

**INSTRUCTION MANUAL**

**COMMUNICATION**

**RECEIVER**

**Type M 84**



**DANSK RADIO AKTIESELSKAB**  
**WORKS: ELEKTROMEKANO ½**

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**INSTRUCTION MANUAL**

**COMMUNICATION**

**RECEIVER**

**Type M 84**

I. Technical Data.

A. Receiver.

Circuit:

The receiver utilizes a 6½-valve double superheterodyne circuit, comprising 1 stage of radio-frequency amplification, 2 stages of intermediate-frequency amplification, 1 stage of audio-frequency amplification and a pentode output stage.

Type of Reception:

1. Unmodulated telegraphy A1 (B.F.O. 110 kc/s.)
2. Modulated telegraphy A2.
3. Telephony A3.

Frequency Range:

15 kc/s. to 545 kc/s. and 670 kc/s. to 26.0 Mc/s. covered by seven bands as follows:

Band 1.	15	to	240 kc/s.
Band 2.	220	to	545 kc/s.
Band 3.	670	to	1650 kc/s.
Band 4.	1500	to	3800 kc/s.
Band 5.	2900	to	8000 kc/s.
Band 6.	7.0	to	18.5 Mc/s.
Band 7.	16.5	to	26.0 Mc/s.

Accuracy of Adjustment:

The receiver is calibrated in kc/s. and Mc/s. The accuracy of adjustment is:

At 500 kc/s. one millimeter main-dial division is equal to a 2 kc/s. change of frequency.

At 25 Mc/s. one millimeter main-dial division is equal to a 0.03 Mc/s. change of frequency.

Moreover, the main dial is divided in 100 degrees. One degree on the main dial is equivalent to ten degrees on the vernier dial, which is fitted to the tuning knob. The receiver is equipped with a vernier tuning knob (ratio 6 : 1).

Frequency Stability:

Provided that the voltages remain constant there will be no noticeable frequency drift.

Sensitivity:

For an output of 5 mW required input voltage is 0.2 to 4.0  $\mu$ V.

Selectivity:

The selectivity can be varied in three steps by means of a switch. The bandwidth for a 6-db attenuation and for a 30-db attenuation, respectively, is as follows:

<u>Switch</u>	<u>Attenuation</u>	
<u>Position:</u>	6 db:	30 db:
"Wide":	7.2 kc/s.	9.2 kc/s.
"Medium":	3.6 kc/s.	7.0 kc/s.
"Narrow":	2.2 kc/s.	4.4 kc/s.

The selectivity switch has a fourth position, marked "Note Filter", which, after the narrowest pass-band, introduces a low frequency filter in the audio frequency circuit, this filter being tuned to approximately 1000 c/s. A beat note that deviates  $\pm$  350 c/s. from 1000 c/s. is here attenuated by at least 20 db.

Image Suppression:

At 1900 kc/s. the image signal is attenuated 90 db.

Automatic Gain Control:

A.G.C. bias is applied to three valves. Values of the output voltage corresponding to various values of the input voltage are given below:

Input :	2.0	4.0	8.0	16.0	32.0	64.0	128.0	μV.
Output:	2.4	4.8	7.3	9.5	12.2	15.3	16.7	V.

Load Impedance:

Telephone : 300 Ω

Loudspeaker: 3.2 Ω

Valves:

M 84 A:

M 84 B:

1	EF 9	1	EF 9
2	ECH 3	2	ECH 3
1	EBF 2	1	EBF 2
1	ECF 1	1	ECF 1
1	CL 6	1	EL 2
		1	AZ 1 (A.C.operation)

B. Power Supply.

Receiver Type M 84 A:

The receiver type M 84 A is designed to operate from the ship's 110-volt D.C.mains.

Receiver Type M 84 B:

The receiver type M 84 B is designed to operate from the ship's 220-volt D.C.mains or from a 220-volt, 50-c/s. A.C.power source, in which case a rectifier unit is mounted on the receiver chassis inside the cabinet.

The receiver type M 84 B may be operated from a 6-volt, 12-volt, 24-volt or 30-volt storage battery (emergency battery). A switch for "series-parallel" connection of the valve filaments according to the battery voltage is provided on the receiver chassis. The anode voltage is provided by a motor generator which converts the battery voltage into 220 V D.C.

Power Consumption:

Type M 84 A.

110-volt D.C.mains operation: 30 W (270mA) approx.

Type M 84 B.

220-volt D.C.mains operation: 60 W (260mA) approx.

220-volt A.C.mains operation: 50 W approx.

Battery operation:

Anode supply, motor generator: 40 W approx.

Filament supply:	6 V	1.6 A
	12 V	0.8 A
	24 V	0.4 A
	30 V	0.4 A

### C. Dimensions and Weight.

Receiver in Cabinet:      Height:    36 cm  
                                 Width :    61 cm  
                                 Depth :    45 cm  
  
                                 Weight:    32 kg approx.

## II. Design.

### A. Mechanical Design.

The receiver is built up on a sturdy aluminium chassis, which is fitted to an aluminium front panel with insulation between. The chassis is protected by a steel cabinet. All control knobs are located on the front panel and are duly marked.

The chassis slides on built-in "Pertinax" (laminated plastic) rails in such a way that when replacing valves and inspecting the receiver the chassis can be drawn out of the cabinet without breaking the connections with the antenna and the power supply.

### B. Electrical Design.

The antenna is inductively coupled to the tuning circuit, which is tuned by one of the sections of a four-gang variable capacitor. The "cold end" of the antenna coupling coil is insulated from the chassis and is brought out to the terminal marked "Ground" (below the antenna plug). On band 1 the antenna is coupled through a R.C.filter without being tuned. The impedance of the antenna coil is approximately 100  $\Omega$ .

On band 4, which is the telephony band, the tuning circuit is coupled as a band-pass filter since the antenna coil over a 5-pF capacitor is coupled to a second circuit. This second circuit is tuned by another section of the four-gang variable capacitor, and then coupled to the grid of the R.F.amplifying valve.

The third section of the four-gang variable capacitor tunes the second R.F.circuit, (which, however, on band 1 is coupled, without being tuned, to the frequency changer through a low-pass filter with the cut-off frequency 320 kc/s.) while the fourth section tunes the first oscillator.

The first I.F.amplifying valve is coupled to the frequency changing valve by means of a 570-kc/s. band-pass filter with critical coupling. The triode section of the first I.F.amplifying valve is employed as a second oscillator tuned to 680 kc/s. the stage being used as a second frequency changer, in which the frequency is changed to 110 kc/s. This frequency changer is coupled to the second I.F.amplifying valve via a double band-pass filter with a variable coupling and by this means the variable selectivity operates. Between the second I.F.valve and the detector is a band-pass filter with critical coupling. In the second I.F.amplifying valve are 2 diodes, which are used as detector and A.G.C.diode, respectively.

After the detector is the A.F.amplifying valve (pentode), which also contains a triode section used as a beat frequency oscillator (110 kc/s.) with variable frequency. The beat frequency oscillator is loosely coupled to the detector diode.

Resistance couplings are used between the detector and the A.F.amplifying valve and between the A.F.amplifying valve and the output valve.

The R.F.gain control regulates the grid bias for the R.F. and I.F. amplifying valves as it is connected as a variable cathode resistor for these valves. The A.F.gain control is arranged in the normal way by means of a potentiometer between the detector and the A.F.amplifying valve. Between the A.F.amplifying valve and the output valve is the note filter, which is tuned to 1000 c/s. To avoid losing too much of the signal strength, the note filter is provided with a feed-back from the anode of the output valve. The loud-speaker is fitted with an attenuator to limit acoustic feed-back during application of highest selectivity on short wave.

The type of reception switch ("Wave Type") has three positions:

1. A1.
2. A2 (and A3).
3. A.V.C.

When the type of reception switch is set in position 1, the beat frequency oscillator (B.F.O.) functions, while the automatic gain (volume) control (A.V.C.) is out of action. When the switch is set in position 2, neither the B.F.O. nor the A.V.C. functions, and when it is set in position 3, the A.V.C. functions, but the B.F.O. and the R.F.gain control are out of action.

The switch for loudspeaker and telephone has three positions:

1. Handset.
2. External Loudspeaker.
3. Internal (built-in) Loudspeaker.

This switch is used for selecting the telephone (the handset), the external loudspeaker or the built-in loudspeaker.

An ordinary headphone set (300  $\Omega$ ) may be connected to the jacks on the front panel of the receiver.

### III. Operating Instructions.

The receiver has the following control knobs and switches:

1. R.F.gain control ("R.F.Volume").
2. Type of reception switch ("Wave Type").
3. Frequency band switch.
4. Tuning knob.
5. Power switch.
6. Selectivity control.
7. Beat frequency oscillator control.
8. A.F.gain control ("A.F.Volume").
9. Switch for loudspeakers and telephone.

To start the receiver: Close the switch for filament and anode currents. Place the frequency band switch on the required band and tune for the desired frequency by means of the big tuning knob.

Set the switch for loudspeakers and telephone in the required position.

Set the type of reception switch in the position for that type of emission which is to be received, and regulate the R.F. and A.F.gain controls for the-desired volume from the loudspeaker or telephone.

When receiving A1 or A2 signals the A.F.gain control should be set on maximum gain and the R.F.gain control should be regulated for the desired volume from the loudspeaker or telephone.

When using the automatic gain control (for broadcast reception), the R.F. gain control is out of action and the A.F. gain control should be adjusted for the desired volume from the loudspeaker or telephone.

If, when receiving A1 signals, the reception is disturbed by noisy interference, an improvement of the reception may be obtained when the selectivity switch is set in position "Note Filter" and the B.F.O. control knob is adjusted for a beat note corresponding to the resonance frequency of the note filter, i.e. approximately 1000 c/s.

#### IV. Installation Instructions.

When delivered from the factory, the receiver is normally adjusted for the operating voltage ordered by the customer. In order to ensure that the receiver is adjusted for the correct operating voltage before it is connected to the power source in question, it should be checked that the indicator for the operating voltage switch on the chassis shows the figure for the voltage in question. The switch is adjusted from the under side of the chassis by means of a pair of flat pliers.

If the receiver is to be operated from a power source of ~~110 V D.C.~~, 220 V D.C. or 220 V A.C., the wires from the power source are connected to the two terminals at the top of the terminal strip on the cabinet. If the receiver is to be operated from a storage battery, the anode voltage from the motor generator is applied to the receiver through the two top terminals, as mentioned above, while the filament voltage from the battery is applied to the receiver ~~through the two terminals underneath.~~ \*

The receiver must be provided with two separate grounding wires, which are brought direct to the receiver, the one being connected to the terminal marked "Ground" on the left-hand side of the cabinet and the other being connected to the terminal marked "Ground" (or "0") on the right-hand side of the cabinet.

\* Through pin 3 and 4 in P4B for 6V = 1/2 of 12V =

# PARTS LIST

5-valve Receiver

TYPE: M 84 B

220V / 24V - 220V

DIAGRAM No. 1911/1912

2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C 1	Antenna capacitor	300 pF	30 B	SRC
C 2	Stopper circuit capacitor	500 pF	40 B	"
C 3	Ground capacitor	0.05 $\mu$ F 350 V	W 48	Hunts
C 4	Trimming capacitor	5-40 pF	16 Fa	Stettner
C 5	" "	"	"	"
C 6	" "	"	"	"
C 7	" "	"	"	"
C 8	" "	"	"	"
C 9	" "	"	"	"
C10				
C11	Trimming capacitor	5-40 pF	16 Fa	Stettner
C12	Filter capacitor	50 pF	SCT 1	TCC
C13	" "	"	"	"
C14	Coupling capacitor	10000 pF	Miniwax	Janko
C15	" "	5 pF	SCT 11	TCC
C16	Parallel capacitor	30 pF	10 B	SRC
C17	" "	"	"	"
C18	Series capacitor	167 pF	20 B	"
C19	Variable capacitor	2x(2x500)pF	UG	Torotor
C20				
C21	Decoupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C22	Cathode by-pass capacitor	0.1 $\mu$ F 350V	"	"
C23	Decoupling capacitor	"	"	"
C24	" "	"	"	"
C25	Filter capacitor	1000 pF	CM20N	TCC
C26	" "	"	"	"
C27	" "	"	"	"
C28	" "	"	"	"



# PARTS LIST

6-valve Receiver

TYPE: M 84 B 220 V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C 29	Filter capacitor	1000 pF	CM20N	TCC
C 30				
C 31	Grid capacitor	100 pF	"	"
C 32	Trimming capacitor	5-40 pF	16 Fa	Stettner
C 33	" "	"	"	"
C 34	" "	"	"	"
C 35	" "	"	"	"
C 36	" "	"	"	"
C 37	" "	"	"	"
C 38	Parallel capacitor	30 pF	10 B	SRC
C 39	" "	"	"	"
C 40				
C 41	Coupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C 42	Filter capacitor	50 pF	SCT 1	TCC
C 43	" "	"	"	"
C 44	" "	100 pF	CM20N	"
C 45	Series capacitor	167 pF	20 B	SRC
C 46	Grid capacitor	100 pF	CM20N	TCC
C 47	Decoupling capacitor	0.1 $\mu$ F 350V	W 48	Hunts
C 48	Cathode by-pass capacitor	"	"	"
C 49	Grid capacitor	50 pF	SCT 1	TCC
C 50				
C 51	Filter capacitor	1000 pF	CM20N	TCC
C 52	" "	"	"	"
C 53	" "	"	"	"
C 54	Decoupling capacitor	0.1 $\mu$ F 350V	W 48	Hunts
C 55	" "	"	"	"
C 56	" "	"	"	"

# PARTS LIST

6 $\frac{1}{2}$ -valve Receiver

TYPE: M 84B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C 57	Parallel capacitor	30 pF ceram.	KTN	TJ
C 58	" "	"	"	"
C 59	" "	"	"	"
C 60				
C 61	Parallel capacitor	15pF ceram.	KTN	TJ
C 62	" "	150 pF	20 B	SRC
C 63	" "	30 pF ceram.	KTN	TJ
C 64	Padding capacitor	100pF + 70pF	20B KRN	SRC TJ
C 65	" "	5700 pF	50 B	"
C 66	" "	2820 pF	50 B	"
C 67	" "	1275 pF	"	"
C 68	" "	630 pF	"	"
C 69	" "	267 pF	30 B	"
C 70				
C 71	Padding capacitor	600 pF	50 B	SRC
C 72	Trimming capacitor	10pF-variation + 20pF	82753/10E KTN	Philips TJ
C 73	" "	"	"	"
C 74	" "	10pF-variation + 25pF	"	"
C 75	" "	10pF-variation + 10pF	"	"
C 76	" "	10pF-variation + 5pF	"	"
C 77	" "	10pF-variation + 20pF	"	"
C 78	" "	10pF-variation + 10pF	"	"
C 79				
C 80				
C 81	Tuning capacitor	200 pF	20 B	SRC
C 82	" "	"	"	"
C 83	Decoupling capacitor	0.05 $\mu$ F 850 V	W 48	Hunts
C 84	" "	0.1 $\mu$ F	"	"

# PARTS LIST

6-valve Receiver

TYPE: M 84B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C 85	Decoupling capacitor	0.1 $\mu$ F	W 48	Hunts
C 86	Cathode by-pass capacitor	"	"	"
C 87	Decoupling capacitor	"	"	"
C 88	" "	"	"	"
C 89	" "	"	"	"
C 90				
C 91	Decoupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C 92	" "	"	"	"
C 93	Grid capacitor	50 pF	SCT 1	TCC
C 94	Tuning capacitor	300 pF	30 B	SRC
C 95	" "	"	"	"
C 96	" "	"	"	"
C 97	" "	"	"	"
C 98	" "	"	"	"
C 99	Coupling capacitor	0.1 $\mu$ F 350V	W 48	Hunts
C100				
C101	Coupling capacitor	20000 pF 400V	0A (EXT)	TJ
C102	" "	10000pF "	" "	"
C103	" "	15000pF "	" "	"
C104	" "	7500 pF "	" "	"
C105	Correcting capacitor	10000pF "	" "	"
C106	" "	5000 pF "	" "	"
C107	" "	10000pF "	" "	"
C108	" "	5000 pF "	" "	"
C109	" "	4000 pF "	" "	"
C110				
C111	Correcting capacitor	7500 pF 400V	0A (EXT)	TJ
C112	" "	4000 pF "	" "	"

# PARTS LIST

6-valve Receiver

TYPE: M 84 B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C113	Correcting capacitor	7500 pF 400V	0A (EXT)	TJ
C114	Tuning capacitor	300 pF	30 B	SRC
C115	" "	"	"	"
C116	Coupling capacitor	100 pF	CM20N	"
C117	" "	0.05 $\mu$ F 350V	W 48	Hunts
C118	" "	"	"	"
C119	Filter capacitor	50 pF	SCT 1	TCC
C120				
C121	Filter capacitor	50 pF	SCT 1	TCC
C122	Decoupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C123	" "	0.1 $\mu$ F	W 48	"
C124	" "	"	"	"
C125	Cathode by-pass capacitor	50 $\mu$ F 12V	CE32B	TCC
C126	Filter capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C127	" "	"	"	"
C128	Decoupling capacitor	0.5 $\mu$ F 350V	"	"
C129	" "	"	"	"
C130				
C131	Cathode by-pass capacitor	50 $\mu$ F 12V	CE32B	TCC
C132	Decoupling capacitor	0.05 $\mu$ F 350 V	W 48	Hunts
C133	" "	"	"	"
C134	" "	0.1 $\mu$ F 350V	"	"
C135	Tuning capacitor	500 pF	40 B	SRC
C136	Variable capacitor	30 pF	LTD	Prahn
C137	Grid capacitor	50 pF	SCT 1	TCC
C138	Coupling capacitor	5 pF	SCT 11	"
C139	" "	0.05 $\mu$ F 350V	W 48	Hunts
C140				

# PARTS LIST

6-valve Receiver

TYPE: M 84B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
C141	Coupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C142	Coupling capacitor	0.05 $\mu$ F 350V	W 48	Hunts
C143	Tuning capacitor	0.03 $\mu$ F	412	Dubilier
C144	Decoupling capacitor	0.1 $\mu$ F 350V	W 48	Hunts
C145	Cathode by-pass capacitor	50 $\mu$ F 50V	CE61D	TCC
C146	Ground capacitor	5000pF 5000V		TJ
C147	Filter capacitor	0.1 $\mu$ F 600V	ARX 4	Wicon
C148	" "	"	"	"
C149	" "	2 $\mu$ F 350V	OK	TJ
C150				
C151	Filter capacitor	4 $\mu$ F 350V	OK	TJ
C152	" "	25+25 $\mu$ F/350	5374k/25+25	Philips
C153				
C154				
C155				
F 1	Fuse	1.0 A	Midget	
F 2	"	0.2 A	"	
L 1	I.F.stopper circuit coil	160 $\mu$ H		Elektrom.
L 2	Antenna coil range 7	0.5 $\mu$ H		"
L 3	" " " 6	0.9 $\mu$ H		"
L 4	" " " 5	5.5 $\mu$ H		"
L 5	" " " 4	21 $\mu$ H		"
L 6	" " " 3	106 $\mu$ H		"
L 7	" " " 2	990 $\mu$ H		"
L 8	" " " 1			"

# PARTS LIST

6-valve Receiver

TYPE: M 84B 220V

DIAGRAM No. 1911/1912

2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
L 9	Band-pass filter coil range 4	21 $\mu$ H		Elektrom.
L 10				
L 11	R.F.circuit coil range 7	0.5 $\mu$ H		Elektrom.
L 12	" " " 6	0.9 $\mu$ H		"
L 13	" " " 5	5.5 $\mu$ H		"
L 14	" " " 4	21 $\mu$ H		"
L 15	" " " 3	106 $\mu$ H		"
L 16	" " " 2	990 $\mu$ H		"
L 17	Low-pass filter coil	8.8 mH		"
L 18	" " "	"		"
L 19	Oscillator coil range 7	0.45 $\mu$ H		"
L 20				
L 21	Oscillator coil range 6	0.68 $\mu$ H		Elektrom.
L 22	" " " 5	4.8 $\mu$ H		"
L 23	" " " 4	15 $\mu$ H		"
L 24	" " " 3	42 $\mu$ H		"
L 25	" " " 2	160 $\mu$ H		"
L 26	" " " 1	220 $\mu$ H		"
L 27	I.F. transformer 570 kc/s.	370 $\mu$ H		"
L 28	Local oscillator coil 1680kc/s.	175 $\mu$ H		"
L 29	I.F.transformer 110 kc/s.	7 mH		"
L 30				
L 31	I.F.transformer 110 kc/s.	7 mH		Elektrom.
L 32	" " " "	"		"
L 33	B.F.O. coil	4 mH		"
L 34	Note filter coil 1000 c/s.			"
L 35	Filter coil			"
L 36	"		K 300	Lübcke

# PARTS LIST

6-valve Receiver

TYPE: M 84B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
L 37	Filter coil		D0-250	Lübcke
L 38				
L 39				
L 40				
LS1	Loudspeaker	3.2 Ω	Gnom	Peerless
P1a	Antenna coaxial socket		75360	
P1b	Antenna coaxial plug		75364	
P2a	" " "		L734/P	Bell Lee
P2b	Antenna coaxial socket		L604/s	
P3a	Socket on chassis	7-conductor	4150	Bell Lee
P3b	Plug inside cabinet	"	4149	"
P4a	Plug on power supply unit	10-conductor		Elektrom.
P4b	Socket on chassis	"	4152	Bell Lee
P5a	Socket for headset & loudspeaker	5-conductor	4144	"
P5b	Plug for headset & loudspeaker	"	4143	"
R 1	Filter resistor	5.1 kΩ	ABT (1W)	Vitrohm
R 2	Grid resistor	0.51 MΩ	"	"
R 3	Cathode resistor	300 Ω	"	"
R 4	Screen grid resistor	51 kΩ	"	"
R 5	Filter resistor	5.1 kΩ	"	"
R 6	Anode resistor	"	"	"
R 7	Grid resistor	0.51 MΩ	"	"
R 8	Screen grid resistor	68 kΩ	"	"
R 9	Cathode resistor	240 Ω	"	"
R10				

# PARTS LIST

6-valve Receiver

TYPE: M 84 B 220V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
R11	Screen grid resistor	20 kΩ	ABT(1W)	Vitrohm
R12	Suppression resistor	100 Ω	SBT(½W)	"
R13	" "	"	"	"
R14	Grid leak	51 kΩ	ABT(1W)	"
R15	Voltage divider resistor	15 kΩ	"	"
R16	" " "	20 kΩ	"	"
R17	Decoupling resistor	5.1 kΩ	"	"
R18	" "	27 Ω	"	"
R19	" "	5.1 kΩ	"	"
R20				
R21	Screen grid resistor	20 kΩ	ABT(1W)	Vitrohm
R22	Filter resistor	0.1 MΩ	"	"
R23	Screen grid resistor	68 kΩ	"	"
R24	Cathode resistor	240 Ω	"	"
R25	Filter resistor	0.1 MΩ	"	"
R26	Grid leak	51 kΩ	ABT(1W)	Vitrohm
R27	Decoupling resistor	5.1 kΩ	"	"
R28	" "	"	"	"
R29	" "	"	"	"
R30				
R31	Filter resistor	0.5 MΩ	ABT(1W)	Vitrohm
R32	Screen grid resistor	51 kΩ	"	"
R33	Decoupling resistor	5.1 kΩ	"	"
R34	Cathode resistor	300 Ω	"	"
R35	Filter resistor	1.0 MΩ	"	"
R36	" "	"	"	"
R37	Load resistor	0.68 MΩ	"	"
R38	" "	0.30 MΩ	"	"



# PARTS LIST

6-valve Receiver

TYPE: M 84 B 220 V

DIAGRAM No. 1911/1912 2070/2071

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
R39	Load resistor	0.27 MΩ	ABT(1W)	Vitrohm
R40				
R41	Filter resistor	0.2 MΩ	ABT(1W)	Vitrohm
R42	Potentiometer, A.F. gain control	0.5MΩ Law Log.	P54-KII	"
R43	Grid resistor	0.51 MΩ	ABT(1W)	"
R44	Cathode resistor	2.0 kΩ	"	"
R45	" "	1.5 kΩ	"	"
R46	Screen grid resistor	0.82 MΩ	"	"
R47	Decoupling resistor	20 kΩ	"	"
R48	Anode resistor	0.20 MΩ	"	"
R49	Grid leak	0.10 MΩ	"	"
R50				
R51	Decoupling resistor	0.20 MΩ	ABT(1W)	Vitrohm
R52	Potentiometer, R.F. gain control	2.5kΩ <sup>Law</sup> Anti-log.	CLR5001	Colvern
R53	Series resistor	51 kΩ	ABT(1W)	Vitrohm
R54	Feedback resistor	1.5 MΩ	"	"
R55	Grid resistor	0.51 MΩ	"	"
R56	Suppression resistor	51 kΩ	SBT(½W)	Vitrohm
R57	Negative feedback resistor	3.0 MΩ	ABT(1W)	"
R58	Cathode resistor	500 Ω	GL(3W)	"
R59	Load resistor	5.0 Ω	"	"
R60				
R61	Damping resistor	2 Ω	GL(3W)	Vitrohm
R62	" "	3 Ω	"	"
R63	Series resistor	15 Ω	"	"
R64	" "	"	"	"
R65	" "	500 Ω	DKS(25W)	"
R66	" "	"	"	"

# PARTS LIST

6-valve Receiver

TYPE: M 84 B 220 V

DIAGRAM No. 1911/1912 2070/2071

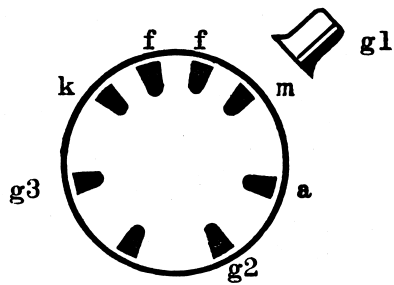
SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
R67	Series resistor	200 Ω	GL(3W)	Vitrohm
R68	" "	"	"	"
R69	Thermistor		CZ 3	Herofon
R70	"		"	"
R71	Series resistor 24V or 24-220V	25 Ω	GL(3W)	Vitrohm
R72	" " " " "	"	"	"
R73	" " " " "	60 Ω	H (3W)	"
S 1	Frequency range switch	7-sect.7-pos.	0-16	MEC
S 2	Selectivity switch	3-sect.5-pos.	0-12	"
S 3	Type of reception switch	2-sect.3-pos.	"	"
S 4	Headset-loudspeaker switch	1-sect.3-pos.	"	"
S 5	Switch for power supply	2-sect.4-pos.	0-16	"
S 6	Mains switch	2-pole	81A004	Torotor
T 1	Transformer	7 kΩ 2kΩ 3.2Ω 300Ω	U4-9175	Lübcke
T 2	"	220V 2x300V 6.3V 4V	T6-636	"
V 1	Protecting lamp, ant. circuit	25W/220V	Mignon	
V 2	R.F.amplifying valve		EF 9	✓ ✓ K <sub>1</sub> 1000
V 3	1 <sup>st</sup> frequency changing valve		ECH 3	✓
V 4	2 <sup>nd</sup> " " "		"	✓
V 5	I.F.amplifying & detector valve		EBF 2	✓ ✓
V 6	A.F.amplifying & B.F.O.valve		ECF 1	✓



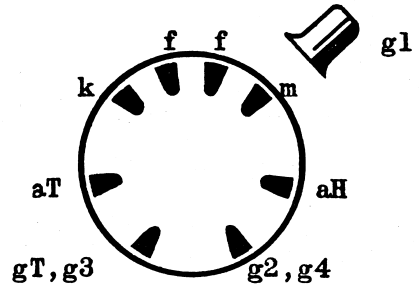
Valve Socket Connections - Bottom View

Rørsokkel - forbindelser - set nedefra

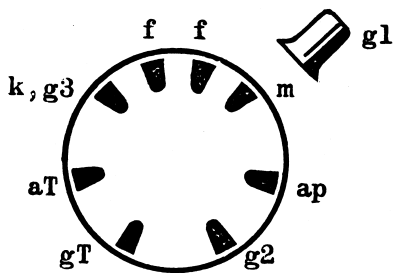
Sockelschaltungen - von unten gesehen



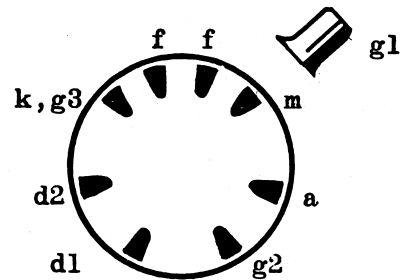
EF 9



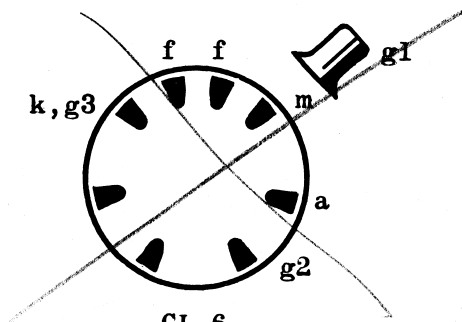
ECH 3



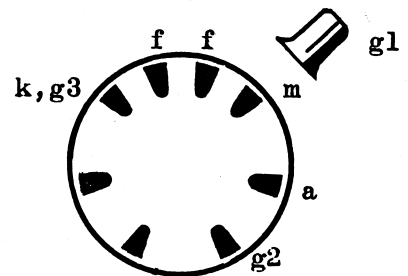
ECF 1



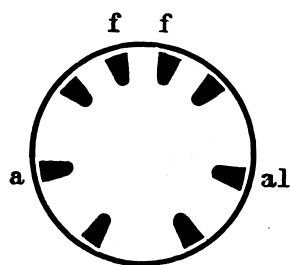
EBF 2



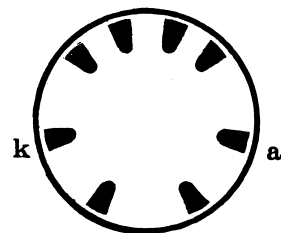
CL 6



EL 2

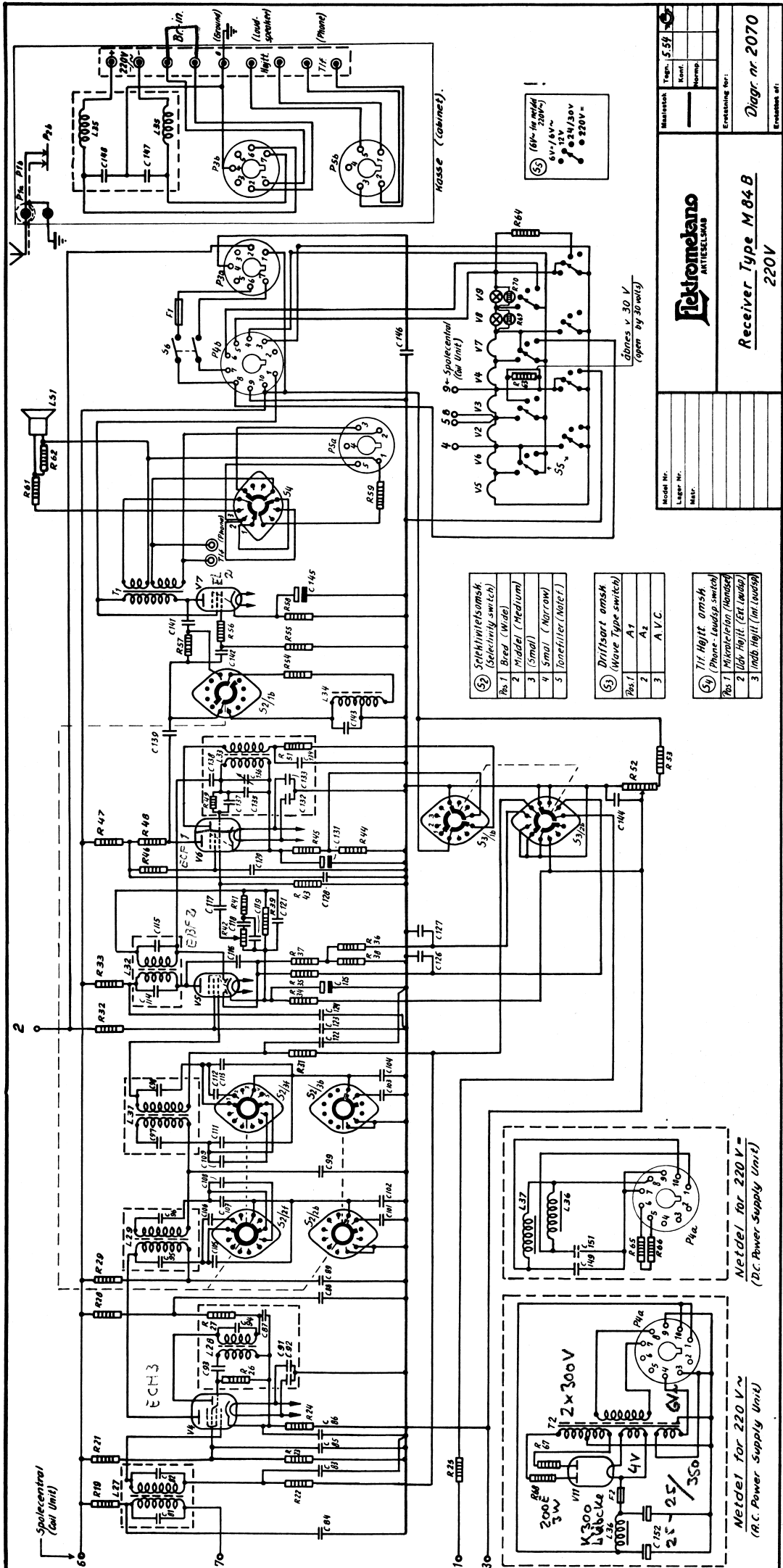


AZ 1



150 A1

*Radio dugi golden*



51 Sjekhvæltelsesomsk (Selectivity switch)

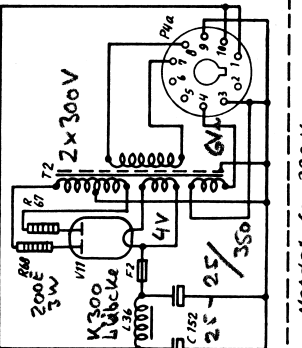
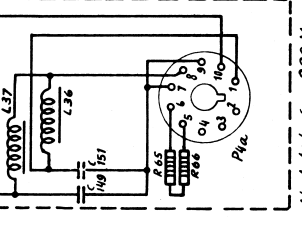
Pos 1	Bred (Wide)
2	Middel (Medium)
3	Smal (Narrow)
5	Tonefilter (Notch)

52 Driftsart omsk (Wave Type switch)

Pos 1	A1
2	A2
3	A.V.C.

53 Tilt Højt omsk (Phone-Loudspeaker switch)

Pos 1	Mikrofon (Microphone)
2	Løst Højt. (Ext. Loudsp.)
3	Indb. Højt. (Int. Loudsp.)



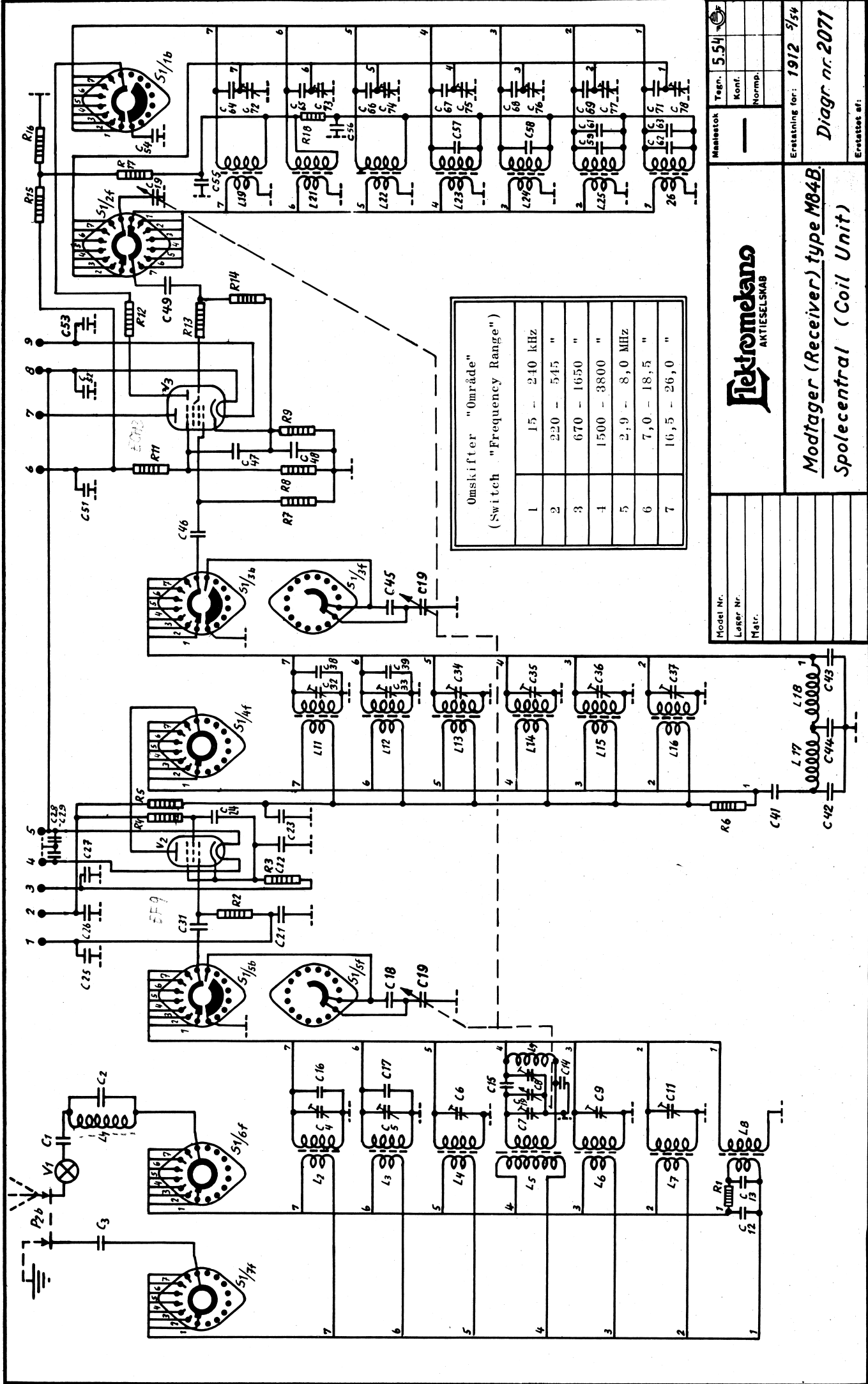
**Fektometano**  
ARTIESELSKAB

Receiver Type M 84-B  
220V

Model Nr. \_\_\_\_\_  
Lager Nr. \_\_\_\_\_  
Mærk. \_\_\_\_\_

Erstatnings list:  
Diagr. nr. 2070  
Erstatnings nr. \_\_\_\_\_

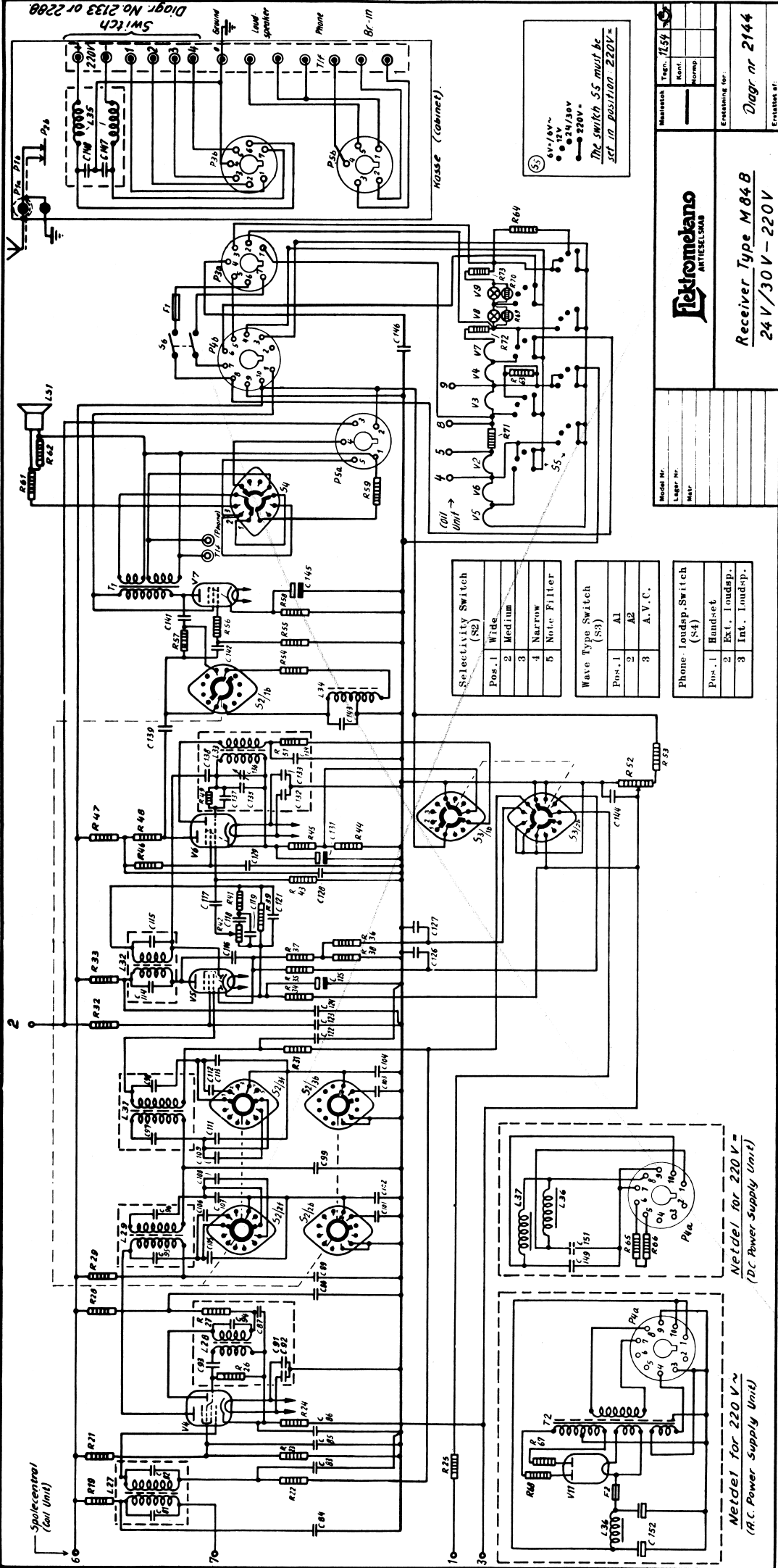
Målestok: Tegning 1:50  
Kont. \_\_\_\_\_  
Bemærk. \_\_\_\_\_



**Teknisk**  
 Model Nr. \_\_\_\_\_  
 Lever Nr. \_\_\_\_\_  
 Matr. \_\_\_\_\_  
 Mærkested \_\_\_\_\_  
 Tegnr. **5.54**  
 Konf. \_\_\_\_\_  
 Normp. \_\_\_\_\_  
 Erstatning for: **1912 5/54**  
**Diagr nr. 2071**  
 Erstatet af: \_\_\_\_\_

**Teknisk**  
 AKTIESELSKAB

**Modtager (Receiver) type M84B**  
**Spolecentral (Coil Unit)**

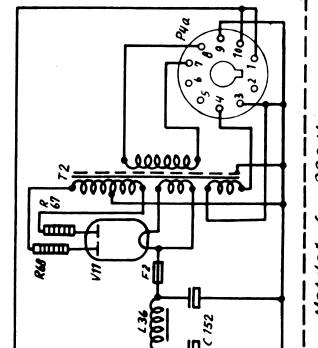
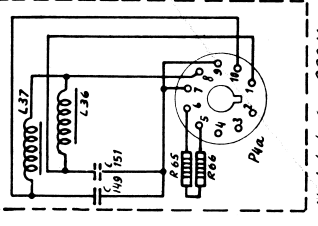


6V/6V~  
 6V/12V  
 234/30V  
 220V~  
 The switch S5 must be  
 set in position 220V~

Selectivity Switch (S2)	
Pos. 1	Wide
2	Medium
3	Narrow
4	Note Filter
5	

Wave Type Switch (S3)	
Pos. 1	A1
2	A2
3	A. V. C.

Phone Loudsp. Switch (S4)	
Pos. 1	Handset
2	Ext. Loudsp.
3	Int. Loudsp.



**Rekomelano**  
 ARTIELEMAN

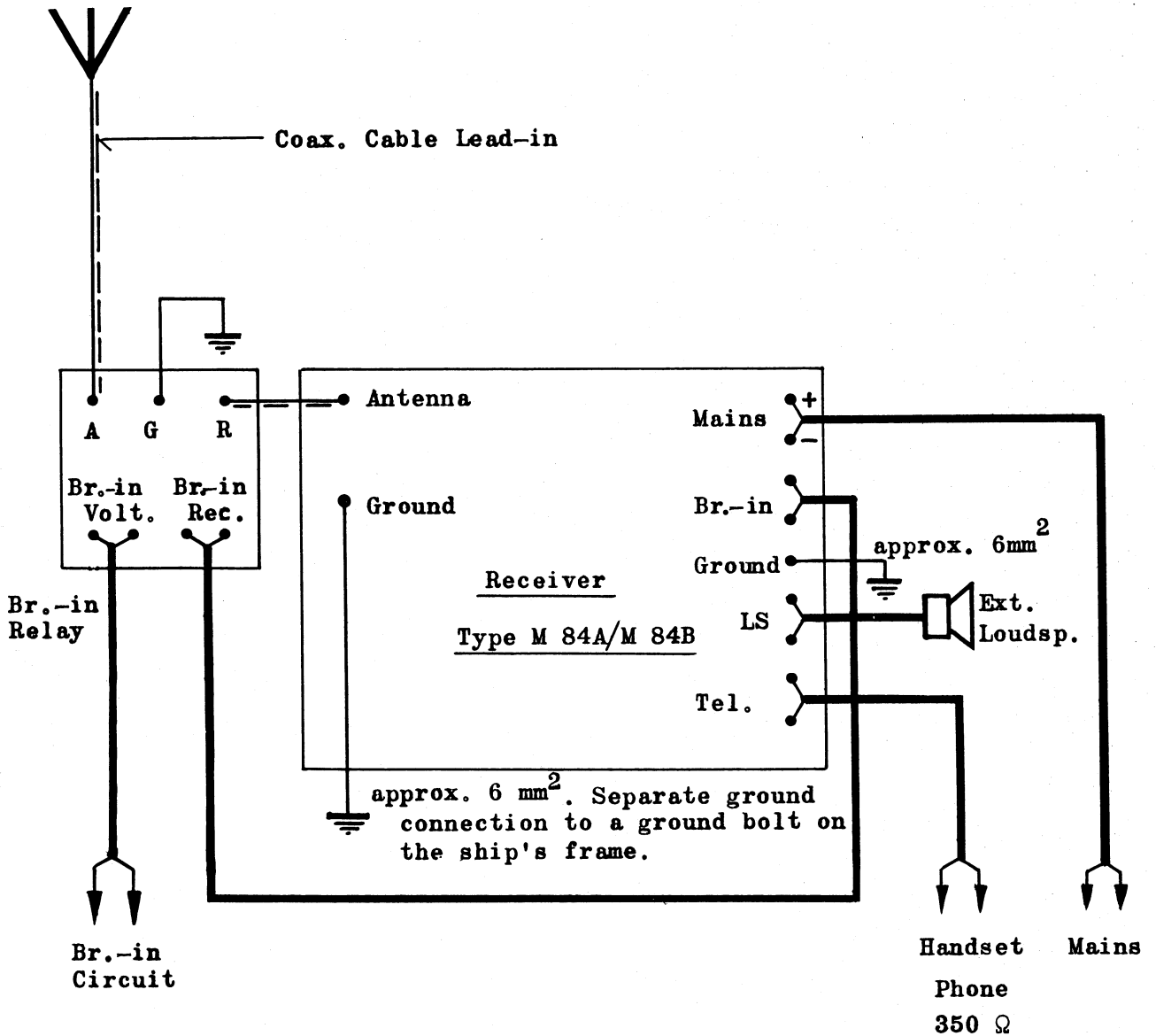
Receiver Type M 84 B  
 24 V / 30 V - 220 V

Model No. \_\_\_\_\_  
 Lager No. \_\_\_\_\_  
 Baujahr \_\_\_\_\_

Material No. \_\_\_\_\_  
 Teil. 1534

Erstausg. Nr. \_\_\_\_\_  
 Diagr. nr. 2144

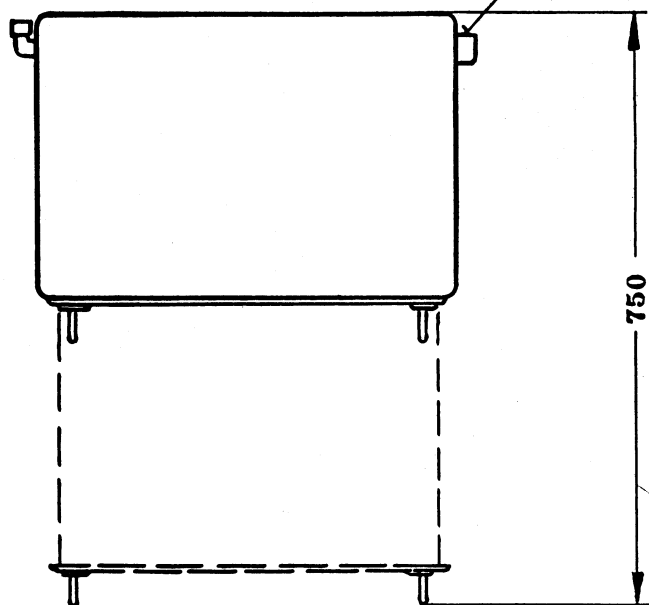
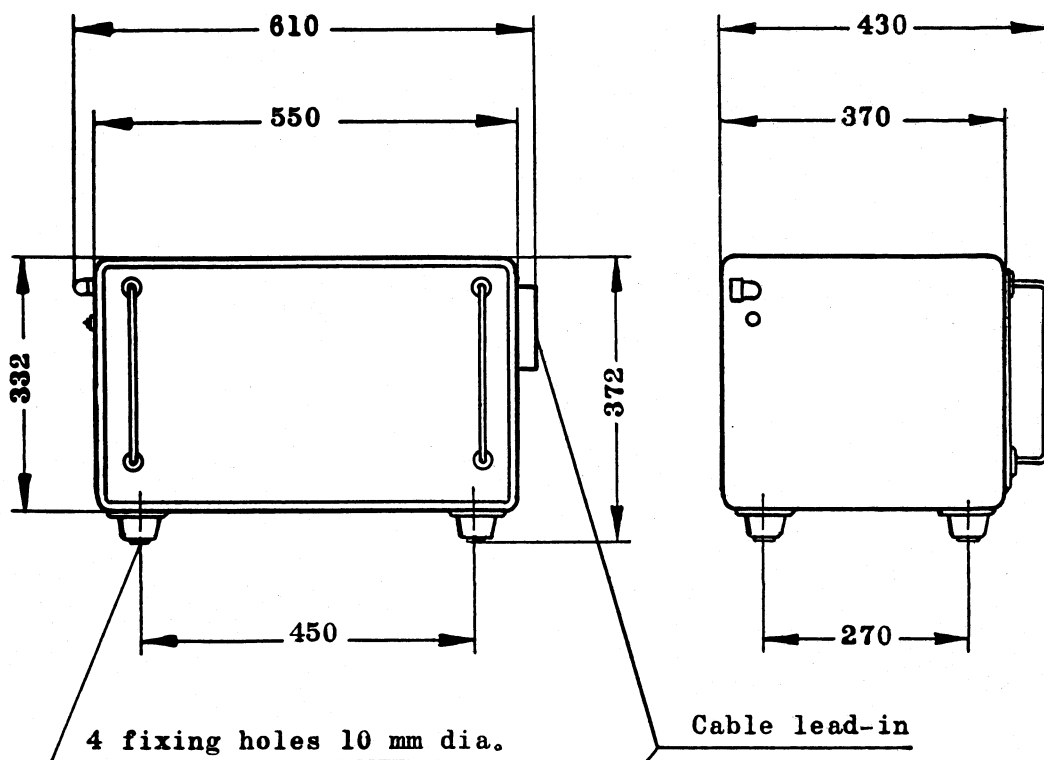
Erstausg. Nr. \_\_\_\_\_



All cables should be 2-core lead-covered cables with a conductor cross section area of approx. 1,5 mm<sup>2</sup>.

Model Nr.	<h1 style="margin: 0;">Elektromekano</h1> <p style="margin: 0;">AKTIESELSKAB</p>	Maalestok	Tegn.	4.56.	
Lager Nr.		Konf.			
Materiale		Normp.			
		<p>Receiver Type M 84</p> <p>Installation Wiring Diagram</p>	<p>Erstatning for:</p> <p style="text-align: center; font-weight: bold;">Diagr. No. 2035</p> <p>Erstattet af:</p>		





Weight: 30 kg

Model Nr.		Maalestok	Tegn.	8.55		
Lager Nr.		1:10	Konf.			
Materiale			Normp.			
		<u>Outline and Mounting Dimensions</u> <u>for Receiver Type M 83 &amp; M 84</u>	Erstatning for:			
			Tegn.nr. 5684			
		Erstattet af:				

# PARTS LIST

6 $\frac{1}{2}$ -valve Receiver

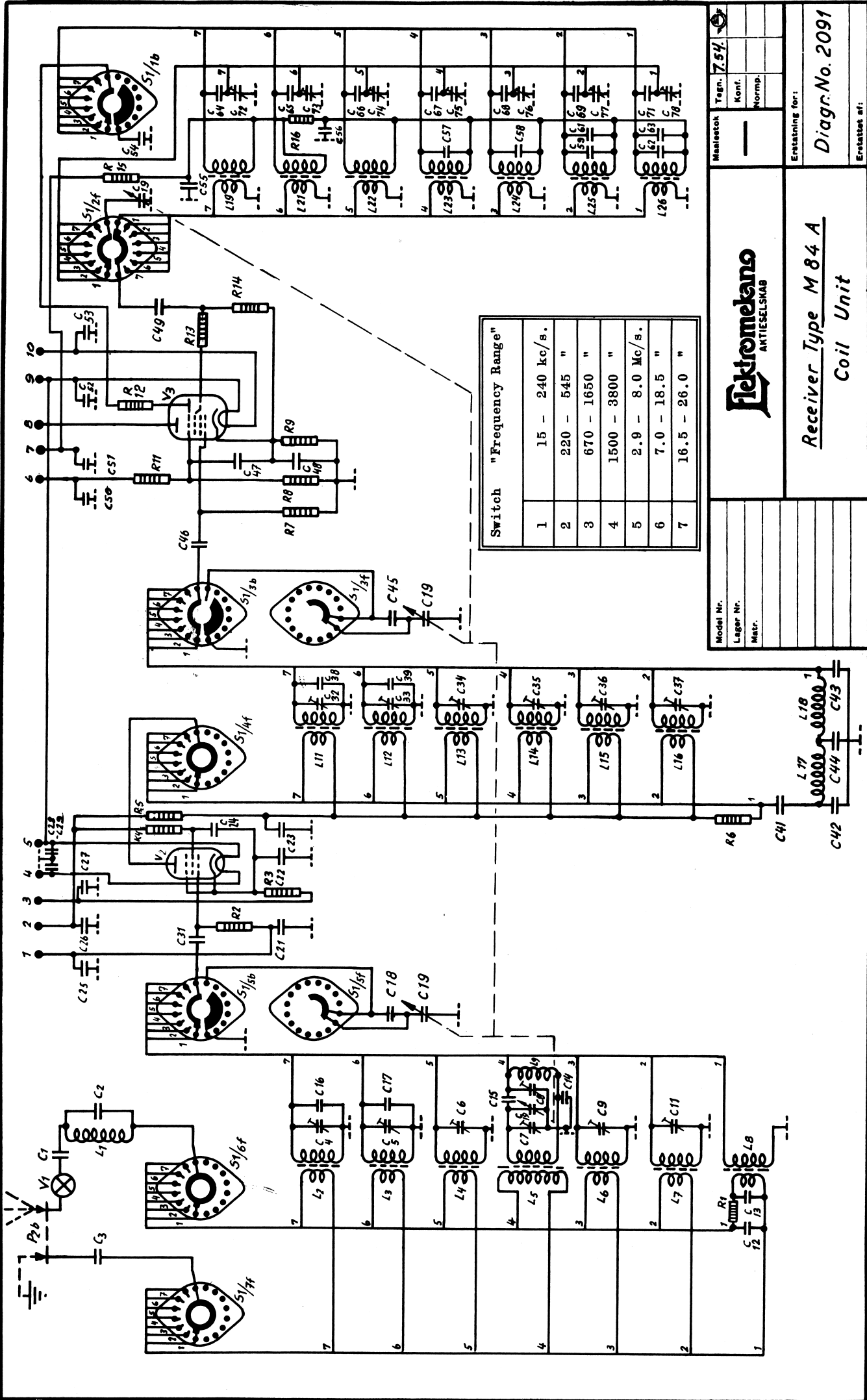
TYPE:

M 84 A 110 V

24/30-110 V

DIAGRAM No. 1914-15 2090-91 2125-2091

SYMBOL	DESCRIPTION	SPECIFICATION	TYPE	MANUFACT.
S 1	Frequency range switch	7-sect. 7-pos.	0-16	MEC
S 2	Selectivity switch	3-sect. 5-pos.	0-12	"
S 3	Type of reception switch	2-sect. 3-pos.	"	"
S 4	Headset-loudspeaker switch	1-sect. 3-pos.	"	"
S 5	Switch for power supply		81A 004	Torotor
T 1	Transformer	7 k $\Omega$ 2 k $\Omega$ 3.2 $\Omega$ 300 $\Omega$	U4-9175	Lübcke
V 1	Protecting lamp, ant. circuit	25W/220V	Mignon	
V 2	R.F.amplifying valve		EF 9	
V 3	1st frequency changing valve		ECH 3	
V 4	2nd " " "		"	
V 5	I.F.amplifying & detector valve		EBF 2	
V 6	A.F.amplifying & B.F.O.valve		ECF 1	
V 7	Output valve	110V: 24/30-110V:	CL 6 EL 2	
V 8	Scale lamp	6V 0.21A		
V 9	" "	"		
V 10				
V 11	Rectifying valve		AZ 1	



Switch	"Frequency Range"
1	15 - 240 kc/s.
2	220 - 545 "
3	670 - 1650 "
4	1500 - 3800 "
5	2.9 - 8.0 Mc/s.
6	7.0 - 18.5 "
7	16.5 - 26.0 "

**Fektromekano**  
ANTIESELSKAB

Model Nr. \_\_\_\_\_  
Lager Nr. \_\_\_\_\_  
M&F. \_\_\_\_\_

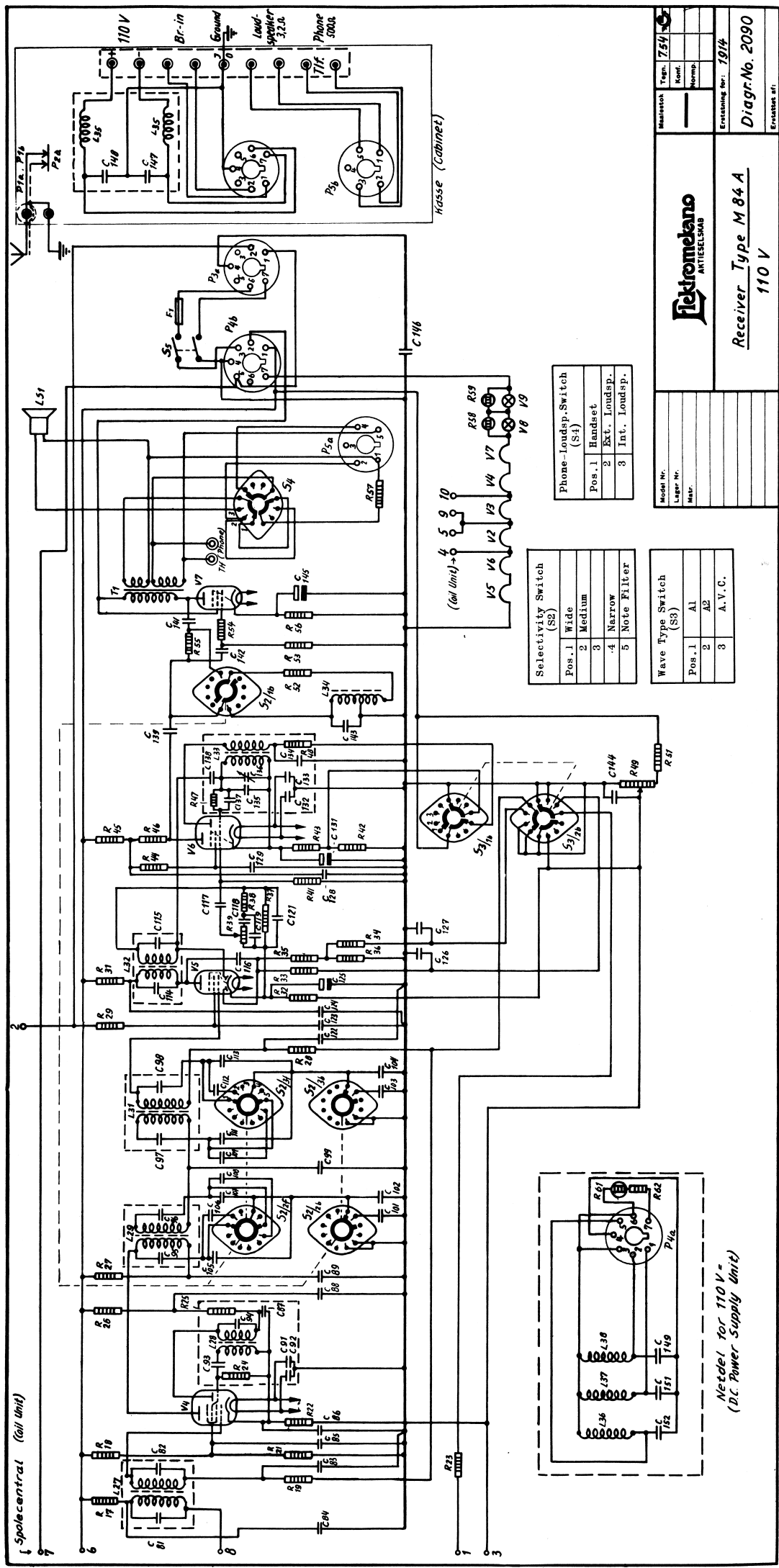
Maaleetok Teg. 7.54  
Kont. \_\_\_\_\_  
Normp. \_\_\_\_\_

Erstatning for: \_\_\_\_\_

Diagr.No. 2091

Erstattes af: \_\_\_\_\_

Receiver Type M 84 A  
Coil Unit



Selectivity Switch (S2)	
Pos. 1	Wide
2	Medium
3	Narrow
4	Note Filter
5	Note Filter

Wave Type Switch (S3)	
Pos. 1	A1
2	A2
3	A. V. C.

Phone-Loudsp.-Switch (S4)	
Pos. 1	Handset
2	Ext. Loudsp.
3	Int. Loudsp.

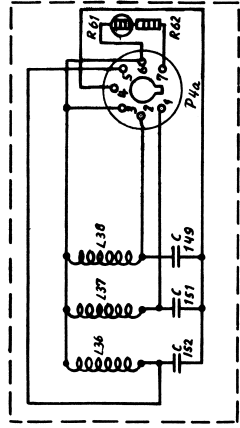
**Fektrometano**  
ANTIESELSAB

Receiver Type M 84 A  
110 V

Model No. \_\_\_\_\_  
Lager No. \_\_\_\_\_  
Mærk. \_\_\_\_\_

Material No. 754  
Kont. \_\_\_\_\_  
Normp. \_\_\_\_\_

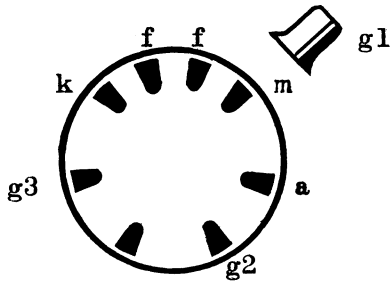
Erstatnings nr. 7914  
Diagr. No. 2090  
Erstattes af: \_\_\_\_\_



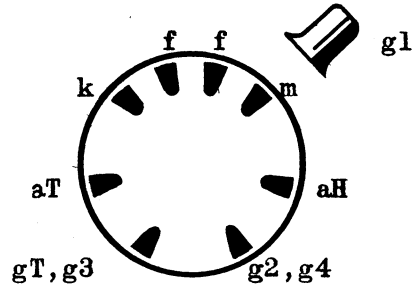
Valve Socket Connections - Bottom View

Rørsokkel-forbindelser - set nedefra

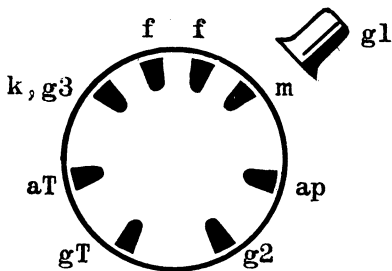
Sockelschaltungen - von unten gesehen



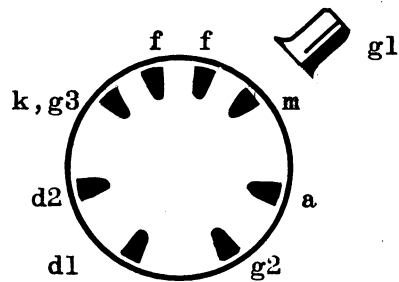
EF 9



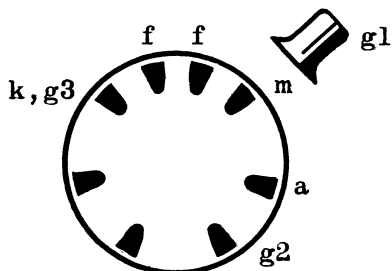
ECH 3



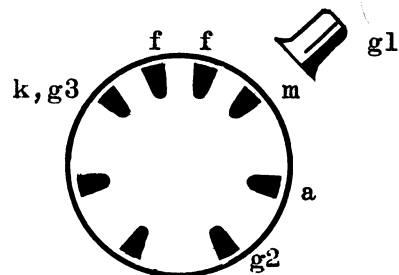
ECF 1



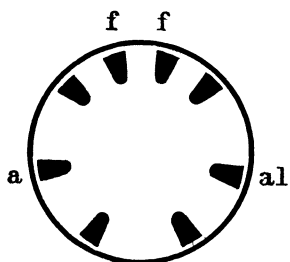
EBF 2



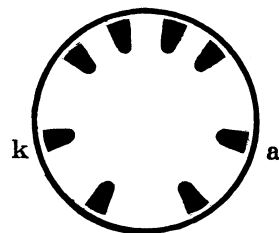
CL 6



EL 2



AZ 1



150 A1