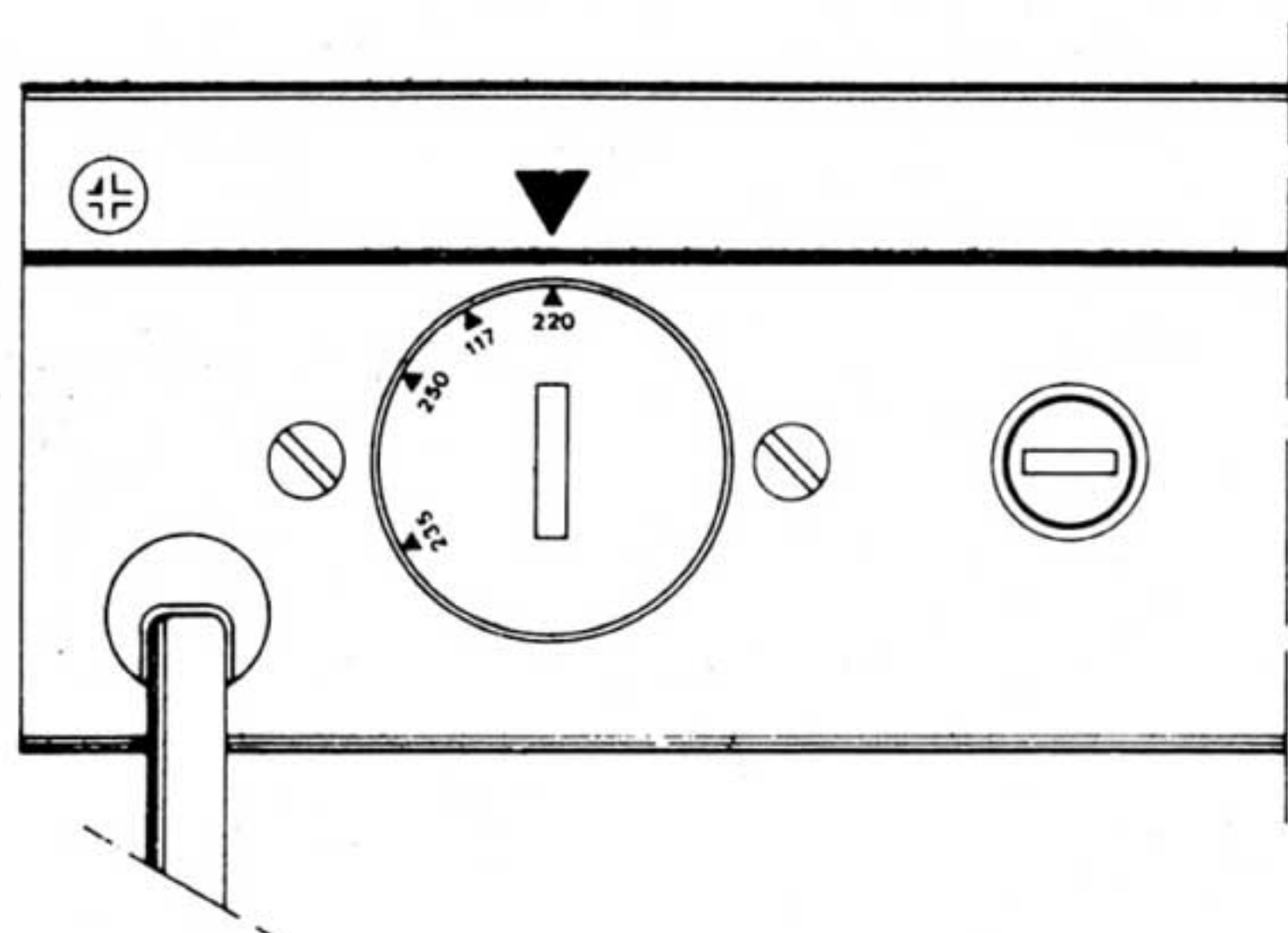
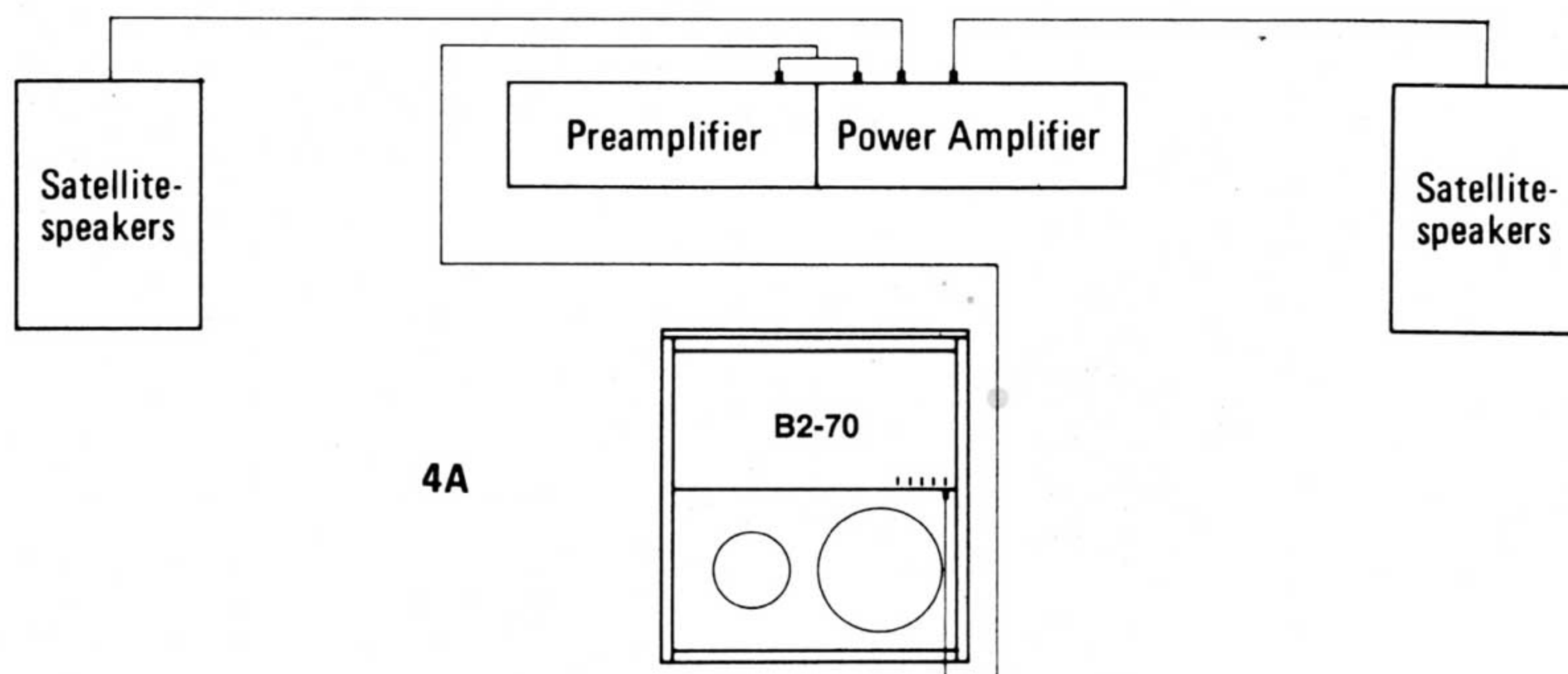
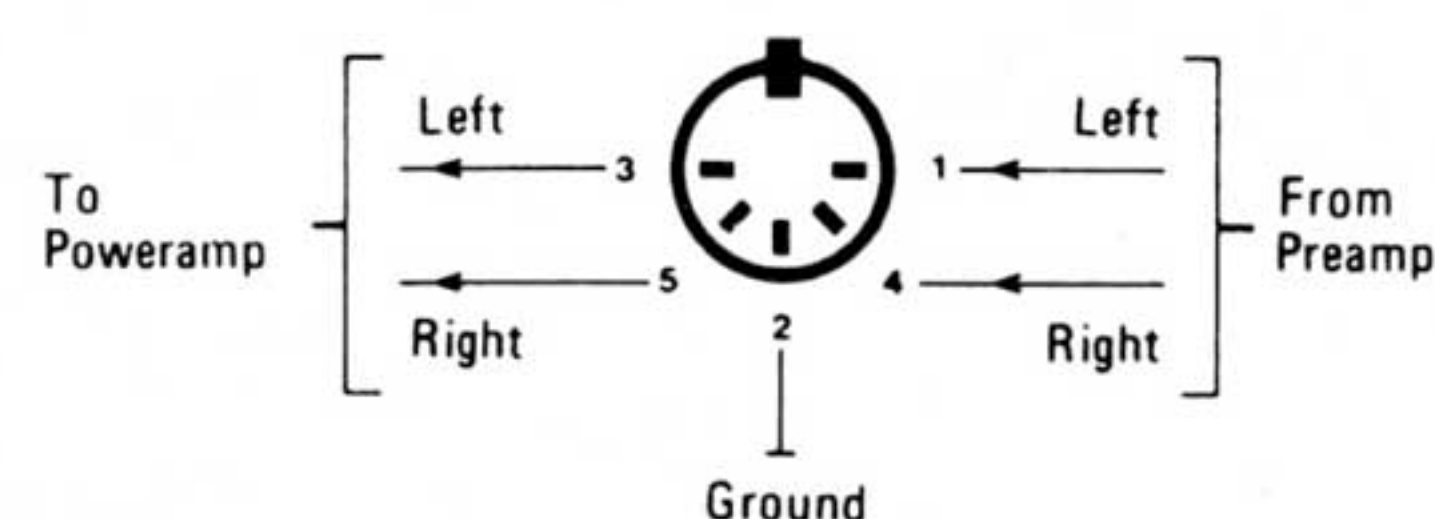
A. Subwoofer connected between Preamplifier and Power Amplifier.

This is the preferred way to connect your Subwoofer B2-70. It should be used whenever you have a separate preamplifier, or an integrated amplifier or receiver where the preamplifier outputs can be separated from the power amplifier inputs.

Connect preamplifier "out" and power amplifier "in" terminals for *both channels* to the 5-pole DIN terminal ⑦ on the Subwoofer, as shown in the diagram below. If your amplifier has phono connectors, use the enclosed adapter cable. (If you own an Audio Pro TA-150 receiver, just plug the enclosed cable with DIN plugs into Subwoofer terminal and "Pream out/Power amp in" terminal on the TA-150).

Leave the satellite stereo speakers connected to your power amplifier, as before, see diagram below for system connections.

Subwoofer B2-70 will reproduce the sum of Left and Right channel low bass signal, while the low bass is removed from the satellite speakers. (The crossover point is adjustable, see section 6).



Your hearing is the final arbiter of correct settings.

The adjustments can be optimized without the aid of any tools except ear and good quality music records.

Before you make final adjustments, make sure your basic stereo system is in good working order.

Acoustic feedback

B2-70 can produce considerable output level at low frequencies, which may cause acoustic feedback via the turntable. To ensure that this is not the case, perform the following test after a coarse setting of the controls as described below.

Set up the equipment for record-playing. Place the pick-up on a non rotating record (disconnect the turntable power cord if necessary). Tap the turntable while gradually increasing the volume control. If there is a shift in the sound character from the loudspeakers (towards sustained sound) before the volume control has been advanced to a setting that represents loud listening, acoustic feedback is a problem.

Moving the turntable or Subwoofer may remedy this problem. Or try placing a vibration isolation pad under the turntable. If this does not help, the turntable is too sensitive and may have to be exchanged.

A. Sensitivity setting

With the knob ⑩ "sensitivity" the volume of the Subwoofer is set to properly match the satellite speakers. If you know the efficiency or sensitivity of your satellite systems, you can calculate a guide value for the setting. If not, start with a setting of 2V.

Sensitivity W for 96 dBspl (DIN standard)	Sensitivity Sound pressure level at 1 m for 1 W input	Efficiency after SHFI swedish standard	Efficiency in halv space (2π)
0.5 W	99 dBspl	2.4%	5.0%
1W	96 dBspl	1.2%	2.5%
2W	93 dBspl	0.60%	1.2%
5W	89 dBspl	0.24%	0.50%
10W	86 dBspl	0.12%	0.25%
20W	83 dBspl	0.06%	0.12%

The table below compares the different ways of expressing loudspeaker efficiency.

When the Subwoofer is connected between the preamp and power amp, the guide value of the sensitivity setting can be calculated using:

$$\text{Guide value} = \frac{\sqrt{\text{DIN sensitivity of satellite speakers} \times \text{Impedance of satellite speakers}}}{\text{Gain of main power amp}}$$

Speaker impedance is normally 4 or 8 ohms and power amplifier gain between 20 and 40 times. If the sensitivity per IHF-A-202 is given for the power amplifier instead of the gain, the gain can be calculated using:

$$\text{Gain of power amp} = \frac{2.8}{\text{IHF-sensitivity}}$$

If, for example, you have a receiver which has a power amp gain of 32 and a pair of 8 ohms satellite speakers with 6% efficiency (=4 W DIN sensitivity, from the table), the guide value will be

$$\sqrt{\frac{4 \times 8}{32}} \approx .18 \text{ V.}$$

If the Subwoofer is connected to the speaker outputs of the main power amp, the guide value is calculated using:

$$\text{Guide value} = \frac{\sqrt{\text{DIN sensitivity of satellite speakers} \times \text{Impedance of satellite speakers}}}{20}$$

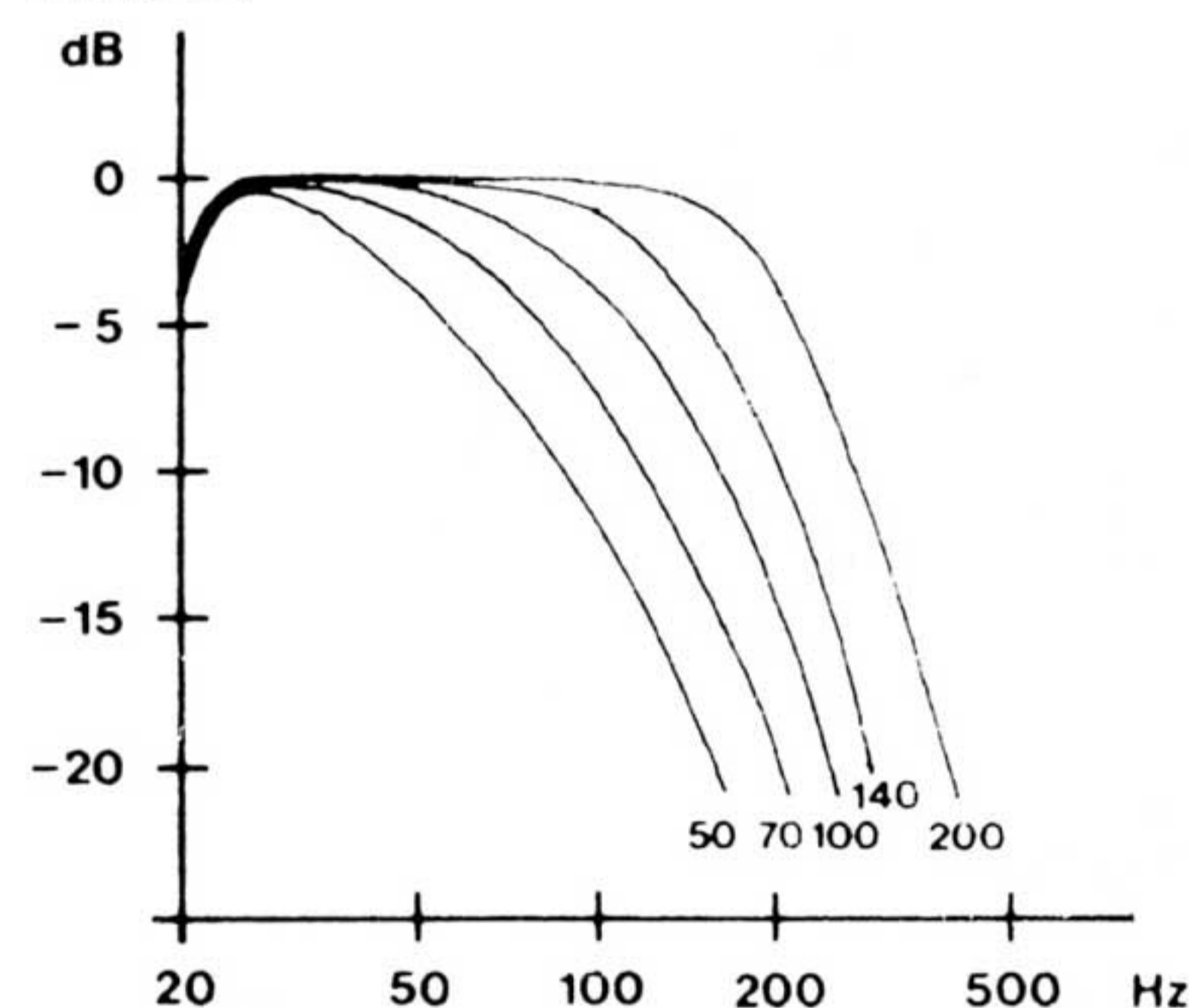
(The signal from the power amp is attenuated 20 times before it reaches the sensitivity control).

The guide value is good when the Subwoofer is placed on the floor against one wall in a normal living-room.

If the Subwoofer is free-standing on the floor, the sensitivity could be increased by 3 dB, i.e. the guide value multiplied by .7. If it, on the other hand, is placed in a corner, the sensitivity could be decreased by the same value. If the walls of your room are very inflexible it might be necessary to reduce the sensitivity somewhat.

B. Setting of upper frequency limit for Subwoofer

The lower frequency limit of Subwoofer B2-70 is always 20 Hz. With knob ⑪ "crossover frequency subwoofer" a second order (12 dB/oktave) lowpass filter is adjustable, giving an upper limit between 40 and 200 Hz as shown in the figure below.



If the Subwoofer is connected to the speaker outputs of the main amplifier (as in 4 B-, and consequently the low bass of the satellite speakers cannot be cut off, the knob should be set to the frequency where the response of the satellites are down 3 dB.

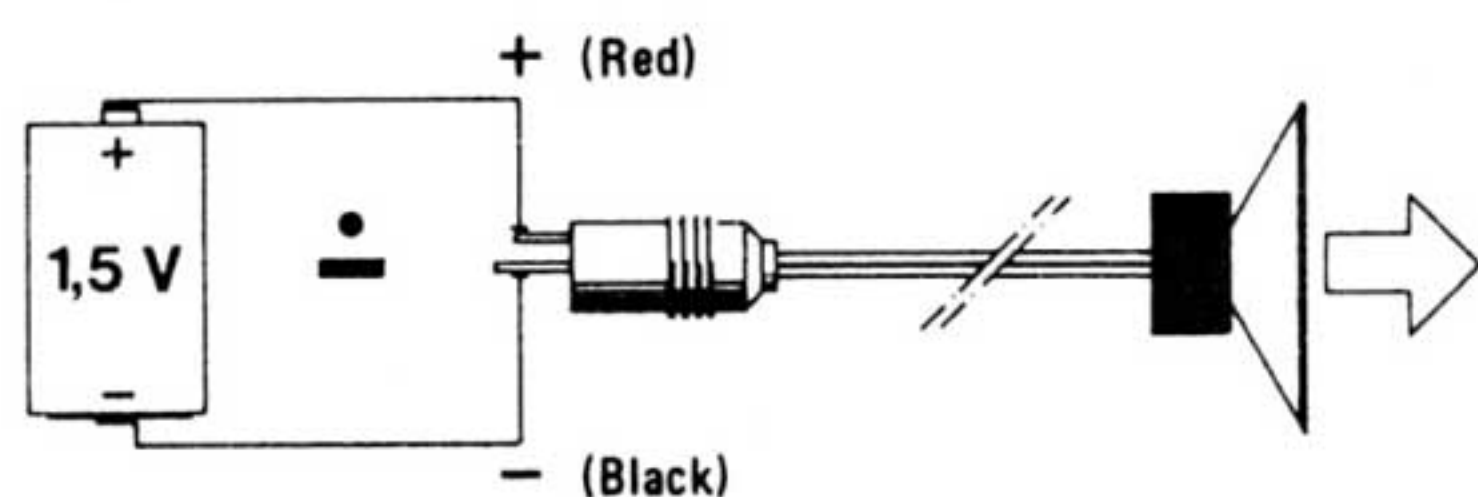
When the Subwoofer is connected between the preamp and power amp as in 4 A – which is recommended – the knob should be set to 100 Hz if your satellites have decent bass. However, if they have a resonance frequency above 70 Hz, the subwoofer should work higher up.

C. Setting of lower frequency limit for satellite speakers

Knob ⑫ "crossover frequency side-systems" is only active when the subwoofer is connected between the preamp and power amp. The purpose of this control is to match the satellites cut off frequency to the upper frequency limit of the Subwoofer, which was set in 6 B.

Note: A few power amplifiers on the market are of inverting type, i.e., they introduce 180° phase shift between input and output. If your power amplifier is of this kind, you should interchange the wires in each of the satellite speakers connections to assure that the satellite speakers and the Subwoofer blend correctly at the crossover frequency.

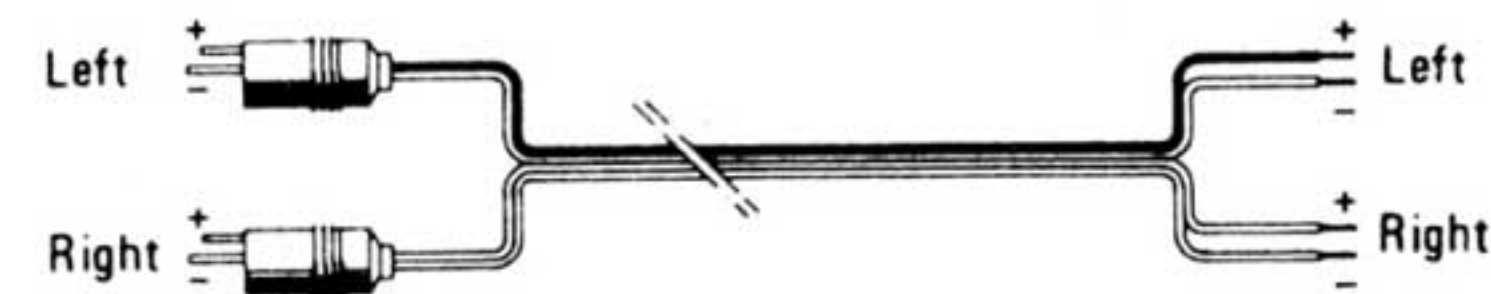
When a regular, non-inverting power amplifier is used, each satellite speaker should be connected so that the woofer cone moves outward when a battery is connected between the speaker wires with the + wire normally being connected to the "hot" (or red) terminal of the power amplifier.



Subwoofer connected to the speaker outputs of the main power amplifier

The four-pole speaker cable supplied with Audio Pro B2-70 is intended for this alternative. If your amplifier has DIN type speaker terminals, the extra DIN plugs must be installed on the free ends of the cable. Be careful to connect "hot" terminal to "hot". – See sketch below.

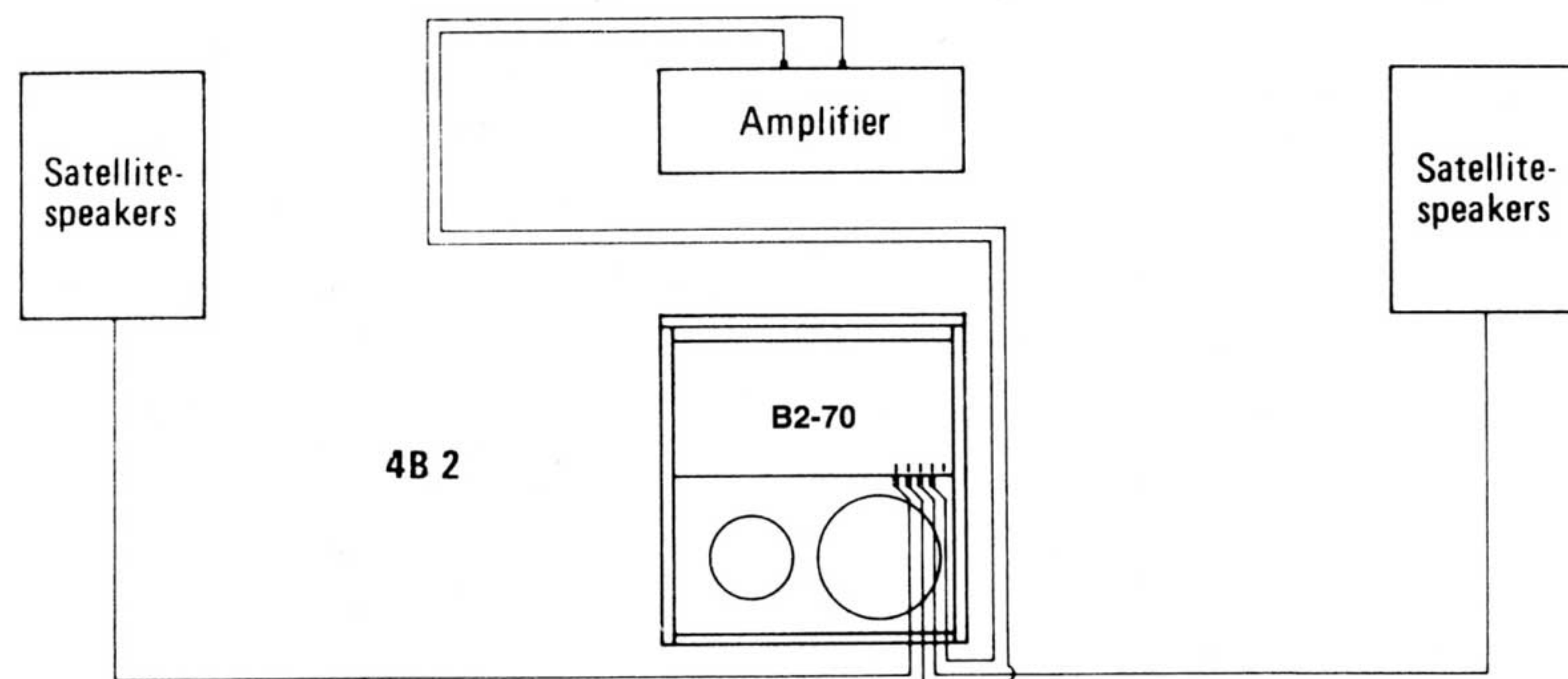
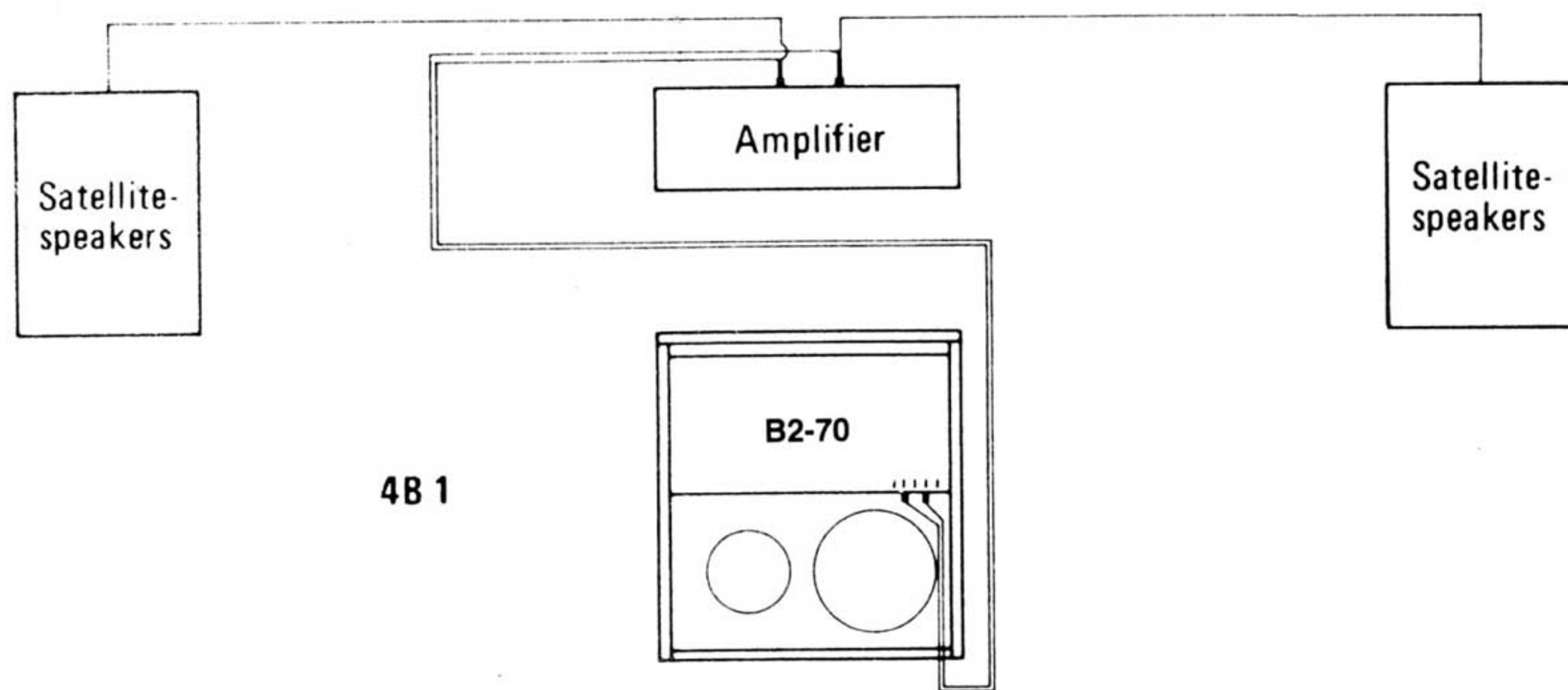
The satellite speakers should be connected in parallel to the two subwoofer channels, either at the amplifier, or at extra terminals on the Subwoofer. Use the most convenient connection method.



The speaker polarity should in this case always be normal, as described under connection alternative A above.

The low bass frequencies *cannot* be removed from the satellite speakers when the Subwoofer is connected this way.

If you want to use *two* Subwoofers B2-70, (one for left and one for right channel) both of them should have their *Left channel inputs* connected to their channel of the amplifier, because the automatic on/off function senses the left channel only.



5. Position of the Subwoofer in the listening room

In theory, the best position for the Subwoofer is midway between satellite speakers, with its front facing forward and in the same plane as the fronts of the satellite speakers.

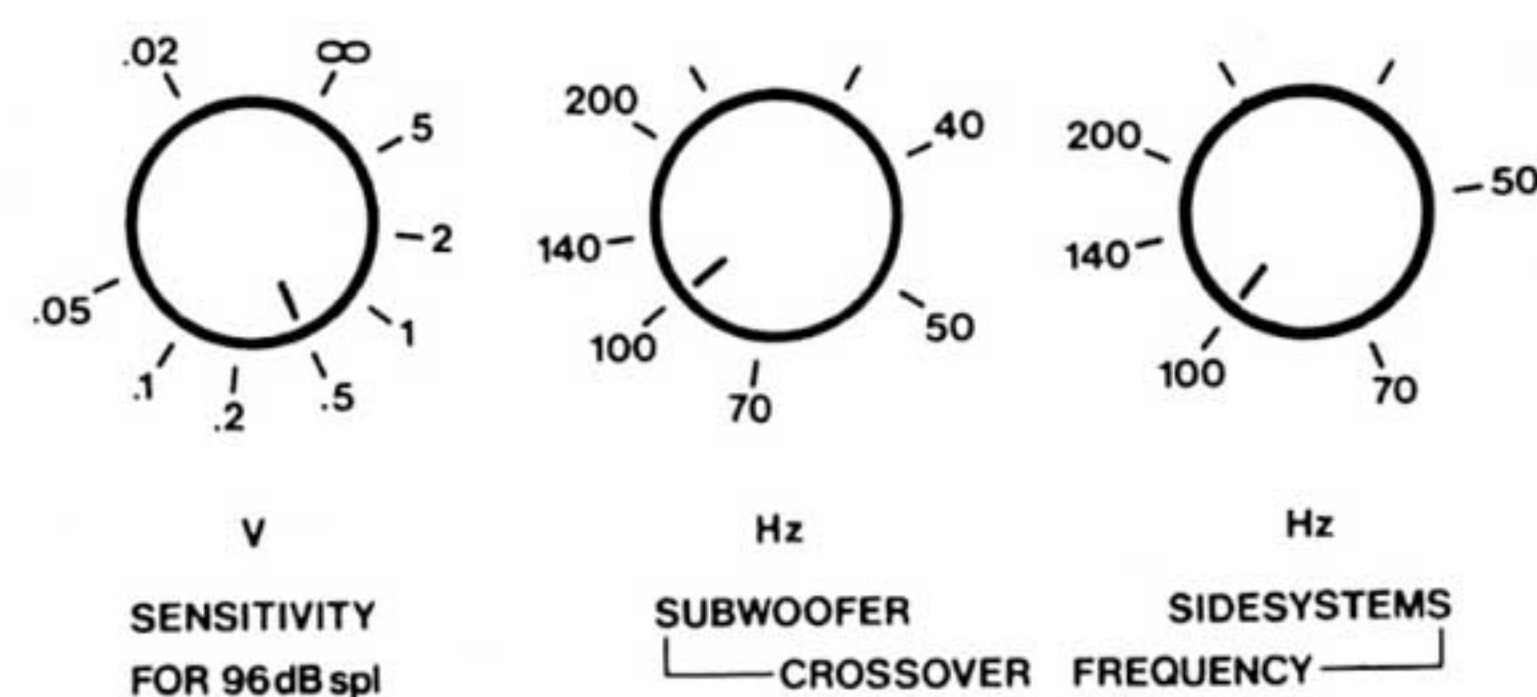
Subwoofer B2-70 may, however, in practice be moved quite far from this position without any detrimental effect on the sound reproduction. It may face forward, sideways, or towards the wall, and it may be placed near a back wall – even in a corner – or freestanding on the floor. *The restrictions are:*

Do not remove the casters. A bass reflex port radiates through the bottom, towards the floor, and 2" clearance is necessary above the floor to insure free sound radiation.

If the subwoofer is facing a wall or furniture, leave at least 3" free room in front of the grille, to insure free sound radiation and unobstructed flow of cooling air around the amplifier.

Different positions of the Subwoofer will affect its efficiency, and the room influence on the frequency response. This can be compensated most often by readjusting the filter setting (see section 6).

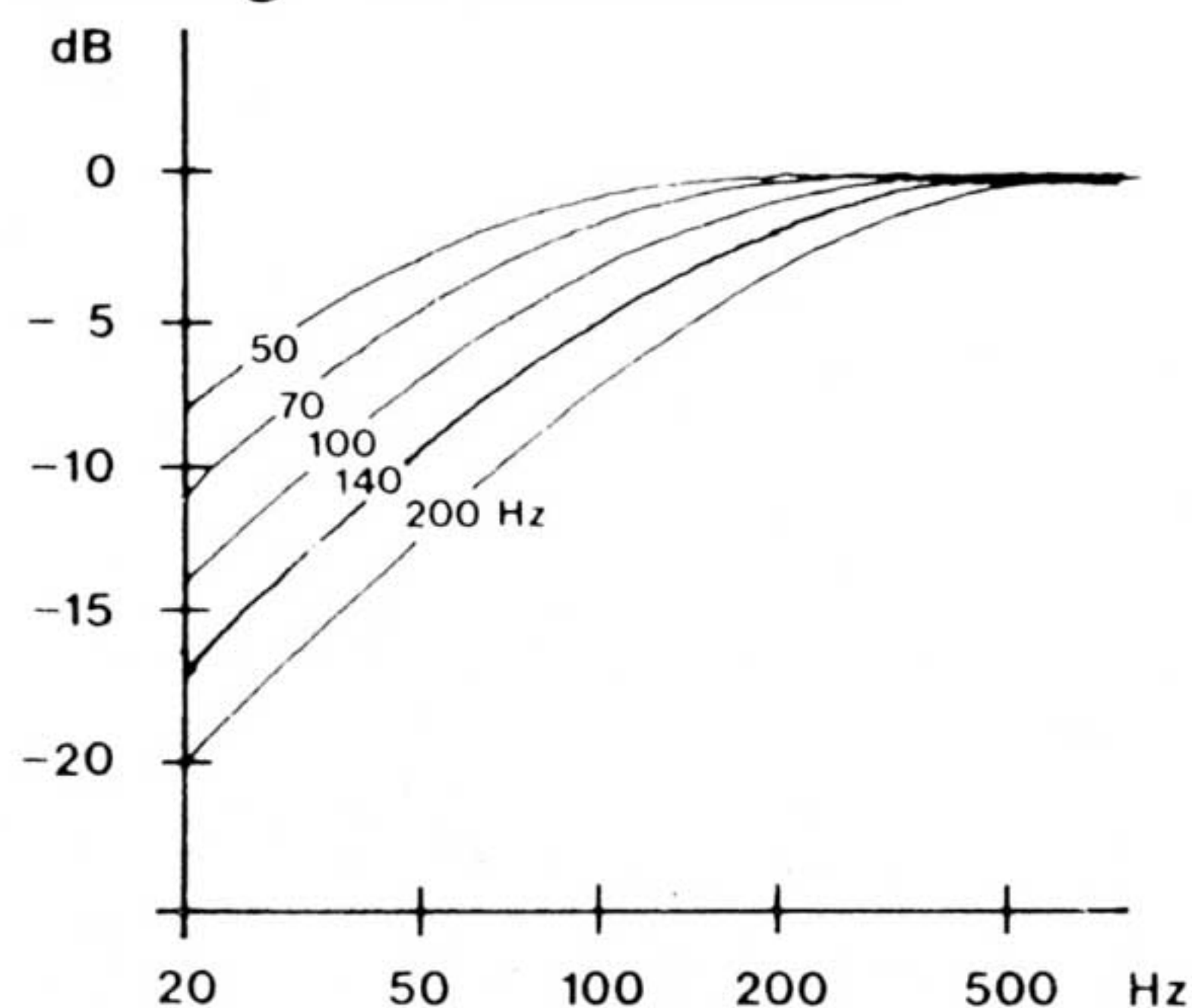
6. Setting of sensitivity and crossover filters



There are three control knobs on the top of the Subwoofer's amplifier cabinet, seen above.

These controls make it possible to match the low bass frequencies from the Subwoofer to the bass – midrange – treble sound of any good satellite stereo speakers for optimum sound, and at the same time to compensate for room effects and different positions of the Subwoofer.

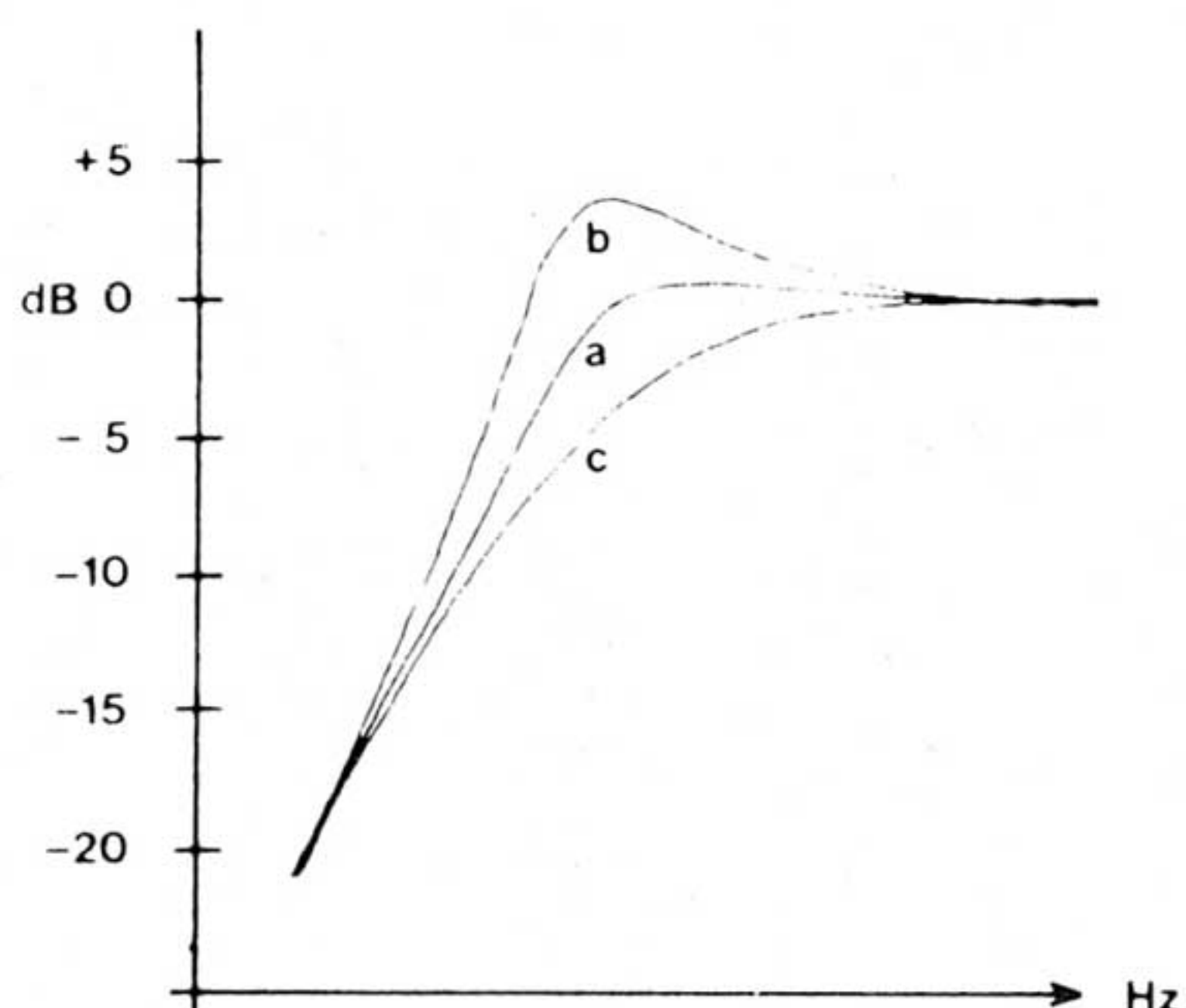
With this knob, two separate first-order (6 dB/octave) high pass filters – one for each channel – are adjustable between 50 and 200 Hz. The filtering – as shown below –



is inserted between the main creamp and main power amp.

If your satellites are properly damped at the bass resonance – as shown in curve "a" below – the knob should be selected to the same frequency as was set for the Subwoofer upper frequency limit in 6 B. If your satellite speakers are underdamped ("boomy"), the knob should be set to a higher frequency and if they are overdamped ("dry") a lower setting is best.

It is the sum of the satellites response (exemplified below) and the filters response (shown above) that should be down 3 dB at the same frequency as was set for the Subwoofer in 6 B.



Some speakers are designed to give flat frequency response when

placed freely, at least three feet from the nearest wall, floor or ceiling. When such speakers are placed against a wall (which is very common) there will be a strong raise in the frequency response in the upper bass up to 200 Hz. In these cases you must cut the bass off the sidesystems high up, while the Subwoofer must stop working at a much lower frequency. A setting of 200 Hz for the "sidesystems crossover frequency" and 120 Hz for the "subwoofer crossover frequency" is not unusual.

7. Service

Audio Pro Subwoofer B2-70 is designed and built for long term stability and reliability. It does not require any periodic maintenance or adjustments, and we trust it will serve you well for many years.

If, however, some problems should arise, we advise against repair or replacement of components except by authorized service centers who have the knowledge and the precision equipment required to properly tune your Subwoofer B2-70:

Contact your Audio Pro Dealer, for the address of your nearest service center.

Data

Frequency response:

20-200 Hz within $\pm 1,5$ dB from curve shown below, 6th order Butterworth response with -3 dB at 20 Hz, upper limit adjustable 40-200 Hz.

Sound pressure level:

At least 102 dBspl at 1 meter in half space (2π steradian solid angle).

Sensitivity (for 96 dBspl)

On preamp terminal: 20 mV -2V (adjustable) >10 kohm input impedance. With adaptor c: 4V-40V (adjustable) 5 kohm input impedance.

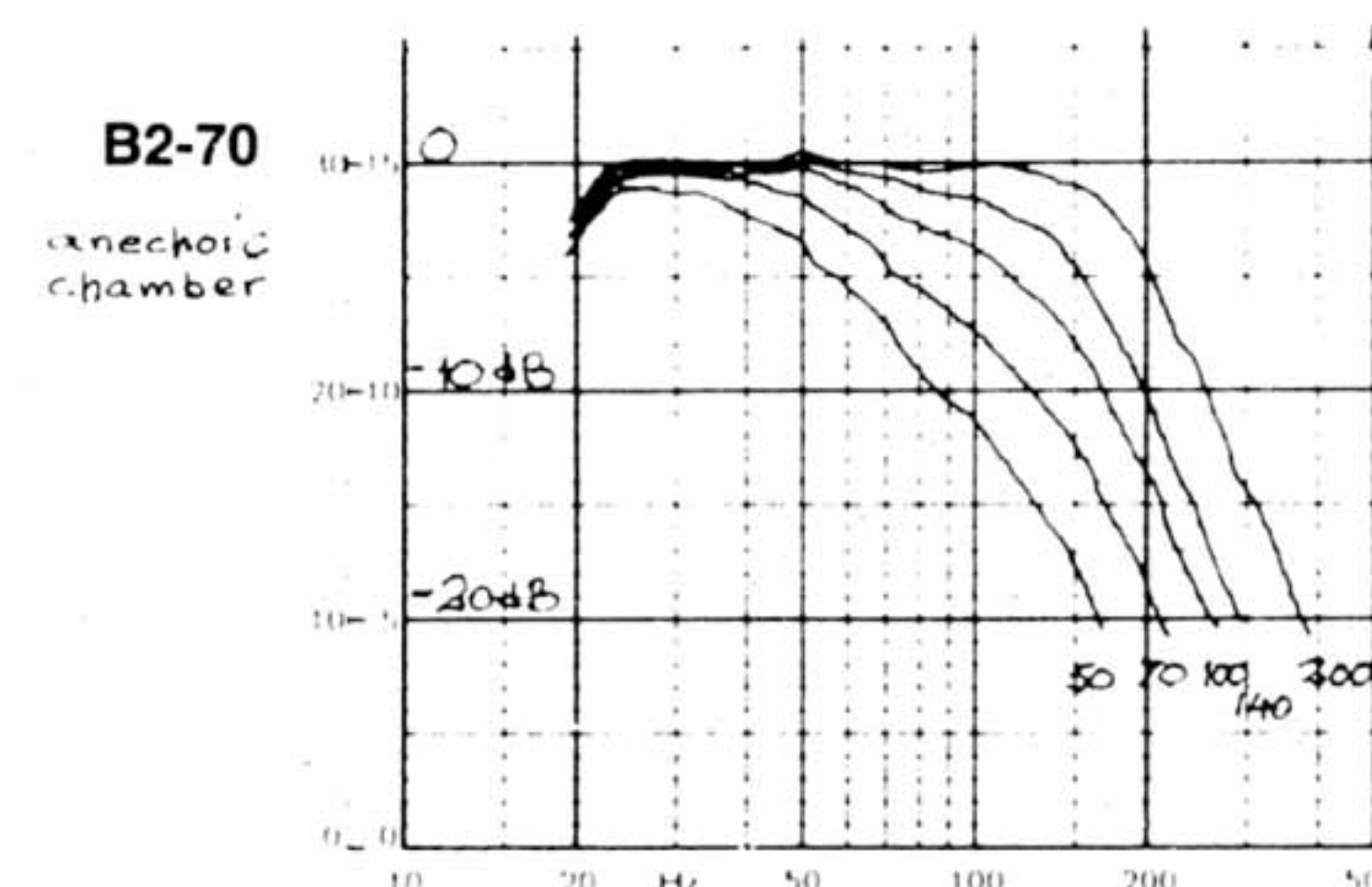
Crossover filter for satellite speakers: Variable 50-200 Hz, 6 dB/octave upper frequency limit >500 kHz, gain 1, output impedance <200 ohm, max signal out >5 V, slew rate 13 V/ μ s, distortion $<.02\%$, hum and noise – 100 dBA rel 0.5V. (Active only when preamp terminals used).

Power supply: 117/220/235/250V, 50-60 Hz, max 200 W (In standby mode 5VA)

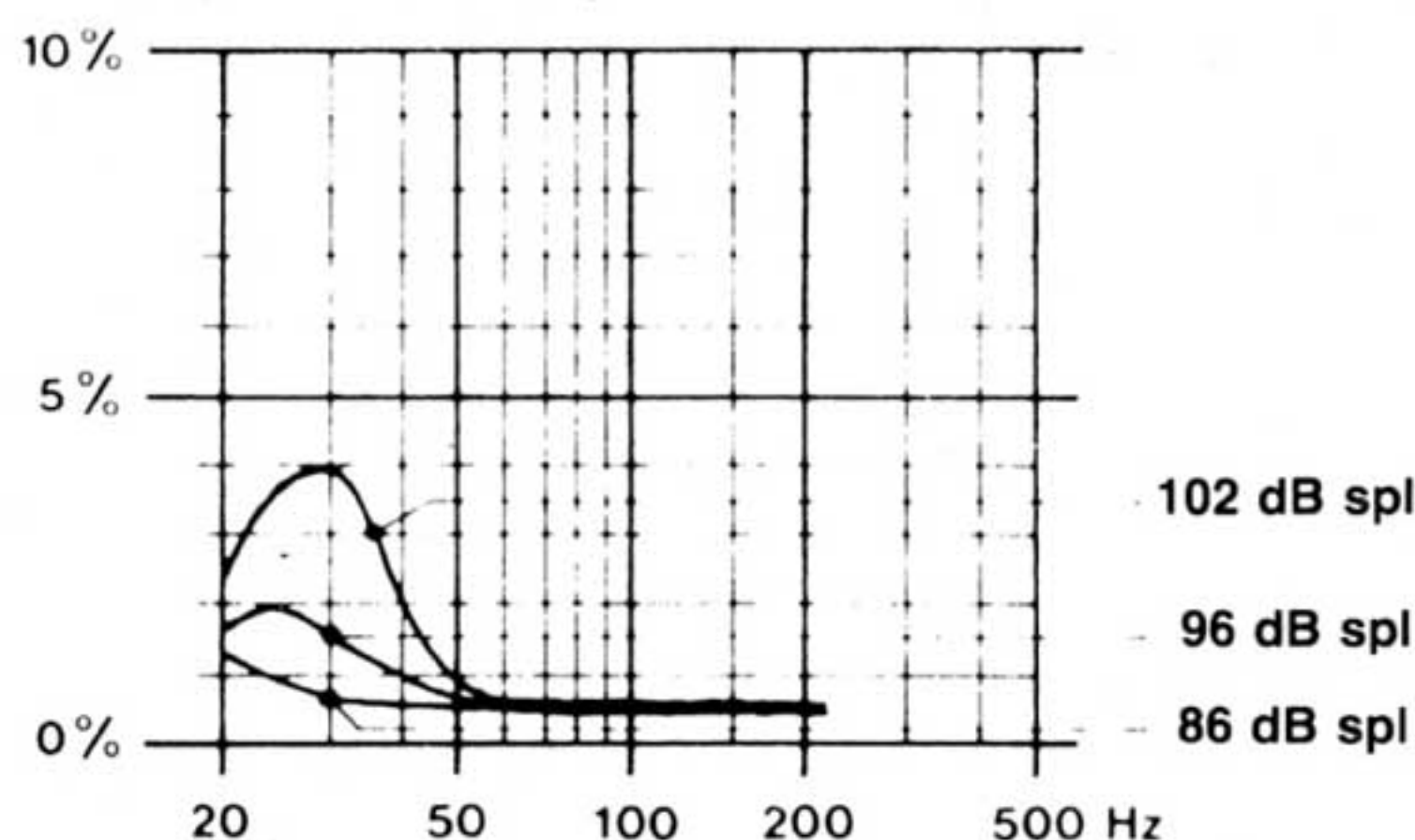
Power on/off: Signal actuated in automatic mode.

Size: 21 12/16" wide \times 17" deep \times 23 11/16" high. (Height includes casters).

Weight: 41 kg (90 lb).



Frequency response at different settings of upper frequency limit.



Typical distortion at different output levels. 2nd + 3rd harmonics.