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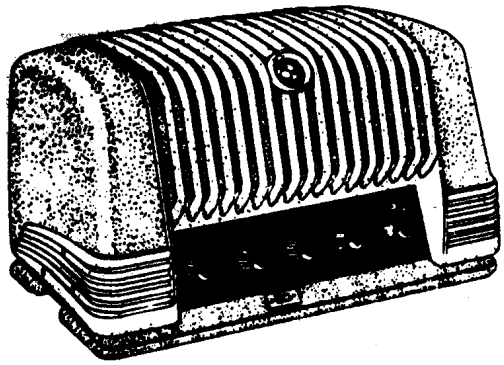
PHILIPS

SERVICE NOTES

for the

70 W AMPLIFIER

EL6420



1952

GENERAL DATA

The amplifier is mounted on a chassis of cast aluminium and has a detachable cap. The whole is streamlined.

WEIGHT

Incl. valves 20.2 kg

DIMENSIONS

Length : 425 mm
Width : 275 mm
Height : 255 mm

ILLUSTRATIONS

ELECTRICAL DATA

Input :	⏀1 and ⏀2	Ω and R
Input impedance	0.9 MΩ	70,000 - 100,000 Ω
Input sensitivity	1.55 mV	145 mV
Average hum level xx	- 56 dB	-66 dB
Average noise level	- 56 dB	-78 dB

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x Depending on the position of the volume controls.
xx The hum is measured via a special R-C filter giving about the same attenuation for the low frequencies as the ear (R = 33000 Ω and C = 22000 pF). Thus the hum measured is the actual audible hum.

Distortion at 1000 c/s	
with the limiter switched off.....	max. 5%
with the limiter switched on.....	max. 7%
internal output resistance.....	40Ω at 100 V
Power output at with the volume indicator begins to work..	6 dB below maximum output
Maximum deflection of the sensitive part of the volume indicator	3 dB below maximum
Maximum deflection of the insensitive part of the indicator.....	1 dB below maximum
Mains voltages (40 - 100 c/s).....	100,125,200,220 and 245 V
Power consumption	
in "filament heating" position.....	100 W
in working position without signal....	145 W
with signal.....	260 W

Valve complement

3 x EF40, 1 x EF22, 1 x ECC40, 2 x EL34, 2 x AX50, 1 x AZ41.
1 x EZ40, 1 x EM34.

CONNECTING THE LOUDSPEAKERS

The secondary winding of the output transformer is connected according to the 100 V system. A voltage adapter enables the output voltage to be adjusted to 100, 70, 50, 35, 25 or 10 V.
Thus loudspeakers with a 100 V matching transformer can be connected to the output (with the adapter set at 100 V). The impedance of the loudspeaker is of no consequence.
The total capacity of the loudspeakers may be about 70 W.
If it is desired to connect a total loudspeaker capacity of more than 70 W and 100 V matching transformers then the adapter has to be set to 70 V. The sound is then attenuated 3 dB per speaker and a loudspeaker capacity up to 140 W can be connected. For a still larger total loudspeaker capacity the adapter has to be set to 50 V, in which case the attenuation is 6 dB per speaker. For each step down to a lower voltage the attenuation is 3 dB more, except in the 10 V position.
The latter position is mainly for low-ohmic speakers and head-phones. Similar steps can be taken with loudspeakers having a 70 V matching transformer; with increased total loudspeaker capacity the voltage adapter is stepped down to 50 V and if necessary to 35 V.
The following table shows the possibilities

Output voltage amplifier	Maximum nominal capacity			Minimum load impedance
	100 V speakers	70 V speakers	50 V speakers	
100 V	70 W	-	-	142 Ω
70 V	140 W	70 W	-	70 Ω
50 V	280 W	140 W	70 W	35 Ω
35 V	560 W	280 W	140 W	18 Ω
25 V	1120 W	560 W	280 W	9 Ω
10 V	Headphones and low-imp. speakers			1,4 Ω

NOTE:

The quality of reproduction is not affected when too high a loudspeaker impedance is connected, thus with too few speakers.

DESCRIPTION OF CIRCUIT

The microphone terminals a1 and a2 are connected respectively to the control grids of B1 and B2 (EF40) via the separating capacitors C1 and C2 and the resistors R13 and R14. R11 and R12 are of such a value (10 MΩ) that owing to the grid current the valves B1 and B2 automatically receive a negative grid voltage. The amplified microphone voltages are laid on to the potentiometers R1 and R2 via C5 and C6. When two microphones of different sensitivity are used these potentiometers serve to equalize the signal for both channels (with the volume controls R3 and R4 wide open). Further they can be so adjusted that when the volume controls (R3 and R4) are fully open there is no "acoustical feed-back"; adjustments are made with a screw-driver.
The sliding contacts of R1 and R2 are connected to the top half of R3 and R4 respectively. R3 and R4 are centre tapped to earth. The top half of R3 serves for regulating the volume of microphone 1 and the bottom half for the volume of the pick-up. The top half of R4 is for regulating the volume of the microphone 2, the bottom half for the volume of the radio input.
The sliding contacts of R3 and R4 are connected to the control grid of B3 via R19-R20 and C7. Thus the signals on R3 (microphone 1 or pick-up) can be mixed with those on R4 (microphone 2 or radio). R19 and R20 serve to prevent as far as possible the volume of one channel being affected by adjustment of the potentiometer in the other channel. When the limiter is switched off the bottom of R21 is earthed via R23 and SK2b.
B3 then receives a negative grid voltage via the cathode resistance R22. When the limiter is switched on, and the output signal is strong enough, a regulating voltage is fed to the control grid. The limiter circuit will be explained at greater length.
Between the anode of B3 and the control grid of B4 is the tone control. When the limiter switch SK2 is in the "off" position C12 is shorted and the signal is then laid on via C11 to the junction point C13-R27. When SK2a is opened a series capacitor C12 (820 pF) is cut in and the low notes are attenuated.
The high and the low notes can be made stronger or weaker with the aid of R5 and R6 respectively. The working of the tone control is illustrated in fig. 2a, where the situation is drawn with R5 at +H and R6 at +B (maximum position).