PHILIPS

POCKET BOOK

INDUSTRIAL COMPONENTS AND MATERIALS DIVISION

ELECTRONIC TUBES

SEMI-CONDUCTORS

COMPONENTS

MATERIALS

ELECTRONIC TUBE DIVISION

CONTENTS

All type numbers contained in this booklet are arranged in alphabetical-numerical order both in the section "Receiving and Amplifying tubes" and in the table of contents. For types not belonging to this group reference is made to the page where the data are given

Note: The fact that a tube is listed in this booklet does not imply that it can always be delivered at short notice.

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DATA OF ELECTRONIC TUBES

TYPE NUMBER SYSTEM

Below the present type number system is given for tubes having type numbers which provide information concerning electrical data, principal uses, bases etc. of the tube.
It is pointed out, however, that in a few instances it has not been possible to adhere strictly to this system.

RECEIVING AND AMPLIFYING TUBES

The type number consists of a number of capital letters followed by either one or two figures (e.g. EF 6, UCH 81).

First letter: indicates the filament rating.
Second and subsequent letters: indicate the type classification.
Figures: indicate a serial number.

The key to this system is given in the following tables.

First letter

A — 4 V
C — 200 mA
D — 1.4 V battery
E — 6.3 V
G — 5 V
K — 2 V battery
O — Semi-conductor
P — 300 mA
U — 100 mA
Z — Cold cathode

Second and subsequent letters

A — R.F. single diode
B — R.F. double diode

C — Triode (except output and gasfilled triodes)
D — Output triode
E — Tetrode (except output tetrodes)
F — Pentode (except output pentodes)
H — Hexode or heptode
K — Octode or heptode
L — Output tetrode or pentode
M — Tuning indicator
P — Tube with secondary emission system
Q — Enneode
T — Miscellaneous
X — Full-wave gasfilled rectifying tube
Y — Half-wave high-vacuum rectifying tube
Z — Full-wave high-vacuum rectifying tube

Figures

Serial number

SPECIAL TUBES

(reliable, ruggedized, long life tubes, etc.)
The system is similar to that of receiving and amplifying tubes, however, the figures are placed between the letters (e.g. E80F, E90CC).

CATHODE-RAY TUBES

The type number consists of two capital letters followed by two sets of figures (e.g. DG 13-2, MW 31-16).

First letter: indicates the method of focusing and deflection.

Second letter: indicates properties of the screen.

First group of figures: indicates dimensions of the screen.

Second group of figures: indicates a serial number.

The key to this system is given in the following tables.

First letter

D — Electrostatic focusing and electrostatic deflection in two directions.

M — Electromagnetic focusing and electromagnetic deflection.

Second letter

B — Bluish fluorescence, short persistence (1% of max. brightness after 0.01 sec).

F — Orange fluorescence, very long persistence (0.1% of max. brightness after 75 sec).

G — Green fluorescence, medium persistence (1% of max. brightness after 0.05 sec).

N — Green fluorescence, long persistence (0.1% of max. brightness after 6.4 sec).

P — Double layer screen, bluish fluorescence of short persistence followed by greenish-yellow fluorescence of very long persistence (0.1% of max. brightness after 80 sec).

R — Greenish-yellow fluorescence, long persistence (0.1% of max. brightness after 20 sec).

W — White fluorescence, medium persistence.
Direct-viewing tubes: colour temp. 8000° K
Projection tubes : colour temp. 5500° K

First group of figures

For round tubes : screen diameter in cm
For rectangular tubes: screen diagonal in cm

Second group in figures

Serial number

TRANSMITTING TUBES

The type number consists of two or three capital letters followed by two sets of figures. For some types a group of letters is added (e.g. TAL 12/10, DCG 4/1000 G).

First letter: indicates the tube classification.
Second letter: indicates type of filament or cathode.
First group of figures: indicates operating voltage.
Second group of figures: indicates power.
Added letters: indicate the tube base.

The key to this system is given in the following tables.

First letter

D — Rectifying tube (included grid-controlled tubes)
M — Triode (A.F. amplifying tube or modulator
P — Pentode
Q — Tetrode
T — Triode (R.F., A.F. or oscillator tube)

For tubes having dual systems two of the above mentioned letters are used (e.g. QQC 04/15).

Second letter

(third letter for tubes having dual systems)

A — Directly-heated tungsten filament
B — Directly-heated thoriated tungsten filament
C — Directly-heated oxide-coated filament
E — Indirectly-heated oxide-coated cathode

Third letter

(fourth letter for tubes having dual systems)

G — Mercury-vapour filling
L — Forced air cooling
W — Water cooling
X — Xenon filling

When the type number does not contain a letter indicating the cooling the tube is radiation cooled.

First group of figures

Rectifying tubes:	Approx. D.C. output voltage in kilovolts in a three-phase half-wave rectifying circuit.
Transmitting tubes:	Approx. max. anode voltage in kilovolts.

Second group of figures

Rectifying tubes:	Approx. D.C. output power in watts or kilowatts per tube in a three-phase half-wave rectifying circuit.
R.F. tubes:	Approx. output power in watts or kilowatts in class C telegraphy.
Modulators:	Approx. anode dissipation in watts or kilowatts.

Added letters

B — Cables
E — Medium 7p.-base
ED — Edison base
EG — Goliath base
G — Medium 4p.-base
GB — Jumbo 4p.-base
N — Medium p.-base
P — P-base

PHOTOTUBES

The type number consists of two figures followed by two letters (e.g. 90AV).

First figure : indicates the tube base.
Second figure: indicates a serial number.
First letter : indicates the type of cathode.
Second letter: indicates the class of phototube.

The key for this system is given in the following tables.

First figure

2 — Loctal 8p.-base
3 — Octal 8p.-base
5 — Special base
8 — Noval 9p.-base
9 — Miniature 7p.-base

Second figure

Serial number

First letter

A — Caesium-antimony cathode (blue sensitive)
C — Caesium-on-oxidized-silver cathode (red sensitive)

Second letter

G — Gasfilled
V — High vacuum

VOLTAGE STABILIZERS

The type number consists of a number followed by a capital letter, a figure and in some cases by a second capital letter (e.g. 85A2, 150 C 1K).

Number: indicates burning voltage.
First letter: indicates the current range.
Figure: indicates a serial number.
Second letter: indicates the tube base.

The key for this system is given in the following tables.

Number

Average burning voltage in volts

First letter

A — max. 10 mA
B — max. 22 mA
C — max. 40 mA
D — max. 100 mA
E — max. 200 mA

Figure

Serial number

Second letter

E — Edison
K — Octal 8p.-base
P — P-base

SYMBOLS

Electrodes

a	Anode
ah	Auxiliary anode
a_{ign}	Ignition anode
d	Anode of detection diode
D	Deflection plate or rod
f	Filament or resistance wire
f_c	Filament tap or tap of resistance wire
g	Grid
$i.c.$	Internal connection (not to be connected externally)
k	Cathode
$k_{(i)}$	Input cathode lead of U.H.F. tube
$k_{(o)}$	Output cathode lead of U.H.F. tube
l	Fluorescent screen
m	External conducting coating
s	Internal shield
S	Switch
st	Starter or trigger electrode of cold cathode tubes

Electrode systems

D	Diode
H	Hexode or Heptode
P	Pentode
T	Triode

Voltages

V_a	Anode voltage Burning voltage of voltage stabilizer
$\triangle V_a$	Burning voltage variation of voltage stabilizer in stabilizing range
V_{arms}	A.C. anode voltage (r.m.s. value)
V_{ag}	Voltage between anode and grid
V_{ainvp}	Peak value of inverse anode voltage
V_{ap}	Peak value of anode voltage
V_{arc}	Arc voltage
V_b	Supply voltage
V_{ba}	Anode supply voltage
V_{bg_2}	Supply voltage of second grid
V_{contr}	Voltage range of current regulator
V_d	Anode voltage of detection diode

V_{dinv}	Inverse anode voltage of detection diode
V_{dinvp}	Peak value of inverse anode voltage of detection diode
V_f	Filament voltage
V_g	Grid voltage
$V_{g(arc)}$	Grid voltage of conducting tube
V_{ginvp}	Peak value of inverse grid voltage
V_{gp}	Peak value of grid voltage
V_i	A.C. input voltage per tube
V_{ign}	Voltage necessary for breakdown to the concerning electrode
V_{invp}	Peak value of inverse voltage
V_k	Voltage between cathode and chassis
V_{kf}	Voltage between cathode and filament
V_{kfp}	Peak value of voltage between cathode and filament
V_l	Voltage of fluorescent screen
V_o	A.C. output voltage: D.C. output voltage
V_{osc}	Oscillator voltage
V_{st}	Starter voltage of a cold cathode tube
V_{tr}	Secondary transformer voltage (without load)

Currents

I_a	Anode current
I_{amax}	Anode current at full drive
I_{amin}	Anode current without drive
I_{ap}	Peak value of anode current
I_b	Supply current
I_{contr}	Current range of voltage stabilizer
I_d	Anode current of detection diode
I_{dp}	Peak value of anode current of detection diode
I_f	Filament current
I_g	Grid current
I_{gmax}	Grid current at full drive
I_{gmin}	Grid current without drive
I_{gp}	Peak value of grid current
I_k	Cathode current
I_l	Current of fluorescent screen
I_o	D.C. output current per tube
I_{rec}	Recommended current
I_{reg}	Stabilized current of current regulator
I_{st}	Starter current
$I_{st\ transf}$	Starter current required to initiate the main discharge
I_{surge}	Surge current

Powers

W_a	Max. anode dissipation
W_{ig}	Driving power
W_o	Max. output power

Resistances

R_a	External anode resistor; Matching resistance; Total anode resistance of rectifying tube
R_{aa}	Matching resistance of push-pull amplifier (anode to anode)
$R_{damping}$	Damping resistance
R_{eq}	Equivalent noise resistance
R_E	Resistance of thermo-element
R_f	Resistance of filament
R_g	External resistance between grid and cathode
R_g'	External resistance between grid and cathode of next tube
R_i	Internal resistance
R_{id}	Internal resistance of detection diode
R_k	Resistance between cathode and chassis
R_{kf}	External resistance between cathode and filament
R_t	Total anode resistance of rectifying tube
R_1	External resistance between $+V_b$ and g_2 (potentiometer)
R_2	External resistance between g_2 and chassis (potentiometer)
R_1	External resistance between $+V_b$ and g_2 (potentiometer)
R_3	External resistance between g_2 and k (potentiometer)
R_4	External resistance between k and chassis (potentiometer)

Capacitances

C_a	Anode to all other elements except control grid
C_{ag}	Anode to grid, all other elements earthed
C_{ak}	Anode to cathode, all other elements earthed
C_{dk}	Anode to cathode of detection diode, all other elements earthed
$C_{DD'}$	Deflection plate D to deflection plate D′, all other elements earthed
C_{filt}	Input capacitor of smoothing filter
C_g	Grid to all other elements except anode

Miscellaneous

d_{tot}	Total distortion
freq.	Frequency
g	Voltage gain per stage
m	Number of anodes of rectifying tube
N	Sensitivity
S	Mutual conductance
S_c	Conversion conductance
S_{eff}	Effective slope of oscillator tube
S_o	Mutual conductance of oscillator triode at $V_g = 0$ V and $V_{osc} = 0$ V
t_{amb}	Ambient temperature
t_{Hg}	Temperature of condensed mercury (at the cathode)
t_{rec}	Recommended temperature
T_{av}	Averaging time
T_{dion}	Deionization time
T_h	Heating time of tube
T_{ion}	Ionization time
T_{imp}	Pulse time
α	Shadow angle on fluorescent screen
η	Efficiency
μ	Gain factor
μ_{g2g1}	Gain factor of grid No. 2 with respect to grid No. 1

RECEIVING AND AMPLIFYING TUBES

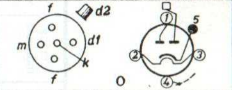
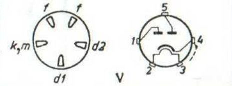
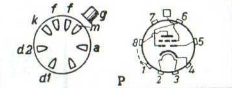
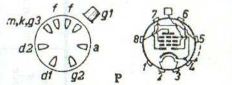
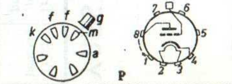
PREFERRED

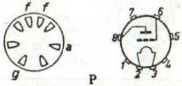
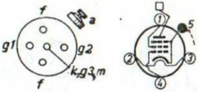
	Type of Tube	Diode pentode	Double diode	Double diode triode	Triple diode triode	Double diode pentode	Triode	Double triode
FILAMENT VOLTAGE OR CURRENT	0.625 V							
	1.25 V							
	1.4 V	**DAF 91** **DAF 96**						
	5 V							
	6.3 V		**EAA 91**	**EBC 81**	**EABC 80**	**EBF 80**	**EC 55** **EC 56** **EC 57** **EC 80** **EC 81** **EC 92**	**ECC 81** **ECC 82** **ECC 83** **ECC 84** **ECC 85** E80CC [2]) E90CC [2])
	18 V							
	100 mA			**UBC 81**	**UABC 80**	**UBF 80**	**UC 92**	**UCC 85**
	300 mA		**EAA 91**		**PABC 80**	**EBF 90**		**ECC 81** **ECC 82** **ECC 83** **PCC 84** **PCC 85**

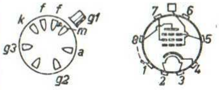
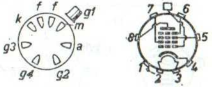
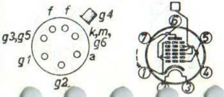
[1]) For hearing aid [2]) Special Quality tubes [3]) For 90° deflection circuits only.

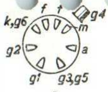
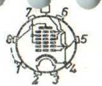
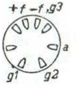
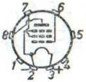
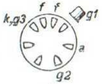
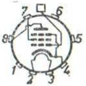
TYPES

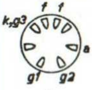
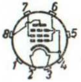
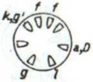
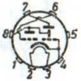
Triode pentode	Triode power pentode	Pentode var. mu	Pentode sharp cut-off	Pentode power	Mixer	Tuning indicator	High-vacuum rectifier
			DF 64[1])				
				DL 64[1])			
		DF 91 DF 96		DL 94 DL 96	DK 92 DK 96	DM 70	DY 86
							GZ 34
ECF 80	ECL 80	EF 85 EF 89	EF 80 EF 86 E80F[2]) E83F[2]) E180F[2])	EL 34 EL 42 EL 81 EL 82 EL 83 EL 84 E80L[2]) E81L[2])	ECH 81	EM 80	EY 81 EZ 80
			18042[2])	18045[2])			
		UF 85 UF 89	UF 80	UL 84	UCH 81	UM 80	UY 85 UY 92
PCF 80	ECL 80 PCL 82[3])	EF 85	EF 80	PL 36[3]) PL 81 PL 82 PL 83	ECH 81		PY 81 PY 82

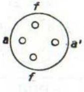
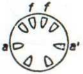
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
AB 1 Double diode	= AB 2 With different base				
AB 2 Double diode Detector and A.G.C.	V_f = 4 V I_f = 0.65 A	$V_{d\ invp}$ = max. 420 V	I_d = max. 0.8		
ABC 1 Double diode triode Typical characteristics	V_f = 4 V I_f = 0.65 A	V_a = 250 V V_g = —7 V	I_a = 4	S = 2.0 mA/V R_i = 13.5 kΩ μ = 27	
ABL 1 Double diode output pentode Class A final amplifier	V_f = 4 V I_f = 2.4 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 9 W	
AC 2 Triode Typical characteristics	V_f = 4 V I_f = 0.65 A	V_a = 250 V V_g = —5.5 V	I_a = 6	S = 2.5 mA/V R_i = 12 kΩ μ = 30	

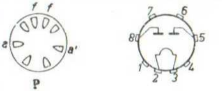
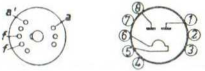
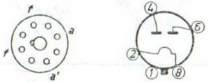
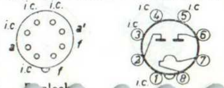
AD 1 Output triode Class A	V_f = 4 V I_f = 0.95 A	V_a = 250 V V_g = —45 V	I_a = 60	S = 6 mA/V R_i = 670 Ω R_a = 2.3 kΩ W_o = 4.2 W W_a = 15 W	 P
AF 2 Variable mu pentode R.F. or I.F. amplifier	V_f = 4 V I_f = 1.1 A	V_a = 200 V V_{g2} = 100 V V_{g1} = —2 V	I_a = 4.25 I_{g2} = 1.8	S = 2.5 mA/V R_i = 1.4 MΩ C_{ag1} < 6 mpF	 O

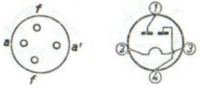
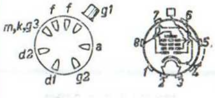
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
AF 3 Variable mu pentode R.F. or I.F. amplifier	$V_f = 4$ V $I_f = 0.65$ A	$V_a = 250$ V $V_{g2} = 100$ V $V_{g1} = -3$ V $V_{g3} = 0$ V	$I_a = 8$ $I_{g2} = 2.6$	$S = 1.8$ mA/V $R_i = 1.2$ MΩ $C_{ag1} < 3$ mpF	 P
AF 7 R.F. pentode R.F. amplifier	$V_f = 4$ V $I_f = 0.65$ A	$V_a = 250$ V $V_{g2} = 100$ V $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 3$ $I_{g2} = 1.1$	$S = 2.1$ mA/V $R_i = 2$ MΩ $C_{ag1} < 3$ mpF	
AH 1 Hexode Mixer	$V_f = 4$ V $I_f = 0.65$ A	$V_a = 250$ V $V_{g4} = 80$ V $V_{g2} = 80$ V $V_{g3} = -12$ V $V_{g1} = -2$ V $V_{osc} = 9$ V_{eff}	$I_a = 1.7$ $I_{(g2+g4)} = 2.6$	$S_c = 0.55$ mA/V $R_i = 2$ MΩ	 P
AK 1 Octode	= **AK 2** with different base				 C

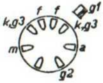
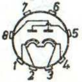
AK 2 Octode Frequency changer	$V_f =$ 4 V $I_f =$ 0.65 A	V_a = 250 V V_{g3+g5} = 70 V V_{g4} = —1.5 V V_{g2} = 90 V R_{g1} = 50 kΩ	I_a = 1.6 I_{g3+g5} = 3.8 I_{g2} = 2.0 I_{g1} = 0.19	S_c = 0.6 mA/V R_i = 1.6 MΩ	 P	
AL 1 Output pentode Class A final amplifier	$V_f =$ 4 V $I_f =$ 1.1 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —15 V R_k = 350 Ω	I_a = 3.6 I_{g2} = 8.8	S = 2.8 mA/V R_i = 43 kΩ R_a = 7 kΩ W_o = 3.1 W W_a = 9 W	 P	
AL 2 Output pentode Class A final amplifier	$V_f =$ 4 V $I_f =$ 1 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —25 V R_k = 625 Ω	I_a = 36 I_{g2} = 5	S = 2.6 mA/V R_i = 60 kΩ R_a = 7 kΩ W_o = 3,8 W W_a = 9 W	 P	

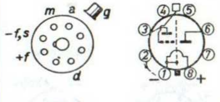
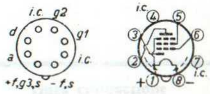
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
AL 4 Output pentode Class A final amplifier	$V_f =$ 4 V $I_f =$ 1.75 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 9 W	 P 
AL 5 Output pentode	= 4688				
AM 1 Tuning Indicator	$V_f =$ 4 V $I_f =$ 0.3 A	$V_b = V_l =$ 250 V R_a = 2 MΩ V_g = 0/—5 V	I_a = 0.095/0.021 I_l = 0.13/0.14	α 74°/0°	 P 
AX 1	= 4652				

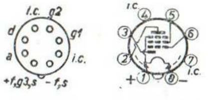
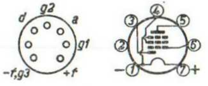
AX 50 Gasfilled full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 3.75 A	V_{tr} = 2×500 V V_{arc} = max. 15 V	I_o = max. 275	C_{filt} = max. 64 μF R_t = min. 200 Ω C_{filt} = max. 32 μF R_t = min. 150 Ω C_{filt} = max. 16 μF R_t = min. 100 Ω	 A	
AZ 1 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 1.1 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 60 = max. 75 = max. 100	R_t = min. 100 Ω = min. 80 Ω = min. 60 Ω C_{filt} = max. 60 μF	 P	

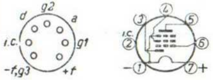
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
AZ 4 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 2.3 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 120 = max. 150 = max. 200	R_t = min. 100 Ω = min. 80 Ω = min. 60 Ω C_{filt}= max. 60 μF	 P
AZ 11 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 1.1 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 60 = max. 75 = max. 100	R_t = min. 100 Ω = min. 80 Ω = min. 60 Ω C_{filt}= max. 60 μF	 Y
AZ 12 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 2.3 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 120 = max. 150 = max. 200	R_t = min. 100 Ω = min. 80 Ω = min. 60 Ω C_{filt}= max. 60 μF	
AZ 31 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 1.1 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 60 = max. 75 = max. 100	R_t = min. 100 Ω = min. 80 Ω = min. 60 Ω C_{filt}= max. 60 μF	 Octal
AZ 41 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 0.72 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 60 = max. 60 = max. 70	R_t = min. 200 Ω = min. 150 Ω = min. 100 Ω C_{filt}= max. 50 μF	 [illegible]loc[illegible]

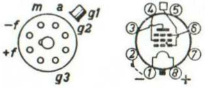
AZ 50 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 3 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	= max. 250 = max. 275 = max. 300	C_{filt} = max. 64 µF R_t = min. 200 Ω C_{filt} = max. 32 µF R_t = min. 150 Ω C_{filt} = max. 16 µF R_t = min. 100 Ω	 A
C 8 **C 10** **C 12**	Current regulators, see p. 239				
CBL 1 Double diode output pentode Class A final amplifier	$V_f =$ 44 V $I_f =$ 0.2 A	V_a = 200 V V_{g2} = 200 V V_{g1} = −8.5 V R_k = 170 Ω	I_a = 45 I_{g2} = 6	S = 8 mA/V R_i = 40 kΩ R_a = 4.5 kΩ W_o = 4 W W_a = 9 W	 P
		V_a = 100 V V_{g2} = 100 V V_{g1} = −4 V R_k = 170 Ω	I_a = 21 I_g = 3	S = 6.5 mA/V R_i = 48 kΩ R_a = 4.5 kΩ W_o = 0.85 W	

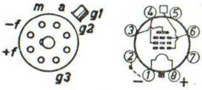
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
CF 50 A.F. pentode Typical characteristics A.F. amplifier	V_f = 30 V I_f = 0.2 A	V_a = 250 V V_{g2} = 100 V V_{g1} = −2 V	I_a = 1.5 I_{g2} = 0.3	S = 3.3 mA/V R_i = 2.5 MΩ μ_{g2g1} = 45	 P
		V_b = 250 V R_a = 0.3 MΩ R_{g2} = 0.9 MΩ R_k = 2 kΩ	I_a = 0.7 I_{g2} = 0.18	g = 315	
		V_b = 450 V R_a = 0.3 MΩ R_{g2} = 1 MΩ V_{g1} = −2 V = −10 V = −12 V	I_a = 1.3 = 0.22 = 0.04	g = 395 = 90 = 7	
CY 2 Double half-wave rectifying tube Rectifier (cathodes and anodes interconnected) Voltage doubler	V_f = 30 V I_f = 0.2 A	V_{tr} = 250 V	I_o = max. 120	C_{filt} = 32/16 μF R_t = min. 125/75 Ω	 P
		V_{tr} = 127 V	I_o = max. 60	C_{filt} = max. 32 μF R_t = 0 Ω	

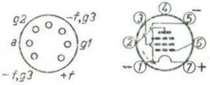
DA 90 Single diode Detector	see 1 A 3				
DAC 21 Diode triode Typical characteristics A.F amplifier	$V_f = 1.4$ V $I_f = 25$ mA	$V_a = 120$ V $V_g = 0$ V	$I_a = 0.75$	$S = 0.4$ mA/V $R_i = 0.1$ MΩ $\mu = 40$	 Octal
		$V_a = 90$ V $V_g = 0$ V	$I_a = 0.45$	$S = 0.3$ mA/V $R_i = 0.13$ MΩ $\mu = 40$	
		$V_b = 120$ V $V_g = 0$ V $R_a = 0.5$ MΩ	$I_a = 0.12$	$g = 25$	
		$V_b = 90$ V $V_g = 0$ V $R_a = 0.5$ MΩ	$I_a = 0.08$	$g = 23$	
DAF 40 Diode pentode R.F. or I.F. amplifier	$V_f = 1.4$ V $I_f = 25$ mA	$V_a = 120$ V $R_{g2} = 0.27$ MΩ $V_{g1} = 0$ V	$I_a = 0.85$ $I_{g1} = 0.20$	$S = 0.7$ mA/V $R_i = 2.6$ MΩ $C_{ag1} < 7$ mpF	 Rimlock
		$V_a = 67.5$ V $V_{g2} = 67.5$ V $V_{g1} = 0$ V	$I_a = 0.85$ $I_{g2} = 0.20$	$S = 0.7$ mA/V $R_i = 1.6$ MΩ	

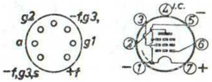
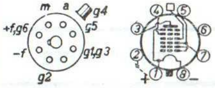
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DAF 41 Diode pentode A.F. amplifier	$V_f = 1.4$ V $I_f = 25$ mA	$V_b = 150$ V $R_a = 0.47$ MΩ $R_{g2} = 2.2$ MΩ $V_{g1} = 0$ V	$I_a = 0.24$ $I_{g2} = 0.05$	$g = 112$	 Rimlock
		$V_b = 90$ V $R_a = 0.47$ MΩ $R_{g2} = 2.2$ MΩ $V_{g1} = 0$ V	$I_a = 0.13$ $I_{g2} = 0.03$	$g = 83$	
		$V_b = 67.5$ V $R_a = 0.22$ MΩ $R_{g2} = 0.82$ MΩ $V_{g1} = 0$ V	$I_a = 0.17$ $I_{g2} = 0.04$	$g = 60$	
DAF 91 Diode pentode Typical characteristics A.F. amplifier	$V_f = 1.4$ V $I_f = 50$ mA	$V_a = 67.5$ V $V_{g2} = 67.5$ V $V_{g1} = 0$ V	$I_a = 1.6$ $I_{g2} = 0.4$	$S = 0.62$ mA/V $R_i = 0.6$ MΩ	 Miniature
		$V_b = 90$ V $R_a = 1$ MΩ $R_{g2} = 3.9$ MΩ $V_{g1} = 0$ V $R_{g1} = 10$ MΩ	$I_b = 0.09$	$g = 60$	

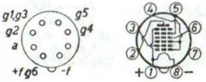
DAF 91 (continued) A.F. amplifier	$V_f = 1.4$ V $I_f = 50$ mA	V_b = 67.5 V R_a = 1 MΩ R_{g2} = 3.9 MΩ V_{g1} = 0 V R_{g1} = 10 MΩ	I_b = 0.06	g = 55	
		V_b = 45 V R_a = 1 MΩ R_{g2} = 3.9 MΩ V_{g1} = 0 V R_{g1} = 10 MΩ	I_b = 0.04	g = 42	
DAF 96 Diode pentode A.F. amplifier	$V_f = 1.4$ V $I_f = 25$ mA	V_b = 64 V R_a = 1 MΩ R_{g2} = 2.7 MΩ R_{g1} = 10 MΩ R_{g1}' = 2,2 MΩ	I_g = 0.042 I_{g2} = 0.013	g = 63	 Miniature
		V_b = 85 V R_a = 1 MΩ R_{g2} = 2.7 MΩ R_{g1} = 10 MΩ R_{g1}' = 2.2 MΩ	I_g = 0.064 I_{g2} = 0.021	g = 70	
DB	Cathode-ray tubes, see p. 178				

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DC 70	U.H.F. tube, see p. 171				
DCC 90 Double triode	see 3 A 5				
DCG **DCX**	Rectifying tubes for transmitting purposes, see p. 198				
DF 21 Pentode R.F. or I.F. amplifier A.F. amplifier	$V_f = 1.4$ V $I_f = 25$ mA	$V_a = 120$ V $R_{g2} = 120$ kΩ $V_{g1} = 0$ V $V_{g3} = 0$ V	$I_a = 1.2$ $I_{g2} = 0.25$	$S = 0.7$ mA/V $R_i = 2.5$ MΩ $C_{ag1} < 6$ mpF	 Octal
		$V_a = 90$ V $V_{g2} = 90$ V $V_{g1} = 0$ V $V_{g3} = 0$ V	$I_a = 1.2$ $I_{g2} = 0.25$	$S = 0.7$ mA/V $R_i = 2$ MΩ	
		$V_b = 120$ V $R_a = 0.5$ MΩ $R_{g2} = 2$ MΩ $V_{g1} = -0.5$ V $V_{g3} = 0$ V	$I_a = 0.15$ $I_{g2} = 0.03$	$g = 85$	

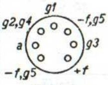
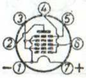
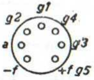
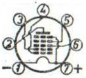
DF 21 (continued) A.F. amplifier	V_f = 1.4 V I_f = 25 mA	V_b = 90 V R_a = 0.5 MΩ R_{g2} = 2 MΩ V_{g1} = —0.5 V V_{g3} = 0 V	I_a = 0.10 I_{g2} = 0.02	g = 69	
DF 22 Variable mu pentode R.F. or I.F. amplifier	V_f = 1.4 V I_f = 50 mA	V_a = 120 V R_{g2} = 0.1 MΩ V_{g1} = —1.5 V V_{g3} = 0 V	I_a = 1.4 I_{g2} = 0.3	S = 1.1 mA/V R_i = 2.5 MΩ C_{ag1} < 5 mpF	 Octal
		V_a = 90 V V_{g2} = 90 V V_{g1} = —1.5 V V_{g3} = 0 V	I_a = 1.4 I_{g2} = 0.3	S = 1.1 mA/V R_i = 1.5 MΩ	
DF 64 **DF 65** **DF 66** **DF 67** **DF 70**	Hearing-aid tubes, see p. 167				

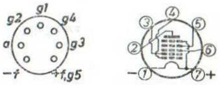
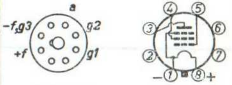
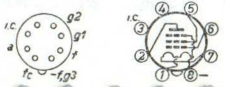
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DF 91 Variable mu pentode R.F. or I.F. amplifier	$V_f = 1.4$ V $I_f = 50$ mA	$V_a = 90$ V $V_{g2} = 45$ V $V_{g1} = 0$ V	$I_a = 1.8$ $I_{g2} = 0.65$	$S = 0.65$ mA/V $R_i = 0.8$ MΩ $C_{ag1} < 0.01$ pF	 Miniature
		$V_a = 67.5$ V $V_{g2} = 45$ V $V_{g1} = 0$ V	$I_a = 1.75$ $I_{g2} = 0.68$	$S = 0.72$ mA/V $R_i = 0.6$ MΩ	
		$V_a = 45$ V $V_{g2} = 45$ V $V_{g1} = 0$ V	$I_a = 1.7$ $I_{g2} = 0.7$	$S = 0.7$ mA/V $R = 0.35$ MΩ	

DF 92 Pentode	see 1 L 4				
DF 96 R.F. pentode R.F. or I.F. amplifier	V_f = 1.4 V I_f = 25 mA	V_a = 64 V V_{g2} = 64 V V_{g1} = 0 V	I_a = 1.65 I_{g2} = 0.55	S = 0.85 mA/V R_i = 0.7 MΩ $C_{ag1} <$ 10 mpF	 Miniature
		V_a = 85 V V_{g2} = 64 V V_{g1} = 0 V	I_a = 1.65 I_{g2} = 0.55	S = 0.75 mA/V R_i = 1.0 MΩ	
DG	Cathode-ray tubes, see p. 178				
DK 21 Octode Frequency changer	V_f = 1.4 V I_f = 50 mA	$V_a = V_b =$ 120 V R_{g5} = 0.12 MΩ V_{g4} = 0 V R_{g2} = 25 kΩ R_{g1+g3} = 35 kΩ	I_a = 1.5 I_{g5} = 0.25 I_{g2} = 2.4 I_{g1+g3} = 0.2	S_c = 0.5 mA/V R_i = 1.5 MΩ	 Octal

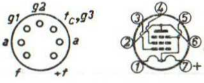
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DK 21		$V_a = V_b =$ 90 V $V_{g5} =$ 90 V $V_{g4} =$ 0 V $R_{g2} =$ 12.5 kΩ $R_{g1+g3} =$ 35 kΩ	$I_a =$ 1.5 $I_{g5} =$ 0.25 $I_{g2} =$ 2.4 $I_{g1+g3} =$ 0.2	$S_c =$ 0.5 mA/V $R_i =$ 1.2 MΩ	
DK 40 [1] Octode Frequency changer	$V_f =$ 1.4 V $I_f =$ 50 mA	$V_a = V_b =$ 135 V $R_{g5} =$ 270 Ω $V_{g4} =$ 0 V $R_{g2} =$ 26 kΩ $R_{g1+g3} =$ 35 kΩ $V_{osc} =$ 8 V	$I_a =$ 1.0 $I_{g5} =$ 0.25 $I_{g2} =$ 2.6	$S_c =$ 0.42 mA/V $R_i =$ 1.0 MΩ	 Rimlock
		$V_a = V_b =$ 90 V $R_{g5} =$ 90 kΩ $V_{g4} =$ 0 V $R_{g2} =$ 8.5 kΩ $R_{g1+g3} =$ 35 kΩ $V_{osc} =$ 8 V	$I_a =$ 1.0 $I_{g5} =$ 0.25 $I_{g2} =$ 2.6	$S_c =$ 0.42 mA/V $R_i =$ 1.0 MΩ	
		$V_a = V_b =$ 67.5 V $V_{g5} =$ 67.5 V $V_{g4} =$ 0 V $V_{g2} =$ 67.5 V $R_{g1+g3} =$ 35 kΩ $V_{osc} =$ 8 V	$I_a =$ 1.0 $I_{g5} =$ 0.25 $I_{g2} =$ 2.6	$S_c =$ 0.42 mA/V $R_i =$ 0.9 MΩ	

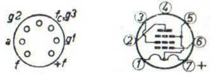
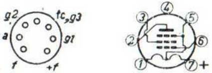
[1] $R_{g_1+g_3}$ conected to + f.

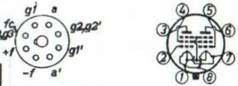
DK 91 Heptode Frequency changer	V_f = 1.4 V I_f = 50 mA	V_a = 90 V_{g2+g4} = 67.5 V V_{g3} = 0 V R_{g1} = 0.1 MΩ	= 1.6 I_{g2+g4} = 3.2 I_{g1} = 0.25	S_c = 0.30 mA/V R_i = 0.6 MΩ	
		V_a = 67.5 V V_{g2+g4} = 67.5 V V_{g3} = 0 V R_{g1} = 0.1 MΩ	I_a = 1.4 I_{g2+g4} = 3.2 I_{g1} = 0.25	S_c = 0.28 mA/V R_i = 0.5 MΩ	 Miniature
		V_a = 45 V V_{g2+g4} = 45 V V_{g3} = 0 V R_{g1} = 0.1 MΩ	I_a = 0.7 I_{g2+g4} = 1.9 I_{g1} = 0.15	S_c = 0.23 mA/V R_i = 0.6 MΩ	
DK 92 Heptode Frequency changer	V_f = 1.4 V I_f = 50 mA	V_a=V_b= 85 V V_{g3} = 0 V V_{osc} = 4 V R_{g4} = 0.18 MΩ R_{g2} = 33 kΩ R_{g1} = 27 kΩ	I_a = 0.65 I_{g4} = 0.14 I_{g2} = 1.65 I_{g1} = 0.13	S_c = 0.32 mA/V S_{eff} = 0.4 mA/V R_i = 1 MΩ R_{eq} = 100 kΩ	
		V_a=V_b= 63.5 V V_{g4} = 63.5 V V_{g3} = 0 V V_{osc} = 4 V R_{g2} = 22 kΩ R_{g1} = 27 kΩ	I_a = 0.70 I_{g4} = 0.15 I_{g2} = 1.55 I_{g1} = 0.13	S_c = 0.3 mA/V S_{eff} = 0.36 mA/V R_i = 0.9 MΩ R_{eq} = 120 kΩ	 Miniature
		V_a=V_b= 41 V V_{g4} = 41 V V_{g3} = 0 V V_{osc} = 2.5 V R_{g2} = 6.8 kΩ R_{g1} = 27 kΩ	I_a = 0.25 I_{g4} = 0.09 I_{g2} = 1.75 I_{g1} = 0.08	S_c = 0.18 mA/V S_{eff} = 0.7 mA/V R_i = 0.75 MΩ R_{eq} = 115 kΩ	

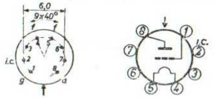
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DK 96 Heptode Frequency changer	V_f = 1.4 V I_f = 25 mA	$V_a = V_b$ = 85 V V_{g3} = 0 V V_{osc} = 4 V R_{g4} = 0.12 MΩ R_{g2} = 33 kΩ R_{g1} = 27 kΩ	I_a = 0.6 I_{g4} = 0.14 I_{g2} = 1.5 I_{g1} = 0.085	S_c = 0.3 mA/V R_i = 0.8 MΩ R_{eq} = 100 kΩ	 Miniature
		$V_a = V_b$ = 64 V V_{g4} = 64 V V_{g3} = 0 V V_{osc} = 4 V R_{g2} = 18 kΩ R_{g1} = 27 kΩ	I_a = 0.55 I_{g4} = 0.12 I_{g2} = 1.6 I_{g1} = 0.085	S_c = 0.275 mA/V R_i = 0.75 MΩ R_{eq} = 110 kΩ	
DL 21 Output pentode Class A final amplifier	V_f = 1.4 V I_f = 50 mA	V_a = 120 V V_{g2} = 120 V V_{g1} = −4.8 V	I_a = 5 I_{g2} = 0.9	S = 1.4 mA/V R_i = 0.35 MΩ R_a = 24 kΩ W_o = 0.27 W	 Octal
		V_a = 90 V V_{g2} = 90 V V_{g1} = −3 V	I_a = 4 I_{g2} = 0.7	S = 1.3 mA/V R_i = 0.3 MΩ R_a = 22.5 kΩ W_o = 0.16 W	
DL 41 Output pentode Class A final amplifier	V_f = 1.4 V I_f = 50 mA	V_a = 120 V V_{g2} = 120 V V_{g1} = −5.8 V	I_a = 5 I_{g2} = 0.82	S = 1.35 mA/V R_i = 0.16 MΩ R_a = 24 kΩ W_o = 0.3 W W_a = 1.2 W	 Riml[illegible]
		V_a = 90 V V_{g2} = 90 V V_{g1} = [illegible]3.6 V	I_a = 4 I_{g2} = 0.65	S = 1.25 mA/V R_i = 0.17 MΩ R_a = 22.5 kΩ W_o = 0.1[illegible] W	

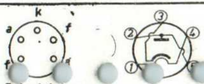
DL 41 Output pentode (continued) Class A final amplifier	$V_f = 1.4$ V $I_f = 0.1$ A	$V_a = 120$ V $V_{g2} = 120$ V $V_{g1} = -5.7$ V	$I_a = 10$ $I_{g2} = 1.65$	$S = 2.5$ mA/V $R_i = 80$ kΩ $R_a = 12$ kΩ $W_o = 0.6$ W $W_a = 1.2$ W	
		$V_a = 90$ V $V_{g2} = 90$ V $V_{g1} = -3.6$ V	$I_a = 8$ $I_{g2} = 1.3$	$S = 2.45$ mA/V $R_i = 90$ kΩ $R_a = 11$ kΩ $W_o = 0.36$ W	
Class B final amplifier		$V_a = 150$ V $V_{g2} = 150$ V $V_{g1} = -13.2$ V $V_i = 10.6$ V	$I_{a\,min} = 2\times 1.5$ $I_{a\,max} = 2\times 11.5$ $I_{g2min} = 2\times 0.25$ $I_{g2max} = 2\times 4$	$R_{aa} = 15$ kΩ $W_o = 2.1$ W	
DL 64 **DL 65** **DL 66** **DL 67** **DL 71** **DL 72**	Hearing-aid tubes, see p. 169				

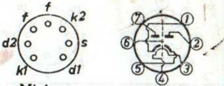
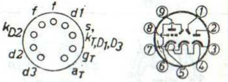
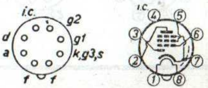
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DL 92 Output pentode Class A final amplifier	V_f = 1.4 V I_f = 0.1 A	$V_a = V_b$ = 84 V V_{g1} = 6.5 V R_{g2} = 10 kΩ	I_a = 8 I_{g2} = 1.7	S = 1.55 mA/V R_i = 0.1 MΩ R_a = 7 kΩ W_o = 190 mW W_a = 0.7 W	 Miniature
		$V_a = V_b$ = 61 V V_{g2} = 61 V V_{g1} = —6 V	I_a = 6.6 I_{g2} = 1.4	S = 1.5 mA/V R_i = 0.1 MΩ R_a = 7 kΩ W_o = 125 mW	
	V_f = 2.8 V I_f = 50 mA	$V_a = V_b$ = 84 V V_{g1} = —6 V R_{g2} = 10 kΩ	I_a = 7.6 I_{g2} = 1.6	S = 1.5 mA/V R_i = 0.1 MΩ R_a = 7 kΩ W_o = 180 mW	
		$V_a = V_b$ = 61 V V_{g2} = 61 V V_{g1} = —5.5 V	I_a = 6.5 I_{g2} = 1.4	S = 1.45 mA/V R_i = 0.1 MΩ R_a = 7 kΩ W_o = 120 mW	

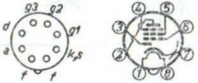
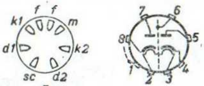
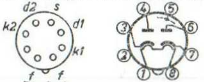
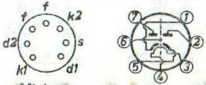
DL 93 Output pentode	see 3A 4				
DL 94 Output pentode Class A final amplifier	V_f = 1.4 V I_f = 0.1 A	V_a = 86 V V_{g2} = 86 V V_{g1} = —4.5 V	I_a = 8 I_{g2} = 1.8	S = 2.0 mA/V R_i = 0.11 MΩ R_a = 8 kΩ W_o = 0.29 W W_a = 1.2 W	 Miniature
	V_f = 2.8 V I_f = 50 mA	V_a = 86 V V_{g2} = 86 V V_{g1} = —4.3 V	I_a = 7.0 I_{g2} = 1.5	S = 1.9 mA/V R_i = 0.12 MΩ R_a = 10 kΩ W_a = 0.27 W	
DL 95 Output pentode	see 3 Q 4				
DL 96 Output pentode Class A	V_f = 1.4 V I_f = 50 mA	V_a = 85 V V_{g2} = 85 V V_{g1} = —5.2 V	I_a = 5 I_{g2} = 0.9	S = 1.4 mA/V R_i = 150 kΩ R_a = 13 kΩ W_o = 0.2 W W_a = 0.6 W	 Miniature
Class A half filament	V_f = 1.4 V I_f = 25 mA	V_a = 85 V V_{g2} = 85 V V_{g1} = —5.2 V	I_a = 2.5 I_{g2} = 0.45	R_a = 15 kΩ W_o = 0.1 W	
Class A	V_f = 2.8 V V_f = 25 mV	V_a = 90 V V_{g2} = 90 V V_{g1} = —6.3 V	I_a = 3.7 I_{g2} = 0.7	R_a = 20 kΩ W_o = 0.15 W	

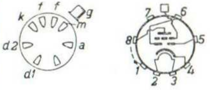
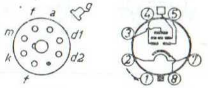
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
	V_f = 1.4 V I_f = 0.1 A	V_a = 120 V V_{g2} = 120 V V_{g1} = —8.7 V	$I_{a\ min}$ = 2× 1.0 $I_{a\ max}$ = 2× 4.1 $I_{g2 min}$ = 2×0.16 $I_{g2 max}$ = 2× 1.1	R_{aa} = 30 kΩ W_o = 0,6 W	
		V_a = 90 V V_{g2} = 90 V V_{g1} = —5.7 V	$I_{a\ min}$ = 2× 1.0 $I_{a\ max}$ = 2× 3.0 $I_{g2 min}$ = 2×0.16 $I_{g2 max}$ = 2× 0.7	R_{aa} = 30 kΩ W_o = 0.3 W	
DLL 21 Double output pentode Class AB push-pull amplifier	V_f = 1.4 V I_f = 0.2 A	V_a = 135 V V_{g2} = 135 V V_{g1} = —9.4 V	$I_{a\ min}$ = 2× 2.0 $I_{a\ max}$ = 2× 8.8 $I_{g2 min}$ = 2×0.35 $I_{g2 max}$ = 2× 2.3	R_{aa} = 15 kΩ W_o = 1.5 W	 Octal
		V_a = 120 V V_{g2} = 120 V V_{g1} = —8.2 V	$I_{a\ min}$ = 2× 2.0 $I_{a\ max}$ = 2× 7.5 $I_{g2 min}$ = 2×0.35 $I_{g2 max}$ = 2× 2.0	R_{aa} = 15 kΩ W_o = 1.2 W	
	V_f = 2.8 V I_f = 0.1 A	V_a = 135 V V_{g2} = 135 V V_{g1} = —9.5 V	$I_{a\ min}$ = 2× 1.5 $I_{a\ max}$ = 2× 8.2 $I_{g2 min}$ = 2×0.25 $I_{g2 max}$ = 2× 2.4	R_{aa} = 15 kΩ W_o = 1.5 W	

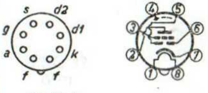
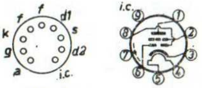
DLL 21 Double output pentode (continued) Class AB push-pull amplifier	V_f = 2.8 V I_f = 0.1 mA	V_a = 120 V V_{g2} = 120 V V_{g1} = −8.1 V	I_a min = 2× 1.5 I_a max = 2× 7.1 I_{g2min} = 2×0.25 I_{g2max} = 2× 1.9	R_{aa} = 15 kΩ W_o = 1.1 W	
		V_a = 90 V V_{g2} = 90 V V_{g1} = −5.9 V	I_a min = 2× 1.0 I_a max = 2× 4.4 I_{g2min} = 2× 0.2 I_{g2max} = 2× 1.3	R_{aa} = 20 kΩ W_o = 0.5 W	
DM 70 Tuning indicator	V_f = 1.4 V I_f = 25 mA	V_f = 1.4 V (Pin 5 positive) V_a = 85 V	I_a = 0.17 (V_g = 0 V)	V_g = −10 V for complete extinction	 Subminiature
		V_f = 1.4 V (Pin 4 positive) V_a = 60 V	I_a = 0.105 (V_g = 0 V)	V_g = −7 V for complete extinction	
DM 71	= DM 70 with short leads				
DN **DP** **DR**	Cathode-ray tubes, see p. 178				

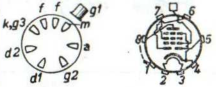
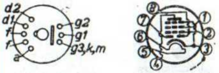
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DY 86 H.T. rectifier for T.V. receivers	$V_f = 1.4$ V $I_f = 0.55$ A	see EY 86 except for heater rating			
E1C **E1F**	= 4671 = 4672	U.H.F. tube see p. 171			
E1T	Decade counter tube, see p. 246				
E80CC **E80F** **E80L**	Reliable, ruggedized and long life tubes, see p. 166				
E81L **E83F**	Repeater tubes, see p. 165				
E90CC **E92CC**	Tube for computers, see p. 175				
E180F	Reliable, ruggedized, see p. 166				
EA 50 Single diode Detector	$V_f = 6.3$ V $I_f = 0.15$ A	V_d = max. 200 V V_{kf} = max. 100 V R_{kf} = max. 20 kΩ	I_d = max. 5	C_{dk} = 2.1 pF	
EA 76 Di[illegible]	$V_f = 6.3$ V I_f = [illegible]0.15 A	$\sim V_{d\,invp}$ = m[illegible]. 420 V	I_d = max. 9		 Subminiature

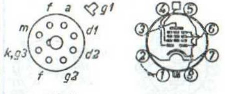
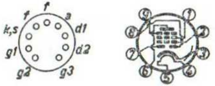
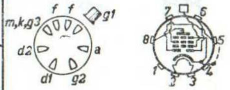
EAA 91 Double diode Detector and A.G.C.	V_f = 6.3 V I_f = 0.3 A	$V_{d\,invp}$ = max. 420 V	I_d = max. 9 I_{dp} = max. 54		 Miniature
EABC 80 Triple diode high mu triode Typical characteristics (diode systems)	V_f = 6.3 V I_f = 0.45 A	$V_{d_1\,invp}$ = max. 350 V $V_{d_2\,invp}$ = max. 350 V $V_{d_3\,invp}$ = max. 350 V	I_{d_1} = max. 1 I_{d_1p} = max. 6 I_{d_2} = max. 10 I_{d_2p} = max. 75 I_{d_3} = max. 10 I_{d_3p} = max. 75	R_{id_1} = 5 kΩ (V_{d_1} = 10 V) R_{id_2} = 200 Ω (V_{d_2} = 5 V) R_{id_3} = 200 Ω (V_{d_3} = 5 V)	 Noval
Typical characteristics (triode systems)		V_a = 250 V V_g = −3 V	I_a = 1.0	S = 1.2 mA/V R_i = 58 kΩ μ = 70	
		V_a = 100 V V_g = −1 V	I_a = 0.8	S = 1.3 mA/V R_i = 54 kΩ μ = 70	
EAC 91	U.H.F. tube, see p. 172				
EAF 41 Diode variable mu pentode R.F. or I.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V R_{g2} = 95 kΩ V_{g1} = −2 V	I_a = 5 I_{g2} = 1.6	S = 1.8 mA/V R_i = 1.2 MΩ C_{ag1} < 2 mpF	 Rimlock
A.F. amplifier		V_b = 250 V R_a = 0.22 MΩ R_{g2} = 0.82 MΩ R_k = 1.6 kΩ	I_a = 0.86 I_{g2} = 0.28	g = 105	

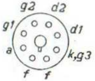
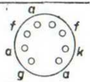
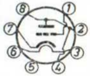
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EAF 42 Diode variable mu pentode R.F. or I.F. amplifier A.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = 250$ V $R_{g2} = 110$ kΩ $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 5$ $I_{g2} = 1.5$	$S = 2.0$ mA/V $R_i = 1.4$ MΩ $C_{ag1} < 2$ mpF	 Rimlock
		$V_b = 250$ V $R_a = 0.22$ MΩ $R_{g2} = 0.82$ MΩ $R_k = 1.5$ kΩ $V_{g3} = 0$ V	$I_a = 0.80$ $I_{g2} = 0.26$	$g = 120$	
EB 4 Double diode Detector and A.G.C.	$V_f = 6.3$ V $I_f = 0.2$ A	$V_{d\,invp} =$ $=$ max. 420 V	$I_d =$ max. 0.8		 P
EB 41 Double diode Detector and A.G.C.	$V_f = 6.3$ V $I_f = 0.3$ A	$V_{d\,invp} =$ $=$ max. 420 V	$I_d =$ max. 9 $I_{dp} =$ max. 54		 Rimlock
EB 91 Double diode Detector and A.G.C.	$V_f = 6.3$ V $I_f = 0.3$ A	$V_{d\,invp} =$ $=$ max. 420 V	$I_d =$ max. 9 $I_{dp} =$ max. 54		 Miniature

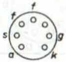
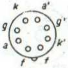
EBC 3 **EBC 33** Double diode triodes Typical characteristics A.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	V_a = 275 V V_g = −6.25 V	I_a = 5	S = 2.0 mA/V R_i = 15 kΩ μ = 30	
		V_a = 200 V V_g = −4.3 V	I_a = 4	S = 2.0 mA/V R_i = 15 kΩ μ = 30	
		V_a = 100 V V_g = −2.1 V	I_a = 2	S = 1.6 mA/V R_i = 19 kΩ μ = 30	P EBC 3
		V_b = 250 V R_a = 0.2 MΩ R_k = 4 kΩ	I_a = 0.75	g = 26	
		V_b = 200 V R_a = 0.2 MΩ R_k = 12.5 kΩ	I_a = 0.35	g = 22	Octal EBC 33
		V_b = 100 V R_a = 0.2 MΩ R_k = 12.5 kΩ	I_a = 0.2	g = 19	

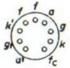
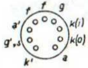
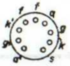
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EBC 41 Double diode high mu triode Typical characteristics A.F. amplifier	$V_f = 6.3$ V $I_f = 0.23$ A	V_a = 250 V V_g = −3 V	I_a = 1	S = 1.2 mA/V R_i = 58 kΩ μ = 70	 Rimlock
		V_b = 250 V R_a = 0.22 MΩ R_k = 1.8 kΩ	I_a = 0.7	g = 51	
EBC 81 Double diode high mu triode Typical characteristics A.F. amplifier	$V_f = 6.3$ V $I_f = 0.23$ A	V_a = 250 V V_g = −3 V	I_a = 1	S = 1.2 mA/V R_i = 58 kΩ μ = 70	 Noval
		V_b = 250 V R_a = 22 kΩ R_k = 1.8 kΩ	I_a = 0.7	g = 51	

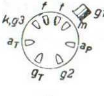
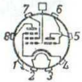
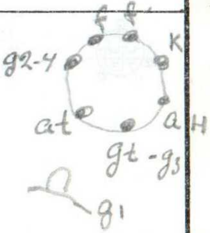
EBF 2 Double diode variable mu pentode I.F. amplifier	$V_f =$ 6.3 V $I_f =$ 0.2 A	$V_a = V_b =$ 250 V R_{g2} = 95 kΩ V_{g1} = —2 V	I_a = 5 I_{g2} = 1.6	S = 1.8 mA/V R_i = 1.3 MΩ $C_{ag1} <$ 2 mpF	 P
		$V_a = V_b =$ 100 V V_{g2} = 100 V V_{g1} = —2 V	I_a = 5 I_{g2} = 1.6	S = 1.8 mA/V R_i = 0.4 MΩ	
EBF 11 Double diode variable mu pentode I.F. amplifier A.F. amplifier	$V_f =$ 6.3 V $I_f =$ 0.2 A	$V_a = V_b =$ 250 V R_{g2} = 85 kΩ V_{g1} = —2 V	I_a = 5 I_{g2} = 1.8	S = 1.8 mA/V R_i = 2.0 MΩ $C_{ag1} <$ 2 mpF	 Y
		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 2 kΩ	I_a = 0.8 I_{g2} = 0.25	g = 98	

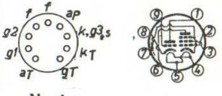
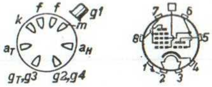
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EBF 32 Double diode variable mu pentode I.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 95$ kΩ $V_{g1} = -2$ V	$I_a = 5$ $I_{g2} = 1.6$	$S = 1.8$ mA/V $R_i = 1.3$ MΩ $C_{ag1} < 2$ mpF	 Octal
		$V_a = V_b = 100$ V $V_{g2} = 100$ V $V_{g1} = -2$ V	$I_a = 5$ $I_{g2} = 1.6$	$S = 1.8$ mA/V $Ri = 0.4$ MΩ	
EBF 80 Double diode variable mu pentode R.F. or I.F. amplifier A.F. amplifier	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = V_b = 250$ V $V_{g3} = 0$ V $R_{g2} = 95$ kΩ $R_k = 295$ Ω	$I_a = 5.0$ $I_{g2} = 1.75$	$S = 2.2$ mA/V $R_i = 1.4$ MΩ $C_{ag1} < 2.5$ mpF	 Noval
		$V_b = 250$ V $R_a = 0.22$ MΩ $R_{g2} = 0.82$ MΩ $R_k = 1.8$ kΩ $V_{g3} = 0$ V	$I_a = 0.75$ $I_{g2} = 0.30$	$g = 110$	
EBL 1 Double diode output pentode Class A final amplifier Class AB push-pull amplifies	$V_f = 6.3$ V $I_f = 1.18$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -6$ V $R_k = 150$ Ω	$I_a = 36$ $I_{g2} = 4$	$S = 8$ mA/V $R_i = 50$ kΩ $R_a = 7$ kΩ $W_o = 4.5$ W $W_a = 9$ W	 P
		$V_a = 250$ V $V_{g2} = 250$ V $R_k = 140$ Ω	I_a min $= 2\times 24$ I_a max $= 2\times 28.5$ I_{g2}min $= 2\times 2.8$ I_{g2}max $= 2\times 4.6$	$R_{aa} = 10$ kΩ $W_o = 8.2$ W	

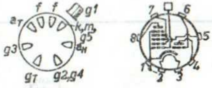
EBL 21 Double diode output pentode Class A final amplifier Class AB push-pull amplifier	V_f = 6.3 V I_f = 0.8 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4.5	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 11 W	
		V_a = 250 V V_{g2} = 275 V V_{g1} = —6.2 V R_k = 125 Ω	I_a = 44 I_{g2} = 5.8	S = 9.5 mA/V R_i = 50 kΩ R_a = 5.7 kΩ W_o = 5.5 W	
		V_a = 300 V V_{g2} = 300 V R_k = 130 Ω	$I_{a\,min}$ = 2×30 $I_{a\,max}$ = 2×36 I_{g2min} = 2×3.8 I_{g2max} = 2×6.5	R_{aa} = 9 kΩ W_o = 13.2 W	Loctal 8p.
EC 50	Thyratron, see p. 210				
EC 55 **EC 56** **EC 57**	U.H.F. tubes, see p. 172				
EC 70 R.F. triode Typical characteristics	V_f = 6.3 V I_f = 0.15 A	V_a = 100 V V_g = —2 V	I_a = 13	S = 5.5 mA/V R_i = 3.6 kΩ μ = 20	Subminiature
EC 80 **EC 81** **EC 91**	U.H.F. tubes, see p. 173				

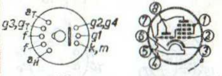
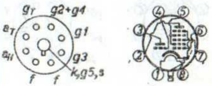
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EC 92 R.F. triode Typical characteristics	V_f = 6.3 V I_f = 0.15 A	V_a = 250 V V_g = —2 V	I_a = 10	S = 5 mA/V R_i = 12 kΩ μ = 60 freq. = max. 300 Mc/s	  Miniature
		V_a = 170 V V_g = —1 V	I_a = 8.5	S = 5.5 mA/V R_i = 12 kΩ μ = 66	
ECC 40 Double triode Class A final amplifier (per system) A.F. amplifier (per system) A.F. amplifier (2 systems in cascade)	V_f = 6.3 V I_f = 0.6 A	V_a = 250 V R_k = 920 Ω V_g = —5.6 V	I_a = 6	S = 2.9 mA/V R_i = 11 kΩ μ = 32 R_a = 15 kΩ W_o = 0.28 W W_a = 1.5 W	  Rimlock
		V_b = 400 V R_a = 0.1 MΩ R_k = 2.2 kΩ R_{g1}' = 0.33 MΩ	I_a = 2.2	g = 24.5 V_o = max. 76 V	
		V_b = 250 V R_a = 0.1 MΩ R_k = 2.2 kΩ R_{g1}' = 0.33 MΩ	I_a = 1.4	g = 24 V_o = max. 44 V	
		V_b = 250 V R_a = 0.22 MΩ R_a' = 0.22 MΩ R[illegible] = 1 M[illegible] R[illegible] = 1 k[illegible]	I_b = 2.0	g = 780	

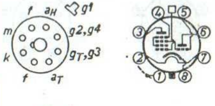
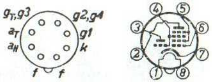
ECC 81 Double triode Typical characteristics (per system)	V_f = 6.3 V, I_f = 0.3 A	V_a = 100 V, V_g = −1 V	I_a = 3.0	S = 3.75 mA/V, R_i = 16.5 kΩ, μ = 62	
		V_a = 170 V, V_g = −1 V	I_a = 8.5	S = 5.9 mA/V, R_i = 11.2 kΩ, μ = 66	
	V_f = 12.6 V, I_f = 0.15 A	V_a = 250 V, V_g = −2 V	I_a = 10	S = 5.5 mA/V, R_i = 11 kΩ, μ = 60	
ECC 82 Double triode Typical characteristics (per system)	V_f = 6.3 V, I_f = 0.3 A	V_a = 250 V, V_g = −8.5 V	I_a = 10.5	S = 2.2 mA/V, R_i = 7.7 kΩ, μ = 17	 
	V_f = 12.6 V, I_f = 0.15 A	V_a = 100 V, V_g = 0 V	I_a = 11.8	S = 2.2 mA/V, R_i = 6.25 kΩ, μ = 19.5	
ECC 83 Double high mu triode Typical characteristics (per system)	V_f = 6.3 V, I_f = 0.3 A	V_a = 250 V, V_g = −2 V	I_a = 1.2	S = 1.6 mA/V, R_i = 62.5 kΩ, μ = 100	
	V_f = 12.6 V, I_f = 0.15 A	V_a = 100 V, V_g = −1 V	I_a = 0.5	S = 1.25 mA/V, R_i = 80 kΩ, μ = 100	Noval
ECC 84 Double triode Typical characteristics (per system)	V_f = 6.3 V, I_f = 0.33 A	V_a = 90 V, V_g = −1.5 V	I_a = 12	S = 6 mA/V, R_i = 4 kΩ, μ = 24	  Noval
ECC 85 Double triode Typical characteristics (per system)	V_f = 6.3 V, I_f = 0.435 A	V_a = 250 V, V_g = −2.3 V	I_a = 10	S = 5.9 mA/V, R_i = 9.8 kΩ, μ = 57	  Noval

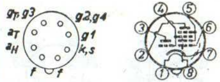
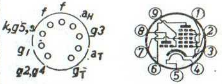
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
ECC 91 Double triode	see 6 J 6				
ECF 1 Triode variable mu pentode I.F. amplifier (pentode system)	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 75$ kΩ $V_{g1} = -2$ V	$I_a = 5$ $I_{g2} = 2$	$S = 2.0$ mA/V $R_i = 1.6$ MΩ $C_{ag1} < 4$ mpF	P
Typical characteristics (triode system)		$V_a = 150$ V $V_g = -3$ V	$I_a = 8$	$S = 2.2$ mA/V $R_i = 9$ kΩ $\mu = 20$	
ACH 1					

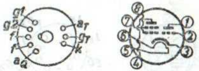
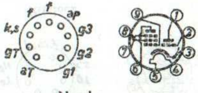
ECF 80 Triode pentode Typical characteristics (pentode system) Typical characteristics (triode system) Frequency changer	$V_f = 6.3$ V $I_f = 0.43$ A	V_a = 170 V V_{g2} = 170 V V_{g1} = —2 V	I_a = 10 I_{g2} = 2.8	S = 6.2 mA/V R_i = 0.4 MΩ R_{eq} = 1.5 kΩ	 Noval
		V_a = 100 V V_g = —2 V	I_a = 14	S = 5 mA/V R_i = 4 kΩ μ = 20	
		V_a = 170 V V_{g2} = 170 V R_{g1} = 0.1 MΩ R_k = 330 Ω	I_a = 6.5 I_{g2} = 2 I_{g1} = 0.025	S_c = 2.2 mA/V R_i = 800 kΩ	
ECH 3 Triode hexode Frequency changer (hexode system)	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b$ = 250 V R_1 = 24 kΩ R_2 = 33 kΩ R_{g3+gT} = 50 kΩ V_{g1} = —2 V	I_a = 3 I_{g2+g4} = 3 I_{g3+gT} = 0.2	S_c = 0.65 mA/V R_i = 1.3 MΩ	 P
		$V_a = V_b$ = 200 V R_1 = 19 kΩ R_2 = 54 kΩ R_{g3+gT} = 50 kΩ V_{g1} = —2 V	I_a = 3 I_{g2+g4} = 3 I_{g3+gT} = 0.2	S_c = 0.65 mA/V R_i = 0.9 MΩ	
		$V_a = V_b$ = 100 V R_1 = 19 kΩ R_2 = 54 kΩ R_{g3+gT} = 50 kΩ V_{g1} = —1.25 V	I_a = 1.0 I_{g2+g4} = 1.4 I_{g3+gT} = 0.2	S_c = 0.45 mA/V R_i = 1.3 MΩ	

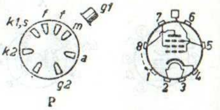
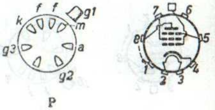
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
ECH 3 Triode hexode (continued) Oscillator (triode system)	$V_f = 6.3$ V $I_f = 0.2$ A	$V_b = 250$ V $R_a = 45$ kΩ $R_{g3+gT} = 50$ kΩ	$I_a = 3.3$ $I_{g3+gT} = 0.2$	$S_o = 2.8$ mA/V $\mu = 24$	
		$V_a = V_b = 100$ V $R_{g3+gT} = 50$ kΩ	$I_a = 3.3$ $I_{g3+gT} = 0.2$	$S_o = 2.8$ mA/V $\mu = 24$	
ECH 4 Triode heptode Frequency changer (heptode system) Oscillator (triode system) I.F. amplifier (heptode system) A.F. amplifier (triode system) Typical characteristics (triode system)	$V_f = 6.3$ V $I_f = 0.35$ A	$V_a = 250$ V $R_{g2+g4} = 24$ kΩ $R_{g3+gT} = 50$ kΩ $V_{g1} = -2$ V	$I_a = 3.0$ $I_{g2+g4} = 6.2$ $I_{g3+gT} = 0.19$	$S_c = 0.75$ mA/V $R_i = 1.4$ MΩ	 P
		$V_b = 250$ V $R_a = 20$ kΩ $R_{g3+gT} = 50$ kΩ	$I_a = 4.5$ $I_{g3+gT} = 0.19$	$S_{eff} = 0.55$ mA/V	
		$V_a = 250$ V $R_{g2+g4} = 45$ kΩ $V_{g3} = 0$ V $V_{g1} = -2$ V	$I_a = 5.3$ $I_{g2+g4} = 3.5$	$S = 2.2$ mA/V $R_i = 0.9$ MΩ $C_{ag1} < 2$ mpF	
		$V_b = 250$ V $R_a = 0.2$ MΩ $V_g = -2$ V	$I_a = 1.0$	$g = 13$	
		$V_a = 100$ V $V_g = 0$ V	$I_a = 12$	$S = 3.2$ mA/V $\mu = 22$	

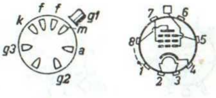
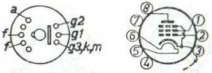
ECH 11 Triode hexode Frequency changer (triode system)	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V $R_{g2}+_{g4}$ = 50 kΩ $R_{g3}+_{gT}$ = 30 kΩ V_{g1} = −2 V	I_a = 2.3 $I_{g2}+_{g4}$ = 3.0 $I_{g3}+_{gT}$ = 0.33	S_c = 0.65 mA/V R_i = 1.2 MΩ V_{osc} = 8.5 V	 Y
Oscillator (triode system)		V_b = 250 V R_a = 30 kΩ $R_{g3}+_{gT}$ = 30 kΩ	I_a = 3.4 $I_{g3}+_{gT}$ = 0.33	S_o = 2.8 mA/V μ = 17	
ECH 21 Triode heptode Frequency changer (heptode system)	V_f = 6.3 V I_f = 0.33 A	V_a=V_b = 250 V $R_{g2}+_{g4}$ = 24 kΩ $R_{g3}+_{gT}$ = 50 kΩ V_{g1} = −2 V	I_a = 3.0 $I_{g2}+_{g4}$ = 6.2 $I_{g3}+_{gT}$ = 0.19	S_c = 0.75 mA/V R_i = 1.4 MΩ	 Loctal 8p.
Oscillator (triode system)		V_b = 250 V R_a = 20 kΩ $R_{g3}+_{gT}$ = 50 kΩ	I_a = 4.5 $I_{g3}+_{gT}$ = 0.19	S_{eff} = 0.55 mA/V	
L.F. amplifier (heptode system)		V_a=V_b = 250 V $R_{g2}+_{g4}$ = 45 kΩ V_{g3} = 0 V V_{g1} = −2 V	I_a = 5.3 $I_{g2}+_{gT}$ = 3.5	S = 2.2 mA/V R_i = 0.9 MΩ C_{ag1} < 2 mpF	
A.F. amplifier (triode system)		V_b = 250 V R_a = 0.2 MΩ V_g = −2 V	I_a = 1.0	g = 13	
Typical characteristics (triode system)		V_a = 100 V V_g = 0 V	I_a = 12	S = 3.2 mA/V μ = 22	

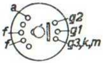
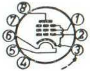
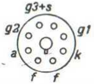
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
ECH 35 Triode hexode Frequency changer (hexode system)	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_1 = 24$ kΩ $R_2 = 33$ kΩ $R_{g3+gT} = 50$ kΩ $V_{g1} = -2$ V	$I_a = 3.0$ $I_{g2+g4} = 3.0$ $I_{g3+gT} = 0.2$	$S_c = 0.65$ mA/V $R_i = 1.3$ MΩ	 Octal
Oscillator (triode system)		$V_b = 250$ V $R_a = 45$ kΩ $R_{g3+gT} = 50$ kΩ	$I_a = 3.3$ $I_{g3+gT} = 0.2$	$S_o = 2.8$ mA/V $\mu = 24$	
ECH 41 Triode hexode Frequency changer (hexode system)	$V_f = 6.3$ V $I_f = 0.23$ A	$V_a = V_b = 250$ V $R_1 = 33$ kΩ $R_2 = 47$ kΩ $R_{g3+gT} = 20$ kΩ $V_{g1} = -2$ V	$I_a = 3.0$ $I_{g2+g4} = 2.2$ $I_{g3+gT} = 0.35$	$S_c = 0.5$ mA/V $R_i = 2$ MΩ $V_{osc} = 8$ V $R_{eq} = 170$ kΩ	 Rimlock
Oscillator (triode system)		$V_b = 250$ V $R_a = 30$ kΩ $R_{g3+gT} = 20$ kΩ	$I_a = 4.9$ $I_{g3+gT} = 0.35$	$S_o = 1.9$ mA/V $S_{eff} = 0.55$ mA/V $\mu = 19$	

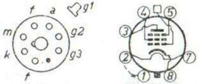
ECH 42 Triode hexode Frequency changer (hexode system)	$V_f = 6.3$ V $I_f = 0.23$ A	$V_a = V_b = 250$ V $R_1 = 27$ kΩ $R_2 = 27$ kΩ $R_{g3+gT} = 22$ kΩ $V_{g1} = -2$ V	$I_a = 3.0$ $I_{g2+g4} = 3.0$ $I_{g3+gT} = 0.35$	$S_c = 0.75$ mA/V $R_i = 1.7$ MΩ $R_{eq} = 100$ kΩ	 Rimlock
Oscillator (triode system)		$V_b = 250$ V $R_a = 33$ kΩ $R_{g3+gT} = 22$ kΩ $V_{osc} = 8$ V	$I_a = 5.1$ $I_{g3+gT} = 0.35$	$S_o = 2.8$ mA/V $S_{eff} = 0.6$ mA/V $\mu = 22$	
ECH 81 Triode heptode Frequency changer (heptode system)	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = V_b = 250$ V $R_{g2+g4} = 22$ kΩ $R_{g3+gT} = 47$ kΩ $V_{g1} = -2$ V	$I_a = 3.25$ $I_{g2+g4} = 6.7$ $I_{g3+gT} = 0.2$	$S_c = 0.775$ mA/V $R_i = 1$ MΩ $R_{eq} = 70$ kΩ	 Noval
R.F. or I.F. amplifier (heptode system)		$V_a = V_b = 250$ V $R_{g2+g4} = 39$ kΩ $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 6.5$ $I_{g2+g4} = 3.8$	$S = 2.4$ mA/V $R_i = 0.7$ MΩ $\mu_{g2g1} = 20$ $R_{eq} = 8.5$ kΩ	
Typical characteristics (triode system)		$V_a = 100$ V $V_g = 0$ V	$I_a = 13.5$	$S = 3.7$ mA/V $R_i = 6$ kΩ $\mu = 22$	
Oscillator (triode system)		$V_b = 250$ V $R_a = 33$ kΩ $R_{g3+gT} = 47$ kΩ	$I_a = 4.5$ $I_{g3+gT} = 0.2$	$S_{eff} = 0.65$ mA/V	

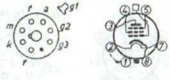
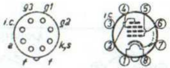
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
ECL 11 Triode output tetrode Class A final amplifier (tetrode system)	$V = 6.3$ V $I_f = 1.0$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -6$ V	$I_a = 36$ $I_{g2} = 4$	$S = 9$ mA/V $R_i = 25$ kΩ $R_a = 7$ kΩ $W_o = 3.8$ W $W_a = 9$ W	
Typical characteristics (triode system)		$V_a = 250$ V $V_g = -2.5$ V	$I_a = 2$	$S = 2$ mA/V $R_i = 35$ kΩ $\mu = 70$	Y
ECL 80 Triode output pentode Class A final amplifier (pentode system)	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = V_b = 170$ V $V_{g3} = 0$ V $V_{g2} = 170$ V $V_{g1} = -6.7$ V	$I_a = 15$ $I_{g2} = 2.8$	$S = 3.2$ mA/V $R_i = 0.15$ MΩ $R_a = 11$ kΩ $W_o = 1.0$ W $W_a = 3.5$ W	 Noval
Sync separator (pentode system)		$V_a = 20$ V $V_{g3} = 0$ V $V_{g2} = 12$ V $V_{g1} = 0$ V	$I_a = 2$		
Typical characteristics (triode system)		$V_a = 100$ V $V_g = 0$ V	$I_a = 8$	$S = 1.9$ mA/V $\mu = 20$	
A.F. amplifier (triode system)		$V_b = 170$ V $R_a = 0.22$ MΩ $V_g = -3.5$ V $R_{g1} = 0.68$ MΩ $V_{g3} = 0$ V	$I_a = 0.5$	$g = 11$	

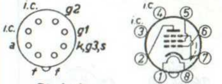
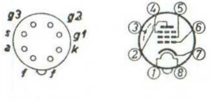
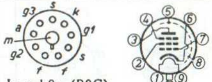
EEP 1 Secondary emission tetrode (phase splitter) Typical characteristics	V_f = 6.3 V I_f = 0.6 A	V_a = 250 V V_{g2} = 150 V V_{k2} = 150 V V_{g1} = −2.5 V	I_a = 8 I_{g2} = 0.45 I_{k2} = −6.5	S = 17 mA/V R_i = 50 kΩ	
EF 6 Pentode R.F. amplifier A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 100 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.8	S = 1.8 mA/V R_i = 2.5 MΩ C_{ag1} < 3 mpF	
		V_a = 100 V V_{g2} = 100 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.8	S = 1.8 mA/V R_i = 1.0 MΩ	
		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.4 MΩ R_k = 3 kΩ V_{g3} = 0 V	I_a = 0.9 I_{g2} = 0.35	g = 140	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.4 MΩ R_k = 5 kΩ V_{g3} = 0 V	I_a = 0.30 I_{g2} = 0.12	g = 100	

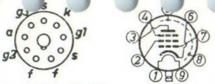
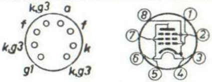
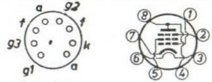
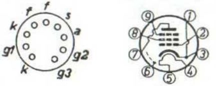
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 9 Variable mu pentode R.F. or I.F. amplifier A.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 90$ kΩ $V_{g1} = -2.5$ V $V_{g3} = 0$ V	$I_a = 6$ $I_{g2} = 1.7$	$S = 2.2$ mA/V $R_i = 1.25$ MΩ $C_{ag1} < 2$ mpF	 P
		$V_a = V_b = 200$ V $R_{g2} = 60$ kΩ $V_{g1} = -2.5$ V $V_{g3} = 0$ V	$I_a = 6$ $I_{g2} = 1.7$	$S = 2.2$ mA/V $R_i = 0.9$ MΩ	
		$V_a = V_b = 100$ V $V_{g2} = 100$ V $V_{g1} = -2.5$ V $V_{g3} = 0$ V	$I_a = 6$ $I_{g2} = 1.7$	$S = 2.2$ mA/V $R_i = 0.4$ MΩ	
		$V_b = 250$ V $R_a = 0.2$ MΩ $R_{g2} = 0.8$ MΩ $R_k = 1.8$ kΩ $V_{g3} = 0$ V	$I_a = 0.87$ $I_{g2} = 0.26$	$g = 105$	
EF 11 Variable mu pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 75$ kΩ $V_{g1} = -2$ V	$I_a = 6$ $I_{g2} = 2.0$	$S = 2.2$ mA/V $R_i = 2.0$ MΩ $C_{ag1} < 2$ mpF	 Y
		$V_a = V_b = 200$ V $R_{g2} = 50$ kΩ $V_{g1} = -2.2$ V	$I_a = 5.7$ $I_{g2} = 2.0$	$S = 2$ mA/V $R_i = 1.5$ MΩ	
		$V_a = V_b = 100$ V $R_{g2} = 50$ kΩ $V_{g1} = -1$ V	$I_a = 2.5$ $I_{g2} = 0.9$	$S = 1.3$ mA/V $R_i = 0.4$ MΩ	

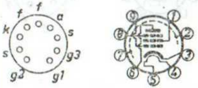
EF 11 A F. amplifier		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.6 MΩ R_k = 1.5 kΩ	I_a = 1.0 I_{g2} = 0.35	g = 98	
EF 12 Pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 100 V V_{g1} = −2 V	I_a = 3.0 I_{g2} = 1.0	S = 2.1 mA/V R_i = 2.0 MΩ C_{ag1} < 2 mpF	  Y
		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.5 MΩ R_k = 1.6 kΩ	I_a = 0.90 I_{g2} = 0.37	g = 181	
		V_b = 200 V R_a = 0.2 MΩ R_{g2} = 0.5 MΩ R_k = 2.2 kΩ	I_a = 0.67 I_{g2} = 0.27	g = 166	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.5 MΩ R_k = 2.2 kΩ	I_a = 0.32 I_{g2} = 0.14	g = 128	
EF 22 Variable mu pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V R_{g2} = 90 kΩ V_{g1} = −2.5 V V_{g3} = 0 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 1.2 MΩ C_{ag1} < 2 mpF	  Loctal 8p.
		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 1.8 kΩ V_{g3} = 0 V	I_a = 0.87 I_{g2} = 0.26	g = 106	

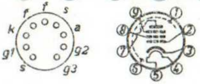
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 37A Low microphony pentode R.F. amplifier A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 100 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.8	S = 1.8 mA/V R_i = 2.5 MΩ C_{ag1} < 20 mpF	 Octal
		V_a = 200 V V_{g2} = 100 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.8	S = 1.8 mA/V R_i = 2.0 MΩ	
		V_a = 100 V V_{g2} = 100 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.8	S = 1.8 mA/V R_i = 1.0 MΩ	
		V_b = 250 V R_a = 0.3 MΩ R_{g2} = 0.8 MΩ R_k = 4 kΩ V_{g3} = 0 V	I_a = 0.6 I_{g2} = 0.2	g = 165	
		V_b = 200 V R_a = 0.3 MΩ R_{g2} = 0.6 MΩ R_k = 6.4 kΩ V_{g3} = 0 V	I_a = 0.45 I_{g2} = 0.17	g = 130	
		V_b = 100 V R_a = 0.3 MΩ R_{g2} = 0.6 MΩ R_k = 6.4 kΩ V_{g3} = 0 V	I_a = 0.22 I_{g2} = 0.08	g = 105	

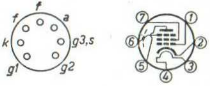
		V_a = 250 V R_{g2} = 90 kΩ V_{g1} = —2.5 V V_{g3} = 0 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 1.2 MΩ $C_{ag1} <$ 3 mpF	
EF 39 Variable mu pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 200 V R_{g2} = 60 kΩ V_{g1} = —2.5 V V_{g3} = 0 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 0.9 MΩ	 Octal
		V_a = 100 V V_{g2} = 100 V V_{g1} = —2.5 V V_{g3} = 0 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 0.4 MΩ	
		V_b = 250 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 1.8 kΩ V_{g3} = 0 V	I_a = 0.87 I_{g2} = 0.26	g = 105	
		V_a = 250 V V_{g2} = 140 V V_{g1} = —2 V V_{g3} = 0 V	I_a = 3.0 I_{g2} = 0.55	S = 1.85 mA/V R_i = 2.5 MΩ $C_{ag1} <$ 0.04 pF	
EF 40 Low noise preamplifier pentode Typical characteristics A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_b = 250 V R_a = 0.22 MΩ R_{g2} = 1.0 MΩ R_k = 1.5 kΩ V_{g3} = 0 V	I_a = 0.86 I_{g2} = 0.18	g = 190	 Rimlock
		V_b = 250 V R_a = 0.33 MΩ R_{g2} = 1.5 MΩ R_k = 2.2 kΩ V_{g3} = 0 V	I_a = 0.58 I_{g2} = 0.12	g = 210	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 41 Variable mu pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 90$ kΩ $V_{g1} = -2.5$ V	$I_a = 6$ $I_{g2} = 1.7$	$S = 2.2$ mA/V $R_i = 1.0$ MΩ $C_{ag1} < 2$ mpF	 Rimlock
EF 42 R.F. pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.33$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 10$ $I_{g2} = 2.4$	$S = 9$ mA/V $R_i = 0.5$ MΩ $\mu_{g2g1} = 83$ $R_{eq} = 840$ Ω $C_{ag1} < 6$ mpF	
EF 43 Variable mu pentode Wide-band amplifier	$V_f = 6.3$ V $I_f = 0.33$ A	$V_a = V_b = 250$ V $R_{g2} = 33$ kΩ $V_{g3} = 0$ V $V_{g1} = -2$ V	$I_a = 15$ $I_{g2} = 3.5$	$S = 6.4$ mA/V $R_i = 0.5$ MΩ $R_{eq} = 1.7$ kΩ $C_{ag1} < 6$ mpF	Rimlock
EF 50 R.F. pentode Wide-band amplifier	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 10$ $I_{g2} = 3$	$S = 6.5$ mA/V $R_i = 1$ MΩ $\mu_{g2g1} = 75$ $R_{eq} = 1.4$ kΩ $C_{ag1} < 7$ mpF	 Loctal 9p. (B9G)
EF 51	U.H.F. tube, see p. 174				

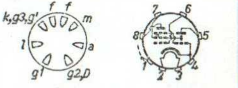
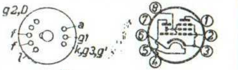
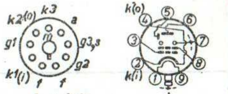
EF 55 R.F. pentode Typical characteristics	V_f = 6.3 V I_f = 1.0 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —4.5 V V_{g3} = 0 V	I_a = 40 I_{g2} = 5.5	S = 12 mA/V R_i = 55 kΩ μ_{g2g1} = 28 C_{ag1} = 0.15 pF	 Loctal 9p. (B9G)
EF 72 R.F. pentode Typical characteristics	V_f = 6.3 V I_f = 0.15 A	V_a = 100 V V_{g2} = 100 V V_{g1} = —1.4 V V_{g3} = 0 V	I_a = 7 I_{g2} = 2.2	S = 5 mA/V R_i = 250 kΩ μ_{g2g1} = 36 R_{eq} = 1.6 kΩ	 Subminiature
EF 73 A.F. pentode Typical characteristics	V_f = 6.3 V I_f = 0.2 A	V_a = 100 V V_{g2} = 100 V V_{g1} = —2 V V_{g3} = 0 V	I_a = 7.5 I_{g2} = 2.5	S = 5.25 mA/V R_i = 250 kΩ μ_{g2g1} = 28	 Subminiature
EF 80 R.F. pentode R.F. or I.F. amplifier	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_{g3} = 0 V V_{g2} = 170 V V_{g1} = —2 V	I_a = 10 I_{g2} = 2.5	S = 7.4 mA/V R_i = 0.5 MΩ C_{ag1} < 7 mpF R_{eq} = 1 kΩ	 Noval
EF 85 R.F. variable mu pentode R.F. or I.F. amplifier	V_f = 6.3 V I_f = 0.3 A	V_a=V_b= 250 V R_{g2} = 60 kΩ V_{g1} = —2 V V_{g3} = 0 V	I_a = 10 I_{g2} = 2.5	S = 6 mA/V R_i = 0.5 MΩ R_{eq} = 1.5 kΩ	

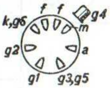
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 86 Low noise preamplifier pentode Typical characteristics A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 140 V V_{g3} = 0 V V_{g1} = −2 V	I_a = 3 I_{g2} = 0.55	S = 1.85 mA/V R_i = 2.5 MΩ μ_{g2g1} = 38	 Noval
		V_b = 250 V R_a = 0.1 MΩ R_{g2} = 0.39 MΩ R_k = 1 kΩ V_{g3} = 0 V	I_b = 2.05	g = 112	
		V_b = 250 V R_a = 0.22 MΩ R_{g2} = 1 MΩ R_k = 2.2 kΩ V_{g3} = 0 V	I_b = 0.95	g = 180	

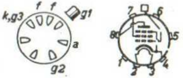
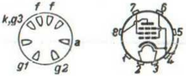
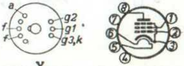
EF 89 Variable mu pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = V_b = 250$ V $R_{g2} = 50$ kΩ $V_{g1} = -2$ V $V_{g3} = 0$ V	$I_a = 9$ $I_{g2} = 3$	$S = 3.6$ mA/V $R_i = 1$ MΩ $C_{ag1} < 2$ mpF $R_{eq} = 4.2$ kΩ	 Noval

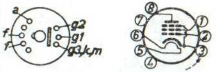
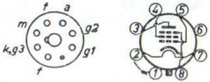
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 91 R.F. pentode Wide-band amplifier	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 250$ V $V_{g3} = 0$ V $V_{g2} = 250$ V $V_{g1} = -2$ V	$I_a = 10$ $I_{g2} = 2.55$	$S = 7.65$ mA/V $R_i = 1$ MΩ $R_{eq} = 1.2$ kΩ $C_{ag1} < 8$ mpF	
EF 92 Variable mu pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = 250$ V $V_{g3} = 0$ V $V_{g2} = 150$ V $V_{g1} = -0.65$ V	$I_a = 8$ $I_{g2} = 2$	$S = 2.5$ mA/V $C_{ag1} < 7$ mpF	 Miniature
		$V_a = 250$ V $V_{g3} = 0$ V $V_{g2} = 200$ V $V_{g1} = -2.5$ V	$I_a = 8$ $I_{g2} = 2.1$	$S = 2.5$ mA/V	
EF 93 Variable mu pentode	see 6 BA 6				

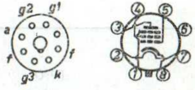
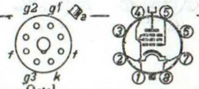
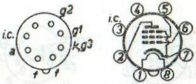
EF 95 R.F. pentode	see 6 AK 5

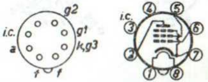
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EFF 51	U.H.F. tube, see p. 174				
EFM 1 A.F. pentode and tuning indicator A.F. amplifier and tuning indicator	$V_f =$ 6.3 V $I_f =$ 0.2 A	$V_b = V_l =$ 250 V $R_a =$ 0.13 MΩ $R_{g2} =$ 0.35 MΩ $V_{g1} = -2/-20$V	$I_a =$ 0.8/0.5 $I_{g2} =$ 0.6/0.2 $I_l =$ 0.65/0.8	$g =$ 60/13 $\alpha =$ 70°/5°	 P
EFM 11 A.F. pentode and tuning indicator A.F. amplifier and tuning indicator	$V_f =$ 6.3 V $I_f =$ 0.2 A	$V_b = V_l =$ 250 V $R_a =$ 0.13 MΩ $R_{g2} =$ 0.35 MΩ $V_{g1} = -1.5/-20$V	$I_a =$ 1.0/0.58 $I_{g2} =$ 0.63/0.26 $I_l =$ 0.65/1.0	$g =$ 80/12 $\alpha =$ 70°/3°	 Y
EFP 60 Secondary emission pentode R.F. or I.F. amplifier	$V_f =$ 6.3 V $I_f =$ 0.37 A	$V_a =$ 250 V $V_{g2} =$ 250 V $V_{k2} =$ 150 V $V_{g1} = -2$ V $V_{g3} =$ 0 V	$I_a =$ 20 $I_{g2} =$ 1.5 $I_{k2} = -15.6$	$S =$ 25 mA/V $R_i =$ 70 kΩ $C_{ag1} <$ .4 mpF	 Loctal 9p.

EK 2 Octode Frequency changer	V_f = 6.3 V I_f = 0.2 A	V_a = 200-250 V V_{g3+g5} = 50 V V_{g4} = —2 V V_{g2} = 200 V R_{g1} = 50 kΩ	I_a = 1.0 I_{g3+g5} = 1.1 I_{g2} = 2.5 I_{g1} = 0.3	S_c = 0.55 mA/V R_i = -2.0 MΩ	 P 
		V_a = 100 V V_{g3+g5} = 50 V V_{g4} = —2 V V_{g2} = 100 V R_{g1} = 50 kΩ	I_a = 1.0 I_{g3+g5} = 1.0 I_{g2} = 1.5 I_{g1} = 0.2	S_c = 0.55 mA/V R_i = 1.2 MΩ	

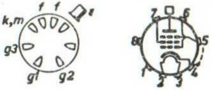
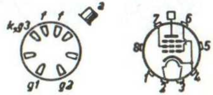
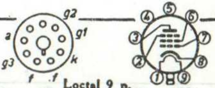
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EL 2 Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —18 V R_k = 485 Ω	I_a = 32 I_{g2} = 5	S = 2.8 mA/V R_i = 70 kΩ R_a = 8 kΩ W_o = 3.6 W W_a = 8 W	 P
Class AB push-pull amplifier		V_a = 250 V V_{g2} = 250 V R_k = 305 Ω	I_a min = 2×27.5 I_a max = 2×32.5 I_{g2}min = 2× 4.5 I_{g2}max = 2× 8	R_{aa} = 8 kΩ W_o = 8 W	
EL 3 N Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.9 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 9 W	
Class AB push-pull amplifier		V_a = 250 V V_{g2} = 250 V R_k = 140 Ω	I_a min = 2× 24 I_a max = 2×28.5 I_{g2}min = 2× 2.8 I_{g2}max = 2× 4.6	R_{aa} = 10 kΩ W_o = 8.2 W	
EL 6 Output pentode Class A final amplifier	V_f = 6.3 V I_f = 1.35 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —7 V R_k = 90 Ω	I_a = 72 I_{g2} = 8	S = 14.5 mA/V R_i = 20 kΩ R_a = 3.5 kΩ W_o = 8 W W_a = 18 W	P
Class AB push-pull amplifier		V_a = 250 V V_{g2} = 250 V R_k = 90 Ω	I_a min = 2× 45 I_a max = 2× 53 I_{g2}min = 2×5.1 I_{g2}max = 2×8.5	R_{aa} = 5 kΩ W_o = 14.5 W	
EL 11 Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.9 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 9 W	 Y

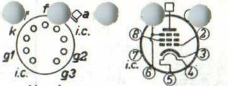
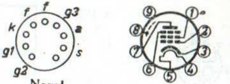
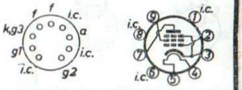
EL 12 Output pentode Class A final amplifier	V_f = 6.3 V I_f = 1.2 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —7 V R_k = 90 Ω	I_a = 72 I_{g2} = 8	S = 15 mA/V R_i = 25 kΩ R_a = 3.5 kΩ W_o = 8 W W_a = 18 W	 Y
EL 33 Output pentode Class A final amplifier Class AB push-pull amplifier	V_f = 6.3 V I_f = 0.9 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —6 V R_k = 150 Ω	I_a = 36 I_{g2} = 4	S = 9 mA/V R_i = 50 kΩ R_a = 7 kΩ W_o = 4.5 W W_a = 9 W	 Octal
		V_a = 250 V V_{g2} = 250 V R_k = 140 Ω	$I_{a\,min}$ = 2× 24 $I_{a\,max}$ = 2×28.5 I_{g2min} = 2× 2.8 I_{g2max} = 2× 4.6	R_{aa} = 10 kΩ W_o = 8.2 W	
EL 34 Class A final amplifier		V_a = 250 V V_{g2} = 265 V V_{g1} = —13.5 V V_{g3} = 0 V	I_a = 100 I_{g2} = 15	S = 11 mA/V R_i = 15 kΩ R_a = 2 kΩ W_o = 11 W W_a = 25 W	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EL 34 Output pentode Class AB push-pull amplifier Class B push-pull amplifier	V_f = 6.3 V I_f = 1.5 A	V_b = 375 V R_{g2}[1]) = 470 Ω R_k = 130 Ω V_{g3} = 0 V	$I_{a\,min}$ = 2× 75 $I_{a\,max}$ = 2× 95 $I_{g2\,min}$ = 2×11.5 $I_{g2\,max}$ = 2×22.5	R_{aa} = 4 kΩ W_o = 37 W	 Octal
		V_b = 425 V R_{g2}[1]) = 1 kΩ V_{g1} = —38 V V_{g3} = 0 V	$I_{a\,min}$ = 2× 30 $I_{a\,max}$ = 2× 120 $I_{g2\,min}$ = 2× 4.4 $I_{g2\,max}$ = 2× 25	R_{aa} = 3.4 kΩ W_o = 55 W	
		V_{ba} = 800 V V_{bg2} = 400 V V_{g1} = —39 V R_{g2} = 750 Ω V_{g3} = 0 V	$I_{a\,min}$ = 2× 25 $I_{a\,max}$ = 2× 91 $I_{g2\,min}$ = 2× 3 $I_{g2\,max}$ = 2× 19	R_{aa} = 11 kΩ W_o = 100 W	
EL 38 Output pentode Typical characteristics	V_f = 6.3 V I_f = 1.4 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —7 V V_{g3} = 0 V	I_a = 100 I_{g2} = 13	S = 14.3 mA/V R_i = 21 kΩ C_{ag1} = 1.2 pF	 Octal
EL 41 Output pentode Class A final amplifier Class AB push-pull amplifier	V_f = 6.3 V I_f = 0.71 A	V_a = 250 V V_{g2} = 250 V R_k = 170 Ω	I_a = 36 I_{g2} = 5.2	S = 10 mA/V R_i = 40 kΩ R_a = 7 kΩ W_o = 4.8 W W_a = 9 W	 Rimlock
		V_a = 250 V V_{g2} = 250 V R[illegible] = 8[illegible]Ω	$I_{a\,min}$ = 2× 36 $I_{a\,max}$ = 2×39.5 $I_{g2\,min}$ = 2× 5.2 $I_{g2\,max}$ = 2[illegible] 8	R_{aa} = 7 kΩ W_o = 9.[illegible] W	

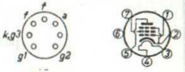
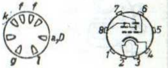
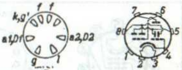
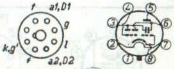
EL 42 Output pentode Class A final amplifier Class AB push-pull amplifier Class B push-pull amplifier		V_a = 225 V V_{g2} = 225 V R_k = 360 Ω	I_a = 26 I_{g2} = 4.1	S = 3.2 mA/V R_i = 90 kΩ R_a = 9 kΩ W_o = 2.8 W W_a = 6 W	
		V_a = 200 V V_{g2} = 200 V R_k = 360 Ω	I_a = 22.5 I_{g2} = 3.5	S = 3.2 mA/V R_i = 90 kΩ R_a = 9 kΩ W_o = 2.1 W	 Rimlock
	V_f = 6.3 V I_f = 0.2 A	V_a = 250 V V_{g2} = 250 V R_k = 310 Ω	$I_{a\,min}$ = 2× 20 $I_{a\,max}$ = 2×21.5 $I_{g2\,min}$ = 2× 3.2 $I_{g2\,max}$ = 2× 6.7	R_{aa} = 15 kΩ W_o = 7 W	
		V_a = 200 V V_{g2} = 200 V R_k = 310 Ω	$I_{a\,min}$ = 2× 16 $I_{a\,max}$ = 2× 17 $I_{g2\,min}$ = 2× 2.6 $I_{g2\,max}$ = 2× 5.6	R_{aa} = 15 kΩ W_o = 4.1 W	
		V_a = 250 V V_{g2} = 250 V V_{g1} = —22.5 V	$I_{a\,min}$ = 2× 5 $I_{a\,max}$ = 2× 20 $I_{g2\,min}$ = 2× 0.8 $I_{g2\,max}$ = 2× 6.5	R_{aa} = 16 kΩ W_o = 6.5 W	

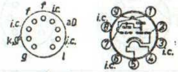
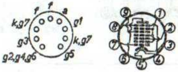
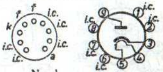
[1] Common screen-grid resistor

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EL 50 Output pentode Typical characteristics Class AB push-pull amplifier	V_f = 6.3 V I_f = 1.5 A	V_a = 800 V V_{g2} = 400 V V_{g1} = −37 V V_{g3} = 0 V	I_a = 22.5 I_{g2} = 2.5	S = 4 mA/V R_i = 50 kΩ W_a = 18 W	 P
		V_a = 800 V V_{g2} = 400 V V_{g1} = −37.5 V V_{g3} = 0 V	$I_{a\,min}$ = 2× 15 $I_{a\,max}$ = 2× 70 $I_{g2\,min}$ = 2× 1.3 $I_{g2\,max}$ = 2× 20	R_{aa} = 16 kΩ W_o = 84 W	
		V_a = 400 V V_{g2} = 425 V V_{g1} = −35 V V_{g3} = 0 V	$I_{a\,min}$ = 2× 25 $I_{a\,max}$ = 2× 95 $I_{g2\,min}$ = 2× 2.5 $I_{g2\,max}$ = 2× 2	R_{aa} = 5 kΩ W_o = 50 W	
EL 51 Output pentode Typical characteristics	V_f = 6.3 V I_f = 1.9 A	V_a = 750 V V_{g2} = 750 V V_{g1} = −37.5 V	I_a = 60 I_{g2} = 10	S = 8 mA/V R_i = 50 kΩ W_a = 45 W	 P
Class AB push-pull amplifier		V_a = 500 V V_{g2} = 500 V R_k = 100 Ω	$I_{a\,min}$ = 2× 87 $I_{a\,max}$ = 2× 110 $I_{g2\,min}$ = 2× 13 $I_{g2\,max}$ = 2× 23	R_{aa} = 4.8 kΩ W_o = 67.5 W	
Class B push-pull amplifier		V_a = 750 V V_{g2}[1]= 750 V V_{g1} = −40 V	$I_{a\,min}$ = 2× 40 $I_{a\,max}$ = 2× 145 $I_{g2\,min}$ = 2× 7.5 $I_{g2\,max}$ = 2× 30	R_{aa} = 6 kΩ W_o = 140 W	
EL 60 Output pentode	= EL 34 with different base				 Loctal 9 p.

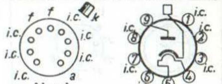
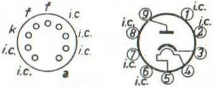
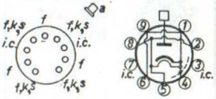
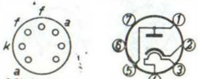
EL 81 Line output pentode Typical characteristics	$V_f = 6.3$ V $I_f = 1.05$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g3} = 0$ V $V_{g1} = 38.5$ V	$I_a = 32$ $I_{g2} = 2.4$	$S = 4.6$ mA/V $W_a = 8$ W $V_{ap} =$ max. 7 kV[2])	 Noval
EL 83 Video amplifying pentode Typical characteristics	$V_f = 6.3$ V $I_f = 0.71$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g3} = 0$ V $V_{g1} = -5.5$ V	$I_a = 36$ $I_{g2} = 5.0$	$S = 10$ mA/V $R_i = 0.13$ MΩ $W_a = 9$ W $C_{g1} = 10.4$ pF $C_a = 6.6$ pF	 Noval
EL 84 Output pentode Class A Class B Class AB	$V_f = 6.3$ V $I_f = 0.76$ A	$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -7.3$ V	$I_a = 48$ $I_{g2} = 5.5$	$S = 11.3$ mA/V $R_i = 38$ kΩ $R_a = 5.2$ kΩ $W_o = 6$ W $W_a = 12$ W	 Noval
		$V_a = 250$ V $V_{g2} = 250$ V $V_{g1} = -11.6$ V	$I_{a\,min} = 2\times 10$ $I_{a\,max} = 2\times 37.5$ $I_{g2\,min} = 2\times 1.1$ $I_{g2\,max} = 2\times 7.5$	$R_{aa} = 8$ kΩ $W_o = 11$ W	
		$V_a = 250$ V $V_{g2} = 250$ V $R_k = 130$ Ω	$I_{a\,min} = 2\times 31$ $I_{a\,max} = 2\times 37.5$ $I_{g2\,min} = 2\times 3.5$ $I_{g2\,max} = 2\times 7.5$	$R_{aa} = 8$ kΩ $W_o = 11$ W.	

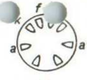
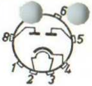
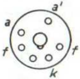
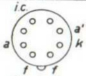
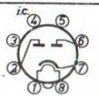
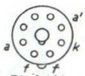
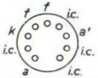
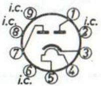
[1]) In the common screen-grid circuit a lamp of 550V/68W must be inserted.
[2]) Max. pulse time 18% of one cycle with a max. of 18 µ sec.

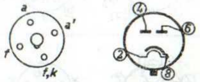
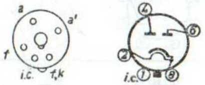
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EL 91 Output pentode Class A final amplifier	$V_f = 6.3$ V $I_f = 0.2$ A	$V_a = 250$ V $V_g = 250$ V $R_k = 680\ \Omega$	$I_a = 16$ $I_{g2} = 2.4$	$S = 2.6$ mA/V $R_i = 130$ kΩ $R_a = 16$ kΩ $W_o = 1.4$ W $W_a = 4$ W	 Miniature
EM 1 Tuning indicator	$V_f = 6.3$ V $I_f = 0.2$ A	$V_b = V_l = 250$ V $R_a = 2$ MΩ $V_g = 0/-5$ V	$I_a = 0.095/0.021$ $I_l = 0.13/0.14$	$\alpha = 74°/0°$	 P
		$V_b = V_l = 200$ V $R_a = 2$ MΩ $V_g = 0/-4$ V	$I_a = 0.075/0.02$ $I_l = 0.13/0.14$	$\alpha = 70°/0°$	
EM 4/EM 34 Tuning indicators (sensitive system) (insensitive system)	$V_f = 6.3$ V $I_f = 0.2$ A	$V_b = V_l = 250$ V $R_{a1} = 1$ MΩ $V_g = 0/-5$ V	$I_l = 2.0/2.5$	$\alpha_1 = 90°/5°$	 P EM 4
		$V_b = V_l = 200$ V $R_{a1} = 1$ MΩ $V_g = 0/-4.2$ V	$I_l = 1.4/1.8$	$\alpha_1 = 90°/5°$	
		$V_b = V_l = 250$ V $R_{a2} = 1$ MΩ $V_g = 0/-16$ V	$I_l = 2.0/2.7$	$\alpha_2 = 90°/5°$	 Octal EM
		$V_b = V_l = 200$ V $R_{a2} = 1$ MΩ $V_g = 0/-12.5$V	$I_l = 1.4/2.0$	$\alpha_2 = 90°/5°$	

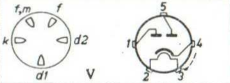
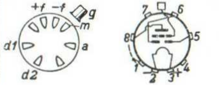
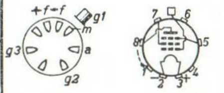
EM 80 Tuning indicator	V_f = 6.3 V I_f = 0.3 A	V_b=V_l= 250 V R_a = 0.5 MΩ V_g = −1/−16 V R_g = 3 MΩ	I_a = 0.4/0.01	β = 5°/50°	 Noval
EQ 80 Enneode F.M. detector A.F. amplifier	V_f = 6.3 V I_f = 0.2 A	V_b = 250 V R_a = 0.47 MΩ R_1 = 34 kΩ R_3 = 3.9 kΩ R_4 = 560 Ω	I_a = 0.28 I_{g2} = 15 I_{g3} = 0.09 I_{g5} = 0.03	R_i = 5 MΩ	 Noval
		V_b = 250 V R_a = 0.47 MΩ $R_{g2+g3+g5}$ = 0.27 MΩ R_k = 2.2 kΩ	I_a = 0.4 $I_{g2+g3+g5}$ = 0.7	g = 150	
EY 51 E.H.T. rectifying tube Rectifier 50 c/s Rectifier 10-500 kc/s Pulse rectifier	V_f = 6.3 V I_f = 90 mA	V_{tr} = max. 5 kV V_{ainvp}=max. 17 kV V_{ainvp}=max. 17 kV	I_o = max. 3 I_o = max. 0.3 I_o = max. 0.35 I_{ap} = max. 80 [3])	C_{filt}= max. 0.1 μF R_t = min. 0.1 MΩ C_{filt}= max. 0.01 μF R_t = min. 0.1 MΩ C_{filt}= max. 5000 pF	
EY 80 Booster diode Booster	V_f = 6.3 V I_f = 0.9 A	V_{ainvp}[1])=max. 4 kV	I_a = max. 180 I_{ap} = max. 400	V_{kfp} =max. 650 V[2]) C_{ak} = 5.5 pF C_{filt} = max. 4 μF	 Noval

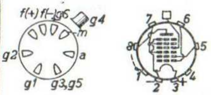
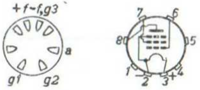
[1]) Max. pulse time 18% of one cycle with a max. of 18 μsec.
[2]) Max. 160 V (r.m.s.) A.C.+450 V.D.C. cathode positive with respect to heater.
[3]) Max. pulse time ⅛% of one cycle with a maximum of 5 μsec.

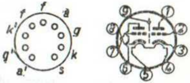
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EY 81 Booster	$V_f = 6.3$ V $I_f = 0.8$ A	$V_{a\,inv\,p} =$ max. 4.5 kV	I_a = max. 150 I_{ap} = max. 450		 Noval
EY 82 Half-wave high vacuum rectifying tube	$V_f = 6.3$ V $I_f = 0.9$ A	V_{tr} = 250 V = 240 V = 220 V = 200 V = 127 V	I_o = max. 180 = max. 180 = max. 180 = max. 180 = max. 180	R_t = min. 125 Ω = min. 105 Ω = min. 65 Ω = min. 30 Ω = 0 Ω C_{filter} = max. 60 μF	 Noval
EY 86 H.T. rectifier for T.V. receivers	$V_f = 6.3$ V $I_f = 90$ mA	V_o = 18 kV	I_o = 0.15	I_o = max. 0.8 mA	 Noval
EY 91 Half-wave rectifying tube Rectifier	$V_f = 6.3$ V $I_f = 0.42$ A	V_{tr} = 250 V V_{tr} = 200 V	I_o = max. 75 I_o = max. 75	C_{filt} = 32 μF R_t = min. 100 Ω R_t = min. 70 Ω V_{kfp} = max. 300 V	 Miniature

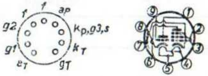
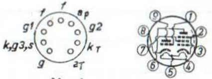
EZ 2 Full-wave rectifying tube Rectifier	V_f = 6.3 V I_f = 0.4 A	V[illegible] = [illegible]×3[illegible] V = 2×350 V	m[illegible] 6[illegible] = max. 60	C_{fil}[illegible] ma[illegible] 32 [illegible] R_t = min. 500 Ω C_{filt}= max. 16 μF R_t = min. 500 Ω V_{kfp}= max. 500 V	 P	
EZ 35 Full-wave rectifying tube Rectifier	V_f = 6.3 V I_f = 0.6 A	V_{tr} = 2×325 V	I_o = max. 70	R_t = min. 350 Ω C_{filt}= max. 16 μF V_{kfp}= max. 350 V	 Octal	
EZ 40 Full-wave rectifying tube Rectifier	V_f = 6.3 V I_f = 0.6 A	V_{tr} = 2×250 V = 2×300 V = 2×350 V	I_o = max. 90 = max. 90 = max. 90	R_t = min. 125 Ω = min. 215 Ω = min. 300 Ω C_{filt}= max. 50 μF V_{kfp}= max. 500 V	 Rimlock	
EZ 41 Full-wave rectifying tube Rectifier	V_f = 6.3 V I_f = 0.4 A	V_{tr} = 2×250 V	I_o = max. 60	C_{filt}= max. 32 μF R_t = min. 300 Ω V_{kfp}= max. 350 V	 Rimlock	
EZ 80 Full-wave rectifying tube Rectifier	V_f = 6.3 V I_f = 0.6 A	V_{tr} = 2×350 V = 2×300 V = 2×275 V = 2×250 V	I_o = max. 90 = max. 90 = max. 90 = max. 90	R_t = min. 300 Ω = min. 215 Ω = min. 175 Ω = min. 125 Ω C_{filt}= max. 50 μF V_{kfp}= max. 500 V	 Noval	

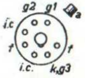
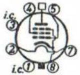
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
GZ 32 Full-wave rectifying tube Rectifier.	$V_f = 5$ V $I_f = 2$ A	$V_{tr} = 2\times500$ V $= 2\times350$ V $= 2\times300$ V	I_a = max. 125 = max. 250 = max. 300	C_{filt} = max. 64 µF R_t = min. 150 Ω C_{filt} = max. 32 µF R_t = min. 100 Ω C_{filt} = max. 16 µF R_t = min. 50 Ω	 Octal
GZ 34 Full-wave rectifying tube Rectifier	$V_f = 5$ V $I_f = 1.9$ A	$V_{tr} = 2\times550$ V $= 2\times500$ V $= 2\times450$ V $= 2\times400$ V $= 2\times350$ V $= 2\times300$ V	I_o = max. 160 = max. 200 = max. 250 = max. 250 = max. 250 = max. 250 I_{ap} = max. 750	R_t = min. 175 Ω = min. 150 Ω = min. 125 Ω = min. 100 Ω = min. 75 Ω = min. 50 Ω C_{filter} = max. 60 µF	 Octal
K 50 A **K 81 A**	Noise diodes, see p. 245				

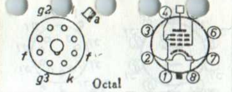
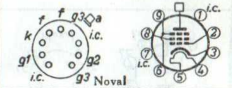
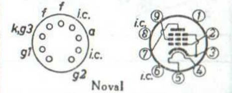
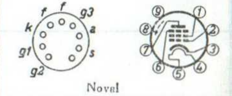
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
KB 2 Double diode Detector and A.G.C.	$V_f = 2$ V $I_f = 95$ mA				 V
KBC 1 Double diode triode Typical characteristics A.F. amplifier	$V_f = 2$ V $I_f = 0.115$ A	$V_a = 135$ V $V_g = -4.5$ V	$I_a = 2.5$	$S = 1.0$ mA/V $R_i = 16$ kΩ $\mu = 16$	 P
		$V_a = 90$ V $V_g = -3.4$ V	$I_a = 1.0$	$S = 0.7$ mA/V $R_i = 23$ kΩ $\mu = 16$	
		$V_b = 135$ V $R_a = 0.2$ MΩ $V_g = -2.0$ V	$I_a = 0.35$	$g = 12.5$	
		$V_b = 90$ V $R_a = 0.2$ MΩ $V_g = -2.0$ V	$I_a = 0.19$	$g = 11$	
KF 3 Variable mu pentode R.F. or I.F. amplifier	$V_f = 2$ V $I_f = 45$ mA	$V_a = 135$ V $V_{g2} = 135$ V $V_{g1} = -0.5$ V $V_{g3} = 0$ V	$I_a = 2.0$ $I_{g2} = 0.6$	$S = 0.65$ mA/V $R_i = 1.3$ MΩ $C_{ag1} < 6$ mpF	 P
		$V_a = 90$ V $V_{g2} = 90$ V $V_{g1} = -0.5$ V $V_{g3} = 0$ V	$I_a = 1.0$ $I_{g2} = 0.2$	$S = 0.5$ mA/V $R_i = 2$ MΩ	

KK 2 Octode Frequency changer	V_f = 2 V I_f = 0.13 A	V_a = 135 V V_{g3+g5} = 45 V V_{g4} = —0.5 V V_{g2} = 135 V R_{g1} = 50 kΩ V_{osc} = 8.5 V	I_a = 0.7 I_{g3+g5} = 1.0 I_{g2} = 2.2 I_{g1} = 0.16	S_c = 0.27 mA/V R_i = 2.5 MΩ	 P
		V_a = 90 V V_{g3+g5} = 45 V V_{g4} = —0.5 V V_{g2} = 90 V R_{g1} = 50 kΩ V_{osc} = 8.5 V	I_a = 0.7 I_{g3+g5} = 1.0 I_{g2} = 1.6 I_{g1} = 0.16	S_c = 0.27 mA/V R_i = 2.0 MΩ	
KL 4 Output pentode Class A final amplifier	V_f = 2 V I_f = 0.15 A	V_a = 135 V V_{g2} = 135 V V_{g1} = —5 V	I_a = 7 I_{g2} = 1.1	S = 2.1 mA/V R_i = 130 kΩ R_a = 19 kΩ W_o = 0.44 W W_a = 1 W	 P
		V_a = 90 V V_{g2} = 90 V V_{g1} = —2.6 V	I_a = 4.7 I_{g2} = 0.8	S = 1.8 mA/V R_i = 150 kΩ R_a = 19 kΩ W_o = 0.16 W	

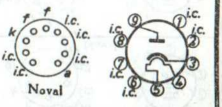
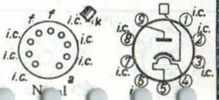
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
PABC 80 Triple diode high-mu triode	V_f = 9.5 V I_f = 0.3 A	See UABC 80 except for heater rating			
PCC 84 Double triode	V_f = 7 V I_f = 0.3 A	See ECC 84 except for heater rating			
PCC 85 Double triode Typical characteristics (per system)	V_f = 9 V I_f = 0.3 A	V_a = 200 V V_g = —2.1 V	I_a = 10	S = 5.8 mA/V R_i = 8.3 kΩ μ = 48	 Noval
		V_a = 170 V V_g = —1.5 V	I_a = 10	S = 6.2 mA/V R_i = 8 kΩ μ = 50	
		V_a = 100 V V_g = —1.1 V	I_a = 4.5	S = 4.6 mA/V R_i = 11 kΩ μ = 50	

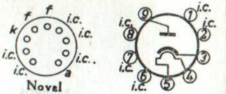
PCF 80 Triode pentode Typical characteristics (pentode system)	V_f = 9 V I_f = 0.3 A	V_a = 170 V V_{g2} = 170 V V_{g1} = —2 V	I_a = 10 I_{g2} = 2.8	S = 6.2 mA/V R_i = 0.4 MΩ R_{eq} = 1.5 kΩ	 Noval
Typical characteristics (triode system)		V_a = 100 V V_g = —2 V	I_a = 14	S = 3.6 mA/V R_i = 4 kΩ μ = 20	
Frequency changer		V_a = 170 V V_{g2} = 170 V R_{g1} = 0.1 MΩ R_k = 330 Ω	I_a = 6.5 I_{g2} = 2 I_{g1} = 0.025	S_c = 2.2 mA/V R_i = 800 kΩ	
PCL 82 Triode output pentode Typical characteristics (pentode system)	V_f = 16 V I_f = 0.3 A	V_a = 170 V V_{g2} = 170 V V_{g1} = —11 V	I_a = 41 I_{g2} = 7.5	S = 7.5 mA/V R_i = 25 kΩ μ_{g1g2} = 12	 Noval
Typical characteristics (triode system)		V_a = 100 V V_g = 0 V	I_a = 4	S = 8mA/V μ = 70	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
MAW	Transmitting tube, see p. 190				
MC	Flying spot, see p. 181				
MF	Radar tubes, see p. 181				
MV	X-Ray tubes, see p. 220				
MW	Picture tubes, see p. 182				
OA	Germanium diodes, see p. 250				
OC	Transistors, see p. 252				
OA 2 **OB 2**	Voltage Stabilizers see p. 231				
PA **PB** **PE**	Transmitting tubes, see p. 190				
PL 2 D 21	Thyratron, see p. 210				
PL 5	Relay tube, see p. 209				
PL 10	Thyratron, see p. 211				
PL 36 Line output pentode Typical characteristics	V_f = 25 V I_f = 0.3 A	V_a = 170 V V_{g2} = 170 V V_{g1} = −21 V	I_a = 100 I_{g2} = 8.5	S = 11 mA/V R_i = 5.5 kΩ W_a = 10 W	 Octal 

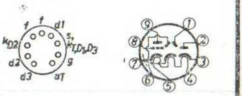
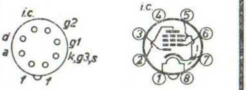
PL38 Output pentode Typical characteristics	$V_f = 30$ V $I_f = 0.3$ A	$V_a = 200$ V $V_{g2} = 200$ V $V_{g1} = -5.5$ V $V_{g3} = 0$ V	$I_a = 75$ $I_{g2} = 9.0$	$S = 13.5$ mA/V $R_i = 20$ kΩ $C_{ag1} < 1.2$ pF $W_a = 25$ W	
PL 81 Line output pentode Typical characteristics	$V_f = 21.5$ V $I_f = 0.3$ A	$V_a = 170$ V $V_{g3} = 0$ V $V_{g2} = 170$ V $V_{g1} = -22$ V	$I_a = 45$ $I_{g2} = 3.0$	$S = 6.2$ mA/V $W_a = 8$ W V_{ap}[1]$) =$ max. 7 kV	
PL 82 Frame or sound output pentode Typical characteristics	$V_f = 16.5$ V $I_f = 0.3$ A	$V_a = 170$ V $V_{g2} = 170$ V $V_{g1} = -10.4$ V	$I_a = 53$ $I_{g2} = 10$	$S = 9.0$ mA/V $R_i = 20$ kΩ $W_a = 9$ W V_{ap}[2]$) =$ max. 2.5 kV	
PL 83 Video amplifying pentode Typical characteristics	$V_f = 15$ V $I_f = 0.3$ A	$V_a = 200$ V $V_{g3} = 0$ V $V_{g2} = 200$ V $V_{g1} = -3.5$ V	$I_a = 36$ $I_{g2} = 5$	$S = 10.5$ mA/V $R_i = 0.1$ MΩ $W_a = 9$ W $C_{g1} = 11.2$ pF $C_a = 6.6$ pF $C_{ag1} < 0.1$ pF	
PL 105 **PL 150** **PL 255** **PL 260**	Thyratrons, see p. 211				
PL 1267	= Z 300 T, Trigger tube, see p. 247				

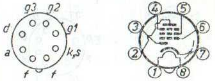
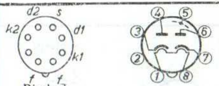
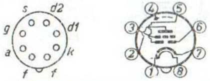
[1]) Max. pulse time 18% of one cycle with a maximum of 18 μsec.
[2]) Max. pulse time 10% of one cycle with a maximum of 2000 μsec.

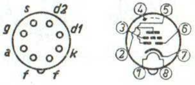
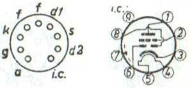
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
PL 1607 **PL 5544** **PL 5545**	Thyratrons, see p. 212				
PL 5551 **PL 5552** **PL 5555**	Ignitrons see p. 213				
PL 5557/ PL 17 **PL 5559/ PL 57**	Thyratrons see p. 212				
PL 5822	Ignitron, see p. 214				
PY 80 Booster diode Booster	V_f = 19 V I_f = 0.3 A	V_{ainvp} [1]) = max. 4 kV	I_a = max. 180 I_{ap} = max. 400	V_{kfp}= max. 650 V[2]) C_a = 5.5 pF C_{filt}= max. 4 μF	
PY 81 Booster diode Booster	V_f = 17 V I_f = 0.3 A	V_{ainvp} = max. 4.5 kV	I_a = max. 150 I_{ap} = max. 450		

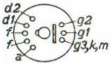
PY 82 Half-wave rectifying tube Rectifier	$V_f = 19$ V $I_f = 0.3$ A	$V_{tr} = 220$ V $V_{tr} = 127$ V	I_o = max. 180 I_o = max. 180	R_t = min. 40 Ω C_{filt}= max. 60 μF R_t = 0 Ω V_{ainvp}=max. 700 V V_{kfp}= max. 550 V³)	
QB **QE** **QQC** **QQE** **TA** **TB**	Transmitting tubes, see p. 192				
TH	Thermocouples, see p. 238				
U 30	Current regulator, see p. 239				

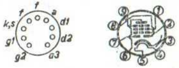
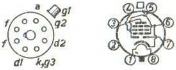
[1]) Max. pulse time 18% of one cycle with a maximum of 18 μsec.
[2]) Max. 160 V (r.m.s.) A.C. + 450 V D.C. Cathode positive with respect to heater.
[3]) Max. 220 V (r.m.s.) A.C. + 250 V D.C. Cathode positive with respect to heater.

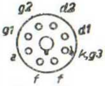
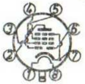
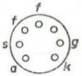
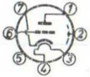
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UABC 80 Triple diode high mu triode	V_f = 28 V I_f = 0.1 A	$V_{d_1 invp}$ = max. 350 V $V_{d_2 invp}$ = max. 350 V $V_{d_3 invp}$ = max. 350 V	I_{d_1} = max. 1 $I_{d_1 p}$ = max. 6 I_{d_2} = max. 10 $I_{d_2 p}$ = max. 75 I_{d_3} = max. 10 $I_{d_3 p}$ = max. 75	R_{id_1} = 5 kΩ (V_{d_1} = 10 V) R_{id_2} = 200 Ω (V_{d_2} = 5 V) R_{id_3} = 200 Ω (V_{d_3} = 5 V)	 Noval
Typical characteristics (diode system)		V_a = 170 V V_g = −2 V	I_a = 0.8	S = 1.2 mA/V R_i = 58 kΩ μ = 70	
Typical characteristics (triode system)		V_a = 100 V V_g = −1 V	I_a = 0.8	S = 1.3 mA/V R_i = 54 kΩ μ = 70	
UAF 41 Diode variable mu pentode R.F. or I.F. amplifier	V_f = 12.6 V I_f = 0.1 A	V_a = V_b = 170 V R_{g2} = 44 kΩ V_{g1} = −2 V	I_a = 5 I_{g2} = 1.6	S = 1.8 mA/V R_i = 1.2 MΩ C_{ag1} < 2 mpF	 Rimlock
		V_a = V_b = 100 V R_{g2} = 44 kΩ V_{g1} = −1.1 V	I_a = 2.8 I_{g2} = 0.9	S = 1.65 mA/V R_i = 1.0 MΩ	
A.F. amplifier		V_b = 170 V R_a = 0.2 MΩ R_{g2} = 0.73 MΩ R_k = 2.7 kΩ	I_a = 0.58 I_{g2} = 0.18	g = 78	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.73 MΩ R_k = 2.7 kΩ	I_a = 0.34 I_{g2} = 0.10	g = 73	

UAF 42 Diode variable mu pentode R.F. or I.F. amplifier A.F. amplifier	$V_f = 12.6$ V $I_f = 0.1$ A	$V_a = V_b = 170$ $R_{g2} = 56$ kΩ $V_{g1} = -2.0$ V $V_{g3} = 0$ V	$I_a = 5.0$ $I_{g2} = 1.5$	$S = 2.$[illegible] mA/V $R_i = 0.9$ MΩ $C_{ag1} < 2$ mpF	 Rimlock
		$V_a = V_b = 100$ V $R_{g2} = 56$ kΩ $V_{g1} = -1.2$ V $V_{g3} = 0$ V	$I_a = 2.8$ $I_{g2} = 0.9$	$S = 1.7$ mA/V $R_i = 0.85$ MΩ	
		$V_b = 170$ V $R_a = 0.22$ MΩ $R_{g2} = 0.82$ MΩ $R_k = 2.7$ kΩ $V_{g3} = 0$ V	$I_a = 0.50$ $I_{g2} = 0.17$	$g = 80$	
		$V_b = 100$ V $R_a = 0.22$ MΩ $R_{g2} = 0.82$ MΩ $R_k = 2.7$ kΩ $V_{g3} = 0$ V	$I_d = 0.29$ $I_{d2} = 0.09$	$g = 75$	
UB 41 Double diode Detector and A.G.C.	$I_f = 19$ V $V_t = 0.1$ A	V_{dinvp} = max. 420 V	I_d = max. 9 I_{dp} = max. 54		 Rimlock
UBC 41 Double diode high mu triode Typical characteristics	$V_f = 14$ V $I_f = 0.1$ A	$V_a = 170$ V $V_g = -1.55$ V	$I_a = 1.5$	$S = 1.65$ mA/V $R_i = 42$ kΩ $\mu = 70$	 Rimlock
		$V_a = 100$ V $V_g = -1.0$ V	$I_a = 0.8$	$S = 1.4$ mA/V $R_i = 50$ kΩ $\mu = 70$	

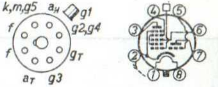
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UBC 41 Double diode high mu triode (continued) A.F. amplifier	V_f = 14 V I_f = 0.1 A	V_b = 170 V R_a = 0.1 MΩ R_k = 3.9 kΩ	I_a = 0.45	g = 37	 Rimlock
		V_b = 100 V R_a = 0.1 MΩ R_k = 3.9 kΩ	I_a = 0.28	g = 34	
UBC 81 Double diode high mu triode Typical characteristics A.F. amplifier	V_f = 14 V I_f = 0.1 A	V_a = 170 V V_g = −1.55 V	I_a = 1.5	S = 1.65 mA/V R_i = 42 kΩ μ = 70	 Noval
		V_a = 100 V V_g = −1 V	I_a = 0.8	S = 1.4 mA/V R_i = 50 kΩ μ = 70	
		V_b = 170 V R_a = 0.1 MΩ R_k = 3.9 kΩ	I_a = 0.45	g = 37	
		V_b = 100 V R_a = 0.1 MΩ R_k = 3.9 kΩ	I_a = 0.28	g = 34	

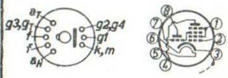
UBF 11 Double diode variable mu pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 20 V I_f = 0.1 A	$V_a = V_b$ = 200 V R_{g2} = 70 kΩ V_{g1} = —2 V	I_a = 5 I_{g2} = 1.7	S = 1.8 mA/V R_i = 1.5 MΩ C_{ag1} < 2 mpF	  Y
		$V_a = V_b$ = 100 V R_{g2} = 70 kΩ V_{g1} = —1 V	I_a = 2.6 I_{g2} = 0.85	S = 1.3 mA/V R_i = 0.9 MΩ	
		V_b = 200 V R_a = 0.2 MΩ R_{g2} = 0.7 MΩ R_k = 2.4 kΩ	I_a = 0.66 I_{g2} = 0.24	g = 82	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.7 MΩ R_k = 2.4 kΩ	I_a = 0.33 I_{g2} = 0.12	g = 76	

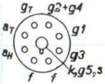
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UBF 80 Double diode variable mu pentode R.F. or I.F. amplifier A.F. amplifier	$V_f =$ 17 V $I_f =$ 0.1 A	$V_a = V_b =$ 170 V R_{g2} = 47 kΩ R_k = 295 Ω V_{g3} = 0 V	I_a = 5.0 I_{g2} = 1.75	S = 2.2 mA/V R_i = 0.9 MΩ $C_{ag1} <$ 2.5 mpF	 Noval
		$V_a = V_b =$ 100 V R_{g2} = 47 kΩ R_k = 295 Ω V_{g3} = 0 V	I_a = 2.8 I_{g2} = 1.0	S = 1.9 mA/V R_i = 0.9 MΩ	
		V_b = 170 V R_a = 0.22 MΩ R_{g2} = 0.68 MΩ R_k = 2.7 kΩ V_{g3} = 0 V	I_a = 0.56 I_{g2} = 0.20	g = 85	
		V_b = 100 V R_a = 0.22 MΩ R_{g2} = 0.68 MΩ R_k = 2.7 kΩ V_{g3} = 0 V	I_a = 0.32 I_{g2} = 0.12	g = 82	
UBL 1 Double diode output pentode Class A final amplifier	$V_f =$ 55 V $I_f =$ 0.1 A	V_a = 200 V V_{g2} = 200 V V_{g1} = −11.5 V R_k = 175 Ω	I_a = 55 I_{g2} = 11	S = 8.5 mA/V R_i = 20 kΩ R_a = 3.5 kΩ W_o = 5.2 W W_a = 11 W	 Octal
		V_a = 185 V V_{g2} = 185 V V_{g1} = −10 V R_k = 140 Ω	I_a = 59 I_{g2} = 11.3	S = 8.8 mA/V R_i = 23 kΩ R_a = 3 kΩ W_o = 5 W	
		V_a = 100 V V_{g2} = 100 V V_{g1} = −5 V R_k = 14[illegible]	I_a = 28.5 I_{g2} = 5.3	S = 7 mA/V R_i = 25 kΩ R[illegible] = 3 kΩ [illegible] = [illegible]5 W	

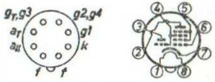
UBL 21 Double diode output pentode Class A final amplifier Class AB push-pull amplifier	V_f = 55 V I_f = 0.1 A	V_a = 180 V V_{g2} = 180 V V_{g1} = −10 V R_k = 140 Ω	I_a = 61 I_{g2} = 10	S = 9 mA/V R_i = 22 kΩ R_a = 3 kΩ W_o = 4.8 W W_a = 11 W	 Loctal 8p.
		V_a = 100 V V_{g2} = 100 V V_{g1} = −5.3 V R_k = 140 Ω	I_a = 32.5 I_{g2} = 5.5	S = 7.5 mA/V R_i = 25 kΩ R_a = 3 kΩ W_o = 1.35 W	
		V_a = 200 V V_{g2} = 200 V R_k = 116 Ω	$I_{a\,min}$ = 2× 50 $I_{a\,max}$ = 2× 56 I_{g2min} = 2×7.8 I_{g2max} = 2× 14	R_{aa} = 4 kΩ W_o = 12.5 W	
UC 92 R.F. triode Typical characteristics	V_f = 9.5 V I_f = 0.1 A	V_a = 100 V V_g = −1 V	I_a = 3	S = 3.5 mA/V R_i = 16.5 kΩ μ = 58 freq.=max.300Mc/s	 Miniature
		V_a = 170 V V_g = −1 V	I_a = 8.5	S = 5.5 mA/V R_i = 12 kΩ μ = 66	

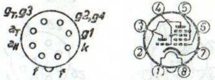
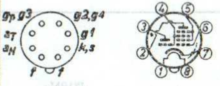
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UCC 85 Double triode	$V_f = 26$ V $I_f = 0.1$ A	see PCC 85 except for heater rating			

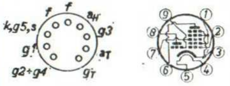
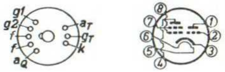
UCH 4 Triode heptode Frequency changer (heptode system) Oscillator (triode system) R.F. or I.F. amplifier (heptode system)	V_f = 20 V I_f = 0.1 A	$V_a = V_b$ = 200 V R_{g2+g4} = 15.5 kΩ R_{g3+gT} = 50 kΩ V_{g1} = —2 V	I_a = 3.0 I_{g2+g4} = 6.5 I_{g3+gT} = 0.19	S_c = 0.75 mA/V R_i = 1.3 MΩ	 Octal
		$V_a = V_b$ = 100 V R_{g2+g4} = 15.5 kΩ R_{g3+gT} = 50 kΩ V_{g1} = —1 V	I_a = 1.5 I_{g2+g4} = 3.0 I_{g3+gT} = 0.095	S_c = 0.6 mA/V R_i = 1.0 MΩ	
		V_b = 200 V R_a = 20 kΩ R_{g3+gT} = 50 kΩ	I_a = 4.1 I_{g2+gT} = 0.19	S_{eff} = 0.45 mA/V V_{osc} = 7.5 V	
		V_b = 100 V R_a = 20 kΩ R_{g3+gT} = 50 kΩ	I_a = 1.9 I_{g3+gT} = 0.095	S_{eff} = 0.44 mA/V V_{osc} = 4 V	
		$V_a = V_b$ = 200 V R_{g2+g4} = 30 kΩ V_{g3} = 0 V V_{g1} = —2 V	I_a = 5.2 I_{g2+g4} = 3.5	S = 2.2 mA/V R_i = 0.7 MΩ C_{ag1} < 2 mpF	
		$V_a = V_b$ = 100 V R_{g2+g4} = 30 kΩ V_{g3} = 0 V V_{g1} = —1 V	I_a = 2.6 I_{g2+g4} = 1.9	S = 2.0 mA/V R_i = 0.7 MΩ	

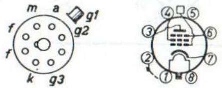
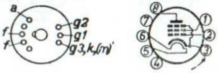
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UCH 4 A.F. amplifier (triode system)		V_b = 200 V R_a = 100 kΩ V_g = −2 V	I_a = 1.5	g = 10.5	
		V_b = 100 V R_a = 100 kΩ V_g = −1 V	I_a = 0.68	g = 10.5	
Typical characteristics (triode system)		V_a = 100 V V_g = 0 V	I_a = 12	S = 3.2 mA/V R_i = 7 kΩ μ = 22	
UCH 11 Triode hexode Frequency changer (hexode system)	V_f = 20 V I_f = 0.1 A	$V_a = V_b$ = 200 V R_{g2+g4} = 40 kΩ R_{g3+gT} = 50 kΩ V_{g1} = −2 V	I_a = 2.5 I_{g2+g4} = 3.0 I_{g3+gT} = 0.16	S_c = 0.75 mA/V R_i = 1.0 MΩ	
		$V_a = V_b$ = 100 V R_{g2+g4} = 40 kΩ R_{g3+gT} = 50 kΩ V_{g1} = −1 V	I_a = 1.2 I_{g2+g4} = 1.5 I_{g3+gT} = 0.10	S_c = 0.45 mA/V R_i = 0.6 MΩ	 Y
Oscillator (triode system)		V_b = 200 V R_a = 30 kΩ R_{g3+gT} = 50 kΩ	I_a = 2.8 I_{g3+gT} = 0.16	V_{osc} = 7 V	
		V_b = 100 V R_a = 30 kΩ R_{g3+gT} = 50 kΩ	I_a = 1.4 I_{g3+gT} = 0.10	V_{osc} = 4 V	

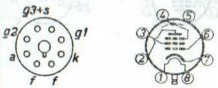
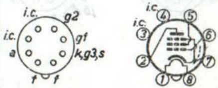
UCH 21 Triode heptode Frequency changer (heptode system) Oscillator (triode system) R.F. or I.F. amplifier (heptode system)	V_f = 20 V I_f = 0.1 A	V_a = 200 V R_{g2+g4} = 15.5 kΩ R_{g3+gT} = 50 kΩ V_{g1} = −2 V	I_a = 3.5 I_{g2+g4} = 6.5 I_{g3+gT} = 0.19	S_c = 0.75 mA/V R_i = 1.0 MΩ	 Loctal 8 p.
		V_a = 100 V R_{g2+g4} = 15.5 kΩ R_{g3+gT} = 50 kΩ V_{g1} = −1 V	I_a = 1.5 I_{g2+g4} = 3.0 I_{g3+gT} = 0.095	S_c = 0.58 mA/V R_i = 1.0 MΩ	
		V_b = 200 V R_a = 20 kΩ R_{g3+gT} = 50 kΩ	I_a = 4.1 I_{g3+gT} = 0.19	S_{eff} = 0.45 mA/V V_{osc} = 7.5 V	
		V_b = 100 V R_a = 20 kΩ R_{g3+gT} = 50 kΩ	I_a = 1.9 I_{g3+gT} = 0.095	S_{eff} = 0.44 mA/V V_{osc} = 4 V	
		V_a = 200 V R_{g2+g4} = 30 kΩ V_{g3} = 0 V V_{g1} = −2 V	I_a = 5.2 I_{g2+g4} = 3.5	S = 2.2 mA/V R_i = 0.7 MΩ C_{ag1} < 2 mpF	
		V_a = 100 V R_{g2+g4} = 30 kΩ V_{g3} = 0 V V_{g1} = −1 V	I_a = 2.6 I_{g2+g4} = 1.9	S = 2.0 mA/V R_i = 0.7 MΩ	

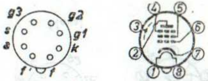
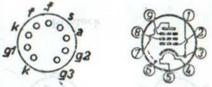
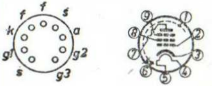
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UCH 21 A.F. amplifier (triode system)		V_b = 200 V R_a = 100 kΩ V_g = —2 V	I_a = 1.5	g = 10.5	
		V_b = 100 V R_a = 100 kΩ V_g = —1 V	I_a = 0.68	g = 10.5	
Typical characteristics (triode system)		V_a = 100 V V_g = 0 V	I_a = 12	S = 3.2 mA/V R_i = 6 kΩ μ = 19	
UCH 41 Triode hexode		$V_a = V_b$ = 170 V R_1 = 22 kΩ R_2 = 47 kΩ R_{g3+gT} = 20 kΩ V_{g1} = —1.8 V	I_a = 2.2 I_{g2+g4} = 1.9 I_{g3+gT} = 0.32	S_c = 0.45 mA/V R_i = 1.2 MΩ	
Frequency changer (hexode system)	V_f = 14 V I_f = 0.1 A	$V_a = V_b$ = 100 V R_1 = 22 kΩ R_2 = 47 kΩ R_{g3+gT} = 20 kΩ V_{g1} = —1.0 V	I_a = 1.0 I_{g2+g4} = 1.0 I_{g3+gT} = 0.20	S_c = 0.32 mA/V R_i = 1.4 MΩ	 Rimlock
Oscillator (triode system)		V_b = 170 V R_a = 10 kΩ R_{g3+gT} = 20 kΩ	I_a = 4.9 I_{g3+gT} = 0.32	S_{eff} = 0.6 mA/V V_{osc} = 7 V	

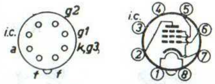
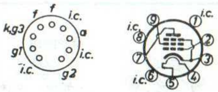
UCH 41 (continued) Oscillator (triode system)	V_f = 14 V I_f = 0.1 A	V_b = 100 V R_a = 10 kΩ R_{g3+gT} = 20 kΩ V_{osc} = 4 V	I_a = 2.8 I_{g3+gT} = 0.20	S_{eff} = 0.56 mA/V S_o = 1.9 mA/V μ = 19	 Rimlock
UCH 42 Triode hexode Frequency changer (hexode system)	V_f = 14 V I_f = 0.1 A	$V_a = V_b$ = 170 V R_1 = 18 kΩ R_2 = 27 kΩ R_{g3+gT} = 47 kΩ V_{g1} = −1.85 V	I_a = 2.1 I_{g2+g4} = 2.6 I_{g3+gT} = 0.20	S_c = 0.67 mA/V R_i = 1.0 MΩ	 Rimlock
		$V_a = V_b$ = 100 V R_1 = 18 kΩ R_2 = 27 kΩ R_{g3+gT} = 47 kΩ V_{g1} = −1.0 V	I_a = 1.2 I_{g2+g4} = 1.5 I_{g3+gT} = 0.10	S_c = 0.53 mA/V R_i = 1.2 MΩ	
Oscillator (triode system)		V_b = 170 V R_a = 10 kΩ R_{g3+gT} = 47 kΩ V_{osc} = 8 V	I_a = 5.7 I_{g3+gT} = 0.20	S_{eff} = 0.65 mA/V	
		V_b = 100 V R_a = 10 kΩ R_{g3+gT} = 47 kΩ V_{osc} = 4 V	I_a = 3.1 I_{g3+gT} = 0.10	S_{eff} = 0.6 mA/V S_o = 2.8 mA/V μ = 22	

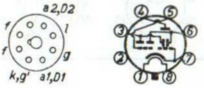
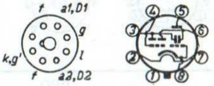
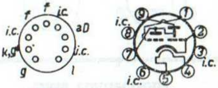
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UCH 81 Triode heptode R.F. or I.F. amplifier (heptode system) Typical characteristics (triode system) • Oscillator (triode system)	$V_f = 19$ V $I_f = 0.1$ A	$V_a = V_b = 170$ V $R_{g2+g4} = 10$ kΩ $R_{g3+gT} = 47$ kΩ $V_{g1} = -2$ V	$I_a = 3.25$ $I_{g2+g4} = 6.7$ $I_{g3+gT} = 0.2$	$S_c = 0.775$ mA/V $R_i = 1$ MΩ $R_{eq} = 70$ kΩ	 Noval
		$V_a = V_b = 170$ V $R_{g2+g4} = 18$ kΩ $V_g = -2$ V	$I_a = 6.8$ $I_{g2+g4} = 3.5$	$S = 2.4$ mA/V $R_i = 0.7$ MΩ	
		$V_a = 100$ V $V_g = 0$ V	$I_a = 13.5$	$S = 3.7$ mA/V $R_i = 6$ kΩ $\mu = 22$	
		$V_b = 170$ V $R_a = 22$ kΩ $R_{g3+gT} = 47$ kΩ	$I_a = 4.5$ $I_{g3+gT} = 0.2$	$S_{eff} = 0.55$ mA/V	
UCL 11 Triode output tetrode Typical characteristics (triode system) Class A final amplifier (tetrode system)	$V_f = 60$ V $I_f = 0.1$ A	$V_a = 200$ V $V_g = -2$ V	$I_a = 2.0$	$S = 2.1$ mA/V $R_i = 30$ kΩ $\mu = 65$	 Y
		$V_a = 200$ V $V_{g2} = 200$ V $V_{g1} = -8.5$ V	$I_a = 45$ $I_{g2} = 6$	$S = 9$ mA/V $R_i = 18$ kΩ $R_a = 4.5$ kΩ $W_o = 4$ W	
UF 9 Variable mu pentode R.F. or I.F. amplifier	$V_f = 12.6$ V $I_f = 0,1$ A	$V_a = V_b = 200$ V $R_{g2} = 60$ kΩ $V_{g1} = -2.5$ V $V_{g3} = 0$ V	$I_a = 6$ $I_{g2} = 1.7$	$S = 2.2$ mA/V $R_i = 1.2$ MΩ $C_{ag1} < 2$ mpF	 Octal
		$V_a = V_b = 100$ V $R_{g2} = 60$ kΩ $V_{g1} = -1.3$ V $V_{g3} = 0$ V	$I_a = 3.2$ $I_{g2} = 0.85$	$S = 2.0$ mA/V $R_i = 0.0$ MΩ	

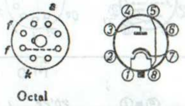
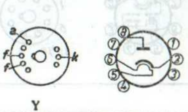
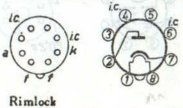
UF 9 (continued) A.F. amplifier	V_f = 12.6 V I_f = 0.1 A	V_b = 200 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 2.5 kΩ V_{g3} = 0 V	I_a = 0.65 I_{g2} = 0.17	g = 88	 Octal
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 2.5 kΩ V_{g3} = 0 V	I_a = 0.33 I_{g2} = 0.08	g = 82	
UF 11 Variable mu pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 15 V I_f = 0.1 A	V_a = 200 V R_{g2} = 70 kΩ V_{g1} = —2 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 1.5 MΩ C_{ag1} < 2 mpF	 Y
		V_a=V_b= 100 V R_{g2} = 70 kΩ V_{g1} = —1 V	I_a = 2.8 I_{g2} = 0.95	S = 1.8 mA/V R_i = 1.1 MΩ	
		V_b = 200 V R_a = 0.2 MΩ R_{g2} = 0.6 MΩ R_k = 2 kΩ	I_a = 0.76 I_{g2} = 0.26	g = 77	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.6 MΩ R_k = 2 kΩ	I_a = 0.37 I_{g2} = 0.12	g = 66	

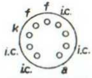
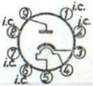
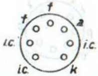
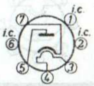
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UF 21 Variable mu pentode R.F. or I.F. amplifier A.F. amplifier	V_f = 12.6 V I_f = 0.1 A	$V_a = V_b$ = 200 V R_{g2} = 60 kΩ V_{g1} = −2.5 V V_{g3} = 0 V	I_a = 6 I_{g2} = 1.7	S = 2.2 mA/V R_i = 1.0 MΩ C_{ag1} < 2 mpF	Loctal 8p.
		$V_a = V_b$ = 100 V R_{g2} = 60 kΩ V_{g1} = −1.3 V V_{g3} = 0 V	I_a = 3.2 I_{g2} = 0.85	S = 2.0 mA/V R_i = 1.0 MΩ	
		V_b = 200 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 2.5 kΩ V_{g3} = 0 V	I_a = 0.65 I_{g2} = 0.17	g = 88	
		V_b = 100 V R_a = 0.2 MΩ R_{g2} = 0.8 MΩ R_k = 2.5 kΩ V_{g3} = 0 V	I_a = 0.33 I_{g2} = 0.08	g = 82	
UF 41 Variable mu pentode R.F. or I.F. amplifier	V_f = 12.6 V I_f = 0.1 A	V_a = 170 V R_{g2} = 40 kΩ V_{g1} = −2.5 V	I_a = 6 I_{g2} = 1.75	S = 2.2 mA/V R_i = 1.0 MΩ C_{ag1} < 2 mpF	Rimlock
		V_a = 100 V R_{g2} = 40 kΩ V_{g1} = −1.4 V	I_a = 3.3 I_{g2} = 1.0	S = 1.9 mA/V R_i = 0.8 MΩ	

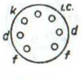
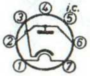
UF 42 R.F. pentode Typical characteristics	$V_f =$ 21 V $I_f =$ 0.1 A	V_a = 170 V V_{g2} = 170 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 10 I_{g2} = 2.8	S = 8 mA/V R_i = 0.3 MΩ $C_{ag1} <$ 6 mpF R_{eq} = 1060 Ω	 Rimlock
UF 80 R.F. pentode R.F. or I.F. amplifier	$V_f =$ 19 V $I_f =$ 0.1 A	V_a = 170 V V_{g3} = 0 V V_{g2} = 170 V V_{g1} = −2 V	I_a = 10 I_{g2} = 2.5	S = 7.4 mA/V R_i = 0.4 MΩ $C_{ag1} <$ 7 mpF	
UF 85 R.F. variable mu pentode R.F. or I.F. amplifier	$V_f =$ 19 V $I_f =$ 0.1 A	$V_a = V_b =$ 170 V R_{g2} = 27 kΩ V_{g1} = −2 V V_{g3} = 0 V	I_a = 9.7 I_{g2} = 2.6	S = 5.8 mA/V R_i = 0.2 MΩ R_{eq} = 1.4 kΩ	 Noval
UF 89 Variable mu pentode R.F. or I.F. amplifier	$V_f =$ 12.6 V $I_f =$ 0.1 A	V_a = 170 V V_{g2} = 100 V V_{g3} = 0 V V_{g1} = −1 V	I_a = 12 I_{g2} = 4.4	S = 4.4 mA/V R_i = > 0.3 MΩ $C_{ag1} <$ 2 mpF	 Noval

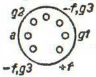
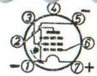
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UL 41 Output pentode Class A final amplifier Class AB push-pull amplifier	V_f = 45 V I_f = 0.1 A	V_a = 170 V V_{g2} = 170 V V_{g1} = —10.4 V	I_a = 53 I_{g2} = 10	S = 9.5 mA/V R_i = 20 kΩ R_a = 3 kΩ W_o = 4 W W_a = 9 W	 Rimlock
		V_a = 100 V V_{g2} = 100 V V_{g1} = —5.7 V	I_a = 29 I_{g2} = 5.5	S = 8.0 mA/V R_i = 18 kΩ R_a = 3 kΩ W_o = 1.35 W	
		V_a = 170 V V_{g2} = 170 V R_k = 100 Ω	$I_{a\,min}$ = 2× 44 $I_{a\,max}$ = 2× 49 $I_{g2\,min}$ = 2× 8.8 $I_{g2\,max}$ = 2×16.5	R_{aa} = 4 kΩ W_o = 9 W	
UL 84 Output pentode Class A final amplifier	V_f = 45 V I_f = 0,1 A	V_a = 165 V V_{g2} = 165 V V_{g1} = —11.3 V	I_a = 73 I_{g2} = 4.5	S = 10.5 mA/V R_i = 20 kΩ R_a = 2.4 kΩ W_o = 6 W W_a = 12 W	 Noval
		V_a = 100 V V_{g2} = 100 V V_g = —6.7 V	I_a = 43 I_{g2} = 2.8	S = 9 mA/V R_i = 20 kΩ R_a = 2.4 kΩ W_o = 1.9 W	

UM 4 Tuning indicator (sensitive system) (insensitive system)	V_f = 12.6 V I_f = 0.1 A	$V_b=V_l=$ 200 R_{a1} = 1.0 MΩ V_g = 0/—4.2 V	I_l = 1.4/1.8	α_1 = 90°/5°	 Octal
		$V_b=V_l=$ 100 V R_{a1} = 1.0 MΩ V_g = 0/—2.5 V	I_l = 0.40/0.52	α_1 = 90°/0°	
		$V_b=V_l=$ 200 V R_{a2} = 1.0 MΩ V_g = 0/—12.5 V	I_l = 1.4/2.0	α_2 = 90°/5°	
		$V_b=V_l=$ 100 V R_{a2} = 1.0 MΩ V_g = 0/—8 V	I_l = 0.40/0.61	α_2 = 90°/0°	
UM 34 Tuning indicator (sensitive system) (insensitive system)	V_f = 12.6 V I_f = 0.1 A	$V_b=V_l=$ 200 V R_{a1} = 1 MΩ V_g = 0/—4.2 V	I_l = 1.4/1.8	α_1 = 90°/5°	 Octal
		$V_b=V_l=$ 200 V R_{a2} = 1 MΩ V_g = 0/—12.5 V	I_l = 1.4/2.0	α_2 = 90°/5°	
UM 80 Tuning indicator	V_f = 19 V I_f = 0.1 V	$V_b=V_l=$ 170 V R_a = 0.5 MΩ R_g = 3 MΩ V_g = —1/—12 V	I_a = 03/0.01	β = 5/50°	 Noval

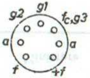
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
UY 1 N Half-wave rectifying tube Rectifier	V_f = 50 V I_f = 0.1 A	V_{tr} = 250 V V_{tr} = 127 V	I_o = max. 140 I_o = max. 140	R_t = min. 175 Ω R_t = 0 Ω C_{filt} = max. 60 µF	 Octal
UY 11 Half-wave rectifying tube Rectifier	V_f = 50 V I_f = 0.1 A	V_{tr} = 250 V	I_o = max. 140	R_t = min. 175 Ω C_{filt} = max. 60 µF	 Y
UY 41 Half-wave rectifying tube	= UY 42				
UY 42 Half-wave rectifying tube Rectifier	V_f = 31 V I_f = 0.1 A	V_{tr} =max. 250 V V_{tr} =max. 220 V V_{tr} =max. 127 V V_{tr} =max. 110 V	I_o = max. 100 = max. 100 = max. 100 = max. 100 I_{ap} = max. 600	R_t = min. 210 Ω = min. 160 Ω 0 Ω 0 Ω C_{filt} = max. 50 µF	 Rimlock

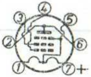
UY 82 Half-wave rectifying tube	V_f = 55 V I_f = 0.1 A	see EY 82 except for heater rating			
UY 85 Half-wave rectifier	V_f = 38 V I_f = 0.1 A	V_{tr} = 250 V = 220 V = 127 V = 110 V	I_o = max. 110 = max. 110 = max. 110 = max. 110 I_{op} = max. 660	R_t = min. 100 Ω = min. 90 Ω = 0 Ω = 0 Ω C_{filter} = 100 µF	  Noval
UY 92 Half-wave high-vacuum rectifier	V_f = 26 V I_f = 0.1 A	V_{tr} = 127 V V_{tr} = 110 V	I_o = max. 70	R_t = 0 Ω C_{filter} = 100 µF	  Miniature

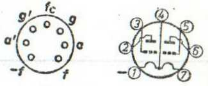
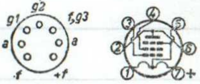
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
1 A 3 Single diode Detector	V_f = 1,4 V I_f = 0.15 A	V_{dinvp} = max. 330 V	I_d = max. 0.5 I_{dp} = max. 5	V_{kf} = max. 140 V	  Miniature
1 AB 6 Heptode Frequency changer	see DK 96				
1 AC 6 Heptode Frequency changer	see DK 92				
1 AH 5 Diode pentode	see DAF 96				
1 AJ 4 R.F. pentode	see DF 96				
1 B 24 A **1 B 35**	TR and ATR switches, see p. 243				

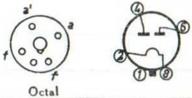
1 L 4 Pentode R.F. or I.F. amplifier	V_f = 1.4 V I_f = 50 mA	V_a = 90 V V_{g2} = 90 V V_{g1} = 0 V	I_a = 4.5 I_{g2} = 2.0	S = 1.025 mA/V R_i = 0.35 MΩ C_{ag1} < 8 mpF	  Miniature
		V_a = 90 V V_{g2} = 67.5 V V_{g1} = 0 V	I_a = 2.0 I_{g2} = 1.3	S =0.925 mA/V R_i = 0.6 MΩ	
1 M 3 Tuning indicator	see DM 70				
1 R 5 Heptode Frequency changer	see DK 91				
1 S 5 Diode pentode	see DAF 91				
1 T 4 Variable mu pentode	see DF 91				

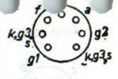
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
2 J 42 **2 J 42A** **2 J 49** **2 J 50**	Magnetrons, see p. 243				
2 K 25	Klystron, see p. 243				
3 A 4 Output pentode Class A A.F. final amplifier	V_f = 1.4 V I_f = 0.2 A	V_f = 1.4 V V_a = 135 V V_{g2} = 90 V V_{g1} = −7.5 V	I_a = 14.8 I_{g2} = 2.6	S = 1.9 mA/V R_i = 90 kΩ R_a = 8 kΩ W_o = 0.6 W W_a = 2 W	
		V_f = 1.4 V V_a = 150 V V_{g2} = 90 V V_{g1} = −8.4 V	I_a = 13.3 I_{g2} = 2.2	S = 1.9 mA/V R_i = 100 kΩ R_a = 8 kΩ W_o = 0.7 W	
R.F. final amplifier (intermittent operation)	V_f = 2.8 V I_f = 0.1 A	V_f = 1.4 V V_a = 150 V V_{g2} = 135 V R_{g1} = 0.2 V	I_a = 18.3 I_{g2} = 6.5 I_{g1} = 0.13	freq. = 50 Mc/s W_o = 1.2 W	Miniature

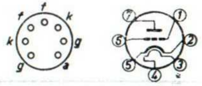
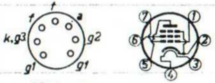
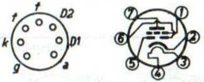


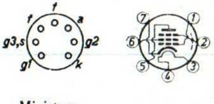
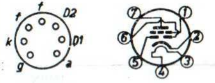
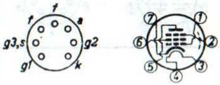
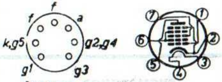


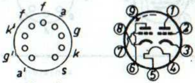
3 A 5 Double triode Typical characteristics (per system)	V_f = 1.4 V I_f = 0.22 A	V_a = 90 V V_g = —2.5 V	I_a = 3.7	S = 1.8 mA/V R_i = 8.3 kΩ μ = 15	 Miniature
R.F. push-pull amplifier or oscillator (intermittent operation)	V_f = 2.8 V I_f = 0.11 A	V_a = 135 V V_{g1} = —20 V V_{ip} = 2× 45 V	I_a = 2× 15 I_g = 2×2.5	freq. = 40 Mc/s W_o = 2 W	
3 C 4 Output pentode	see DL 96				
3 C 45	Thyratron, see p. 210				
3 Q 4 Output pentode Class A final amplifier	V_f = 1.4 V I_f = 0.1 A	V_a = 86 V V_{g2} = 86 V V_{g1} = —4.5 V	I_a = 8 I_{g2} = 1.8	S = 2.0 mA/V R_i = 0.11 MΩ R_a = 8 kΩ W_o = 0.29 W W_a = 1.2 W	 Miniature
	V_f = 2.8 V I_f = 50 mA	V_a = 86 V V_{g2} = 86 V V_{g1} = —4.3 V	I_a = 7.0 I_{g2} = 1.5	S = 1.9 mA/V R_i = 0.12 MΩ R_a = 10 kΩ W_o = 0.27 W	
3 S 4 Output pentode	see DL 92				
3 V 4 Output pentode	see DL 94				

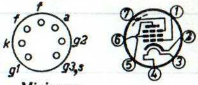
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
4 C 35	Thyratron, see p. 210				
4 J 50 **4 J 78**	Magnetrons, see p. 243				
5 C 22	Thyratron, see p. 210				
5 J 26	Magnetron, see p. 243				
5 Y 3 GT Full-wave rectifying tube	$V_f =$ 5 V $I_f =$ 2 A	V_{tr} = 2×500 V V_{tr} = 2×350 V	I_o = 84 I_o = 125	R_t = min. 140 Ω R_t = min. 50 Ω C_{filter} = 10 μF	
6 AB 8 Triode Output pentode	see ECL 80				
6 AJ 8 Triode heptode Frequency changer	see ECH 81				

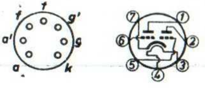
6 [illegible]K 5 R.F. pentode Typical characteristics	V_f = 6.3 V I_f = 0.175 A	[illegible] = [illegible]0 V V_{g2} = 120 V V_{g1} = −2 V	I_a = 7.7 I_{g2} = 2.4	S = [illegible] mA/V R_i = 0.7 MΩ R_{eq} = 2 kΩ C_{ag1} < 0.02 pF	 Miniature 
6 AK 8 Triple diode high mu triode	see EABC 80				
6 AL 5 Double diode	see EAA 91				
6 AM 5 Output pentode	see EL 91				
6 AM 6 R.F. pentode	see EF 91				

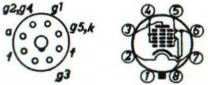
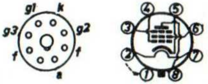
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6 AQ 4 Grounded-grid triode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_g = —1.5 V R_k = 150 Ω	I_a = 10	S = 8.5 mA/V R_i = 12 kΩ μ = 100 W_a = 2.5 W R_{eq} = 400 Ω freq.=max.250 Mc/s	 Miniature
6 AQ 5 Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.45 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —12.5 V	I_a = 45 I_{g2} = 4.5	S = 4.1 mA/V R_i = 52 kΩ R_a = 5 kΩ W_o = 4.5 W W_a = 12 W	 Miniature
6 AQ 8 Double triode	see ECC 85				
6 AT 6 Double diode high mu triode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_g = —3 V V_a = 100 V V_g = —1 V	I_a = 1 I_a = 0.8	S = 1.2 mA/V R_i = 58 kΩ μ = 70 S = 1.3 mA/V R_i = 54 kΩ μ = 70	 Miniature

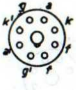
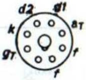
6 AU 6 R.F. pentode Typical characteristics	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 250$ V $V_{g2} = 150$ V $V_{g1} = -1$ V $V_{g3} = 0$ V	$I_a = 10.6$ $I_{g2} = 4.3$	$S = 5.2$ mA/V $R_i = 1$ MΩ	 Miniature
		$V_a = 100$ V $V_{g2} = 100$ V $V_{g1} = -1$ V $V_{g3} = 0$ V	$I_a = 5.2$ $I_{g2} = 2$	$S = 3.9$ mA/V $R_i = 0.5$ MΩ	
6 AV 6 Double diode high mu triode Typical characteristics	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 250$ V $V_g = -2$ V	$I_a = 1.2$	$S = 1.6$ mA/V $R_i = 62.5$ kΩ $\mu = 100$	 Miniature
6 BA 6 Variable mu pentode R.F. or I.F. amplifier	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = V_b = 250$ V $V_{g3} = 0$ V $R_{g2} = 33$ kΩ $V_{g1} = -1$ V	$I_a = 11.6$ $I_{g2} = 4.5$	$S = 4.5$ mA/V $R_i = 1$ MΩ $R_{eq} = 4$ kΩ $C_{ag1} < 3.5$ mpF	 Miniature
		$V_a = V_b = 100$ V $V_{g3} = 0$ V $V_{g2} = 100$ V $V_{g1} = -1$ V	$I_a = 10.8$ $I_{g2} = 4.4$	$S = 4.3$ mA/V $R_i = 0.25$ MΩ $R_{eq} = 4.3$ kΩ	
6 BE 6 Heptode Frequency changer	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 250$ V $V_{g2+g4} = 100$ V $V_{g3} = -1.5$ V $R_{g1} = 20$ kΩ	$I_a = 3$ $I_{g2+g4} = 7.1$ $I_{g1} = 0.5$	$S_c = 0.475$ mA/V $R_i = 1$ MΩ	 Miniature

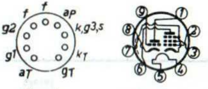
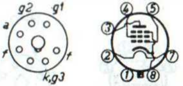
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6 BE 7 Enneode	see EQ 80				
6 BQ 5 Output pentode	see EL 84				
6 BQ 7 A Double triode Typical characteristics (per system)	$V_f = 6.3$ V $I_f = 0.4$ A	$V_a = 150$ V $R_k = 220\ \Omega$	$I_a = 9$	$S = 6.4$ mA/V $R_i = 6.1$ kΩ $\mu = 39$	 Noval
6 BR 5 Tuning indicator	see EM 80				
6 BX 6 R.F. pentode	see EF 80				
6 BY 7 R.F. variable mu pentode	see EF 85				

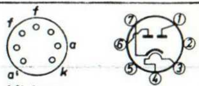
6 CA 7 Output pentode	see EL 34				
6 CB 6 R.F. sharp-cut off pentode Typical characteristics	$V_f = 6.3$ V $I_f = 0.3$ A	$V_a = 200$ V $V_{g2} = 150$ V $V_{g3} = 0$ V $R_k = 180\ \Omega$	$I_a = 9.5$ $I_{g2} = 2.8$	$S = 6.2$ mA/V $R_i = 0.6$ MΩ	 Miniature
6 CD 7 Tuning indicator	see EM 34				
6 CJ 6 Line output pentode	see EL 81				
6 CK 6 Video amplifying pentode	see EL 83				
6 CN 6 Output pentode	see EL 38				

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6 CQ 6 Variable mu pentode	see EF 92				
6 DA 6 Varibale mu pentode	see EF 89				
6 J 6 Double triode Typical characteristics (per system)	V_f = 6.3 V I_f = 0.45 A	V_a = 100 V R_k = 100 Ω	I_a = 8.5	S = 5.3 mA/V R_i = 7.1 kΩ μ = 38	 Miniature
R.F. class C telegr. amplifier and oscillator		V_a = 150 V V_g = −10 V R_g = 625 Ω R_k = 220 Ω	I_a = 2×15 I_g = 2× 8	W_{ig} = 0.35 W W_a = 3.5 W	
6 N 8 Double diode var. mu pentode	see EBF 80				
6 Q 4 Grounded-grid triode	see EC 80				
6 R 3 Booster	see EY 81				
6 R 4 Oscillator tr[illegible]	see EC 81				

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6 SA 7 GT Heptode Frequency changer	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_{g2+g4} = 100 V V_{g3} = 0 V R_{g1} = 20 kΩ	I_a = 3.5 I_{g2+g4} = 8.5 I_{g1} = 0.5	S_c = 0.45 mA/V R_i = 1 MΩ	 Octal
		V_a = 250 V V_{g2+g4} = 100 V V_{g3} = —2 V R_{g1} = 20 kΩ	I_a = 3.5 I_{g2+g4} = 8.5 I_{g1} = 0.5	S_c = 0.45 mA/V R_i = 1 MΩ	
6 SK 7 GT Variable mu pentode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_{g2} = 100 V V_{g1} = —3 V V_{g3} = 0 V	I_a = 9.2 I_{g2} = 2.6	S = 2 mA/V R_i = 0.8 MΩ	 Octal
		V_a = 100 V V_{g2} = 100 V V_{g1} = —1 V V_{g3} = 0 V	I_a = 13 I_{g2} = 2.6	S = 2.35 mA/V R_i = 0.12 MΩ	

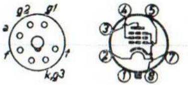
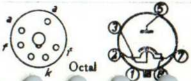
6 SN 7 GT Double triode Typical characteristics (per system)	V_f = 6.3 V I_f = 0.6 A	V_a = 250 V V_g = —8 V	I_a = 9	S = 2.6 mA/V R_i = 7.7 kΩ μ = 20	 Octal 
		V_a = 90 V V_g = 0 V	I_a = 10	S = 3 mA/V R_i = 6.7 kΩ μ = 20	
6 SQ 7 GT Double diode high mu triode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_g = —2 V	I_a = 0.9	S = 1.1 mA/V R_i = 91 kΩ μ = 100	 Octal 
		V_a = 100 V V_g = —1 V	I_a = 0.4	S = 0.9 mA/V R_i = 110 kΩ μ = 100	

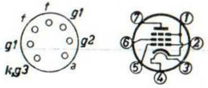
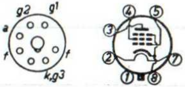
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6 U 8 Triode pentode Typical characteristics (pentode system)	V_f = 6.3 V I_f = 0.45 A	V_a = 250 V V_{g2} = 110 V R_k = 68 Ω	I_a = 10 I_{g2} = 3.5	S = 5.2 mA/V R_i = 0.4 MΩ	 Noval
Typical characteristics (triode system)		V_a = 150 V R_k = 56 Ω	I_a = 18	S = 8.5 mA/V R_i = 4.8 kΩ μ = 40	
6 V 6 GT Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.45 A	V_a = 250 V V_{g2} = 250 V V_{g1} = —12.5 V	I_a = 45 I_{g2} = 4.5	S = 4.1 mA/V R_i = 50 kΩ R_a = 5 kΩ W_o = 4.5 W W_a = 12 W	 Octal
Class AB push-pull amplifier		V_a = 250 V V_{g2} = 250 V V_{g1} = —15 V	$I_{a\,min}$ = 2×70 $I_{a\,max}$ = 2×79 $I_{g2\,min}$ = 2× 5 $I_{g2\,max}$ = 2× 13	S = 3.75 mA/V R_i = 60 kΩ R_{aa} = 10 kΩ W_o = 10 W	

6 X 2 E.H.T. Rectifying tube	see EY 51				
6 X 4 Full-wave high vacuum rectifying tube Rectifier	V_f = 6.3 V I_f = 0.6 A	V_{tr} = 2×325 V	I_o = 70	R_t = min. 300 Ω C_{filter} = max. 4 μF	 Miniature
7 AN 7 Double triode	see PCC 84				
8 A 8 Triode pentode	see PCF 80				
9 AK 8 Triple diode high-mu triode	see PABC 80				
9 AQ 8 Double triode	see PCC 85				
12 AT 6 Double diode high-mu triode	V_f = 12.6 V I_f = 0.15 A	see 6 AT 6 except for heater rating			
12 AT 7 Double triode	see ECC 81				
12 AU 6 R.F. pentode	V_f = 12.6 V I_f = 0.15 A	see 6 AU 6 except for heater rating			

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
12 AU 7 Double triode	see ECC 82				
12 AV 6 Double diode high mu triode	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 AV 6 except for heater rating			
12 AX 7 Double high mu triode	see ECC 83				
12 BA 6 Variable mu pentode	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 BA 6 except for heater rating			
12 BE 6 Pentode grid frequency changer	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 BE 6 except for heater rating			

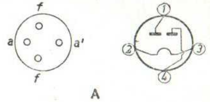
12 SA 7 GT Heptode	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 SA 7 GT except for heater rating
12 SK 7 GT Variable mu pentode	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 SK 7 GT except for heater rating
12 SN 7 GT Double triode	$V_f = 12.6$ V $I_f = 0.3$ A	see 6 NS 7 GT except for heater rating
12 SQ 7 GT Double diode high mu triode	$V_f = 12.6$ V $I_f = 0.15$ A	see 6 SQ 7 GT except for heater rating
15 A 6 Video amplifying pentode	see PL 83	
16 A 5 Frame or sound output pentode	see PL 82	

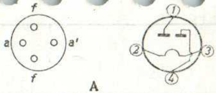
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
17 Z 3 Booster diode	see PY 81				
19 D 8 Triode heptode	see UCH 81				
19 X 3 Booster diode	see PY 80				
19 Y 3 Half-wave rectifying tube	see PY 82				
21 A 6 Line output pentode	see PL 81				
25 L 6 GT Output pentode Class A final amplifier	V_f = 25 V I_f = 0.3 A	V_a = 200 V V_{g2} = 125 V R_k = 180 Ω	I_a = 46 I_{g2} = 2.2	S = 8 mA/V R_i = 28 kΩ R_a = 4 kΩ W_o = 3.8 W W_a = 10 W	 Octal
		V_a = 110 V V_{g2} = 110 V V_{g1} = —7.5 V	I_a = 49 I_{g2} = 4	S = 8 mA/V R_i = 13 kΩ R_a = 2 kΩ W_o = 2.1 W	
35 Z 5 GT Half-wave rectifying tube Rectifier	V_f = 35 V I_f = 0.15 A	V_{tr} = 117 V V_{tr} = 235 V	I_o = 100 I_o = 100	R_t = min. 15 Ω R_t = min. 100 Ω C = 40 μF	 Octal

50 C 5 Output pentode	$V_f =$ 50 V $I_f =$ 0.15 A	$V_a =$ 110 V $V_{g1} =$ 110 V $V_{g2} =$ —7.5 V	$I_a =$ 49 $I_{g2} =$ 4.5	$S =$ 7.5 mA/V $R_i =$ 10 kΩ $R_a =$ 2.5 kΩ $W_o =$ 1.9 W $W_a =$ 5.5 W	 Miniature
50 L 6 GT Output pentode Class A final amplifier	$V_f =$ 50 V $I_f =$ 0.15 A	$V_a =$ 200 V $V_{g2} =$ 110 V $V_{g1} =$ —8 V	$I_a =$ 50 $I_{g2} =$ 2	$S =$ 9.5 mA/V $R_i =$ 30 kΩ $R_a =$ 3 kΩ $W_o =$ 4.3 W $W_a =$ 10 W	 Octal
		$V_a =$ 110 V $V_{g2} =$ 110 V $V_{g1} =$ —7.5 V	$I_a =$ 49 $I_{g2} =$ 4	$S =$ 9 mA/V $R_i =$ 13 kΩ $R_a =$ 2 kΩ $W_o =$ 2.1 W	

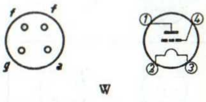
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
58 CG 58 CV	Phototubes, see p. 228				
85 A1 85 A2	Voltage reference tubes, see p. 230				
90 AG 90 AV 90 CG 90 CV	Phototubes, see p. 228				
90 C1 100 E1 150 A1 150 B2 150 C1	Voltage stabilizers, see p. 231				
328	Industrial rectifying tube, see p. 204				
329 340	Current regulators, see p. 239				
354 367 451	Industrial rectifying tubes, see p. 204				

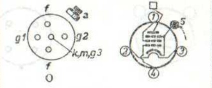
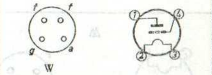
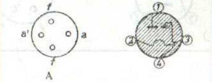
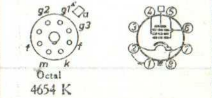
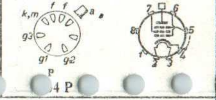
723 AB 725 A	Klystron, see p. 243 Magnetron, see p. 243
1002 1010	Industrial rectifying tubes, see p. 204
1012	Current regulator, see p. 239
1037 1039 1048 1049 1053 1054 1059 1063A 1069K 1089 1110 1119	Industrial rectifying tubes, see p. 205
1120	Current regulator, see p. 239
1129 1138 1163 1164 1173 1174 1176 1177	Industrial rectifying tubes, see p. 206

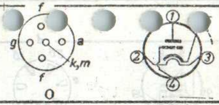
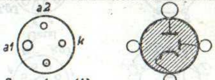
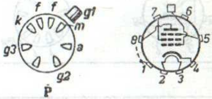
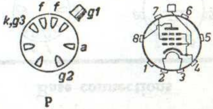
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
1331	Current regulator, see p. 239				
1533 **1534** **1543** **1544** **1553** **1554**	Industrial rectifying tubes, see p. 207				
1561 Full-wave rectifying tube Rectifier	V_f = 4 V I_f = 2 A	V_{tr} = 2×500 V = 2×400 V = 2×300 V	I_o = max. 120 = max. 140 = max. 160	C_{filt} < 60 μF R_t = min. 50 Ω C_{filt} > 60 μF R_t = min. 100 Ω	
1564 **1710** **1725A** **1729** **1738** **1749A** **1759** **1768** **1788**	Industrial rectifying tubes, see p. 207				

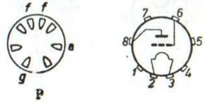
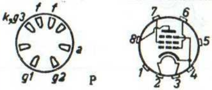
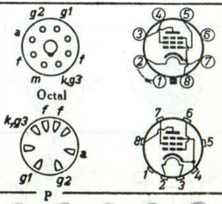
1805 Full-wave rectifying tube Rectifier	$V_f =$ 4 V $I =$ 1 A	V_{tr} = 2×500 V = 2×300 V	I_o = max. 60 = max. 100	R_t = min. 100 Ω = min. 60 Ω C_{filt} = max. 60 μF	 A
1838 **1849** **1859**	Industrial rectifying tubes, see p. 208				

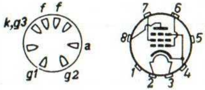
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
1904 1905 1908 1909 1909A 1910 1913 1918-01 1923 1926 1927 1928 1941 1945	Current regulators, see p. 239				
3530 3533 3538 3545 3546 3554	Phototubes, see p. 228				
4060 4065 4066	Electrometer tubes, see p. 236				
4152	Bimetal relay, see p. 238				

4349 **4369** **4370** **4371** **4372** **4373**	Surge arresters, see p. 234				
4378 **4379** **4380** **4383** **4390** **4397**	Surge arresters, see p. 235				
4624 Output triode Class A final amplifier	$V_f = 7.2$ V $I_f = 1.1$ A	$V_a = 800$ V $V_g = -90$ V	$I_a = 35$	$S = 2.3$ mA/V $R_i = 3$ kΩ $\mu = 7$ $R_a = 11$ kΩ $W_o = 9$ W $W_a = 32$ W	 W
4630 Triode Pre-amplifier	$V_f = 4.2$ V $I_f = 0.25$ A	$V_a = 130$ V $R_a = 6$ kΩ $V_g = -8.4$ V	$I_a = 8.5$	$S = 1.3$ mA/V $R_i = 5.5$ kΩ $g = 1.3$ N $W_a = 1.1$ W	
4631 Triode Pre-amplifier	$V_f = 2$ V $I_f = 0.25$ A	$V_a = 130$ V $R_a = 0.6$ MΩ $V_g = -1.5$ V	$I_a = 0.7$	$S = 0.5$ mA/V $R_i = 55$ kΩ $g = 3.24$ N $W_a = 1.1$ W	Spec. 4 p. (3)

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
4636 Pentode Typical characteristics	$V_f =$ 4 V $I_f =$ 1.1 A	V_a = 200 V V_{g2} = 100 V V_{g1} = —2 V	I_a = 3 I_{g2} = 1.2	S = 2.3 mA/V R_i = 2.2 MΩ C_{ag1} < 6 mpF	
4641 Output triode Typical characteristics	$V_f =$ 4 V $I_f =$ 2.1 A	V_a = 1500 V V_{g1} = —140 V	I_a = 15	S = 2 mA/V R_i = 4.6 kΩ μ = 10 W_a = 25 W	
4652 = AX 1 Gasfilled full-wave rectifying tube Rectifier	$V_f =$ 4 V $I_f =$ 2.4 A	V_{tr} = 2×500 V V_{arc} = max. 15 V	I_o = max. 125	R_t = min. 200 Ω C_{filt} = max. 64 μF R_t = min. 150 Ω C_{filt} = max. 32 μF R_t = min. 100 Ω C_{filt} = max. 16 μF	
4654 Output pentode Class A final amplifier	$V_f =$ 6.3 V $I_f =$ 1.5 A	V_a = 250 V V_{g2} = 275 V R_k = 175 Ω V_{g3} = 0 V	I_a = 72 I_{g2} = 8	S = 8.5 mA/V R_i = 22 kΩ R_a = 3.5 kΩ W_o = 9.2 W W_a = 18 W	
Class AB push-pull amplifier		V_b = 375 V R_{g2} = 500 Ω R_k = 195 Ω V_{g3} = 0 V	I_a min = 2× 53 I_a max = 2× 67 I_{g2} min = 2×6.5 I_{g2} max = 2× 16	R_{aa} = 5 kΩ W_o = 26 W	

4657 Triode Typical characteristics	$V_f =$ 4 V $I_f =$ 1.0 A	V_a = 200 V V_g = −1.5 V	I_a = 1	S = 2.2 mA/V R_i = 45 kΩ μ = 99 C_{ag} < 3 pF	
4662 Neon tuning indicator Tuning indicator		V_a = 150—170 V V_{ab} = 165—190 V	I_a = 2 I_{ab} = 0.04—0.05		 Spec. 4 p. (1)
4671 **4672**	U.H.F. tubes, see p. 171				
4673 R.F. pentode R.F. amplifier	$V_f =$ 4 V $I_f =$ 1.35 A	V_a = 250 V V_{g2} = 200 V V_{g1} = −2.5 V V_{g3} = 0 V	I_a = 8 I_{g2} = 1.5	S = 5 mA/V R_i > 1.5 MΩ C_{ag1} < 12 mpF	
4682 Output pentode Class AB push-pull amplifier Class B push-pull amplifier	$V_f =$ 4 V $I_f =$ 1.1 A	V_a = 375 V V_{g2} = 250 V R_k = 540 Ω V_a = 375 V V_{g2} = 250 V V_{g1} = −32 V	I_a min = 2× 24 I_a max = 2× 29 I_{g2} min = 2×3.5 I_{g2} max = 2× 4 I_a min = 2× 20 I_a max = 2× 45 I_{g2} min = 2× 3 I_{g2} max = 2×5.5	R_{aa} = 15 kΩ W_o = 14 W R_{aa} = 9 kΩ W_o = 19 W	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
4683 Output triode Class AB push-pull amplifier Class B push-pull amplifier	V_f = 4 V I_f = 0.95 A	V_a = 350 V R_k = 850 Ω V_a = 350 V V_g = −75 V	I_a min = 2× 43 I_a max = 2× 46 I_a min = 2× 35 I_a max = 2× 70	R_{aa} = 8 kΩ W_o = 15.6 W R_{aa} = 5 kΩ W_o = 20 W	
4687	Voltage stabilizer, see p. 233				
4688 Output pentode Class AB push-pull amplifier	V_f = 4 V I_f = 2 A	V_a = 375 V V_{g2} = 275 V R_k = 165 Ω	I_a min = 2× 48 I_a max = 2× 62 I_{g2}min = 2× 5 I_{g2}max = 2× 9	R_{aa} = 6.5 kΩ W_o = 28.5 W	
4689 Output pentode Class AB push-pull amplifier	V_f = 6.3 V I_f = 1.5 A	V_a = 375 V V_{g2} = 275 V R_k = 165 Ω	I_a min = 2× 48 I_a max = 2× 62 I_{g2}min = 2× 5 I_{g2}max = 2× 9	R_{aa} = 6.5 kΩ W_o = 28.5 W	
4690	Thyratron, see p. 210				

4694 Output pentode Class AB push-pull amplifier	V_f = 6.3 V I_f = 0.9 A	V_a = 375 V V_{g2} = 250 V R_k = 145 Ω	I_a min = 2× 24 I_a max = 2× 30 I_{g2}min = 2×2.5 I_{g2}max = 2× 5	R_{aa} = 13 kΩ W_o = 12 W	
4699N Output pentode Class A final amplifier	V_f = 6.3 V I_f = 1.5 A	V_a = 250 V V_{g2} = 250 V R_k = 90 Ω	I_a = 72 I_{g2} = 8	S = 14.5 mA/V R_i = 20 kΩ R_a = 3.5 kΩ W_o = 8 W W_a = 18 W	 P
Class AB push-pull amplifier		V_b = 375 V R_{g2} [1])= 700 Ω R_k = 125 Ω	I_a min = 2× 52 I_a max = 2× 64 I_{g2}min = 2×6.5 I_{g2}max = 2× 17	R_{aa} = 6 kΩ W_o = 27.5 W	
5823	Trigger tube, see p. 247				
5854	Image iconoscope, see p. 241				
6007 Output pentode	see DL 67				
6008 Pentode	see DF 67				
6084 A.F. pentode	see E 80 F				

[1]) Common screen-grid resistor.

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
6085 Double triode	see E 80 CC				
6227 Output pentode	see E 80 L				
6267 Low-noise Preamplifier pentode	see EF 86				
6375 Triode	see DC 70				
7475	Voltage stabilizer, see p. 233				
8020	H.V. diode, see p. 243				
13201	Voltage stabilizer, see p. 233				

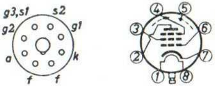
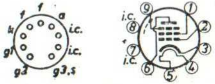
18004 **18040** **18042** **18045** **18046**	Repeater tubes, see p. 164
18120 **18121** **18130**	Image converters, see p. 237

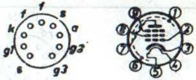
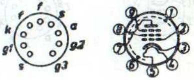
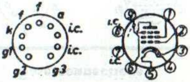
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
18500 18501 18502 18503 18504 18505 18506 18513 18514	Radiation counter tubes, see p. 242				
20610 to 28137	X-ray tubes, see p. 216				
55029 55030 55031 55032 55085-01 55085-02 55085-03 55085-04 55100-01 55100-02 55100-03 55100-04	Magnetrons, see p. 243				

55334 55395	Klystrons, see p. 243
95322	Penning manometer tube, see p. 244

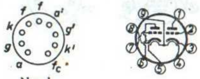
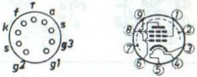
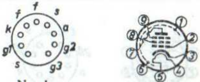
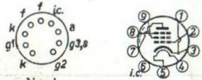
SPECIAL A.F. AND R.F. AMPLIFYING TUBES

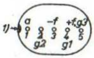
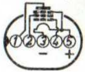
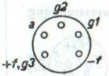
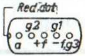
REPEATER TUBES

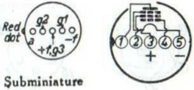
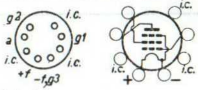
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
18004 Triode Final ampifier	V_f = 4.4 V I_f = 0.97 A	V_a = 130 V V_g = —25 V	I_a = 22	S = 1.0 mA/V R_i = 2.3 kΩ R_a = 2.1 kΩ W_o = 0.2 W W_a = 3.5 W d_{tot} < 5%	 Medium 4 p.
18040 Pentode Pre-amplifier Final amplifier	V_f = 18 V I_f = 0.20 A	V_a = 210 V R_a = 20 kΩ V_{g2} = 210 V R_k = 185 Ω V_{g3} = 0 V	I_a = 15 I_{g2} = 4	S = 10 mA/V R_i = 0.4 MΩ g = 5.15 N	 Loctal 8 p.
		V_a = 210 V V_{g2} = 210 V R_k = 120 Ω V_{g3} = 0 V	I_a = 20 I_{g2} = 5.3	S = 11 mA/V R_i = 0.3 MΩ R_a = 15 kΩ W_o = 1 W d_{tot} = 5% W_a = max. 4.5 W	
18042 Pentode Typical characteristics	V_f = 18 V I_f = 0.1 A	V_a = 210 V V_{g2} = 120 V R_b = 165 Ω V_{g3} = 0 V	I_a = 10 I_{g2} = 2.1	S = 9 mA/V R_i = 0.5 MΩ R_{eq} = 750 Ω	 Noval

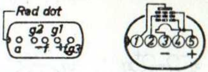
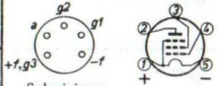
18045 Output pentode Class A final amplifier	V_f = 18 V I_f = 0.130 A	V_a = 210 V V_{g3} = 0 V V_{g2} = 210 V R_k = 120 Ω S = 11 mA/V	I_a = 20 I_{g2} = 5.3	R_a = 15 kΩ W_o = 1 W d_{tot} = 5% W_a = max. 4.5 W	 Noval
18046 Output pentode Class A final amplifier	V_f = 20 V I_f = 0.135 A	V_a = 210 V V_{g3} = 0 V V_{g2} = 210 V R_k = 120 Ω	I_a = 20 I_{g2} = 5.3	S = 11 mA/V R_a = 15 kΩ W_o = 1 W d_{tot} = 5% W_a = max. 4.5 W	
E 81 L Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.375 A	V_a = 210 V V_{g3} = 0 V V_{g2} = 210 V R_k = 120 Ω S = 11 mA/V	I_a = 20 I_{g2} = 5.3	R_a = 15 kΩ W_o = 1 W d_{tot} = 5% W_a = max. 4.5 W	 Noval
E 83 F Pentode Typical characteristics Class A final amplifier	V_f = 6.3 V I_f = 0.3 A	V_a = 210 V V_{g2} = 120 V R_k = 165 Ω V_{g3} = 0 V	I_a = 10 I_{g2} = 2.1	S = 0.9 mA/V R_i = 0.5 MΩ R_{eq} = 750 Ω	 Noval
		V_{ba} = 210 V V_{bg2} = 120 V R_{g2} = 5.6 kΩ R_k = 180 Ω V_{g3} = 0 V	I_a = 8.3 I_{g2} = 1.7	S = 8.2 mA/V R_i = 0.44 MΩ R_a = 20 kΩ W_o = 0.87 W W_a = max. 2.1 W	

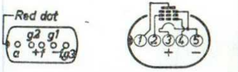
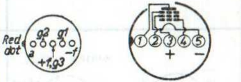
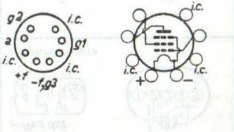
RELIABLE, RUGGEDIZED AND LONG LIFE TUBES

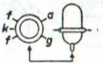
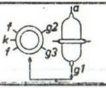
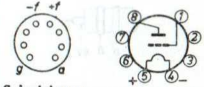
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
E 80 CC Double triode Typical characteristics (per system)	V_f = 6.3 V I_f = 0.6 A V_f = 12.6 V I_f = 0.3 A	V_a = 250 V V_g = —5.5 V	I_a = 6	S = 2.7 mA/V R_i = 10 kΩ μ = 27 W_a = 2 W (abs. max.)	 Noval
E 80 F A. F. pentode Typical characteristics A.F. amplifier	V_f = 6.3 V I_f = 0.3 A	V_a = 250 V V_{g2} = 100 V R_k = 560 Ω V_{g3} = 0 V	I_a = 3 I_{g2} = 0.55	S = 1.85 mA/V R_i = 1.5 MΩ μ_{g2g1} = 25	 Noval
		V_b = 400 V R_a = 0.22 MΩ R_{g2} = 1.2 MΩ R_k = 1.0 kΩ V_{g3} = 0 V	I_a = 1.35 I_{g2} = 0.28	g = 200	
E 80 L Output pentode Class A final amplifier	V_f = 6.3 V I_f = 0.75 A	V_a = 200 V V_{g2} = 200 V R_k = 130 Ω V_{g3} = 0 V	I_a = 30 I_{g2} = 4.2	S = 9.0 mA/V R_a = 7 kΩ W_o = 2.7 W W_a = 8 W	 Noval
E 180 F Broadband amplifier pentode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 190 V V_{g2} = 160 V V_{g1} = + 9 V R_k = 630 Ω V_{g3} = 0 V	I_a = 13 I_{g2} = 3	S = 16.5 mA/V R_i = 35 kΩ μ_{g2g1} = 50 —	 Noval

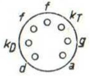
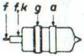
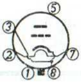
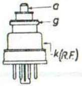
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DF 64 Pentode Typical characteristics A.F. amplifier	$V_f = 0.625V$ $I_f = 10\ mA$	$V_a = 15\ V$ $V_{g2} = 15\ V$ $V_{g1} = -0.62\ V$	$I_a = 0.06$ $I_{g2} = 0.02$	$S = 0.1\ mA/V$ $R_i = 1\ M\Omega$ $\mu_{g2g1} = 7.5$	  Subminiature
		$V_b = 15\ V$ $R_a = 2.2\ M\Omega$ $R_{g2} = 4.7\ M\Omega$ $V_{g1} = 0\ V$ $R_{g1,} = 10\ M\Omega$ $R_{g1} = 5\ M\Omega$	$I_k = 0.0064$	$g = 25$	
DF 65 Pentode Typical characteristics A.F. amplifier	$V_f = 0.625V$ $I_f = 13.3mA$	$V_a = 22.5\ V$ $V_{g2} = 18\ V$ $V_{g1} = -1.15\ V$	$I_a = 0.05$ $I_{g2} = 0.01$	$S = 0.1\ mA/V$ $R_i = 4\ M\Omega$	  Subminiature
		$V_b = 22.5\ V$ $R_a = 1\ M\Omega$ $R_{g2} = 3.9\ M\Omega$ $V_{g1} = 0\ V$ $R_{g1} = 10\ M\Omega$ $R_{g1} = 5\ M\Omega$	$I_a = 0.0117$ $I_{g2} = 0.0025$	$g = 31$	
DF 66 Pentode Typical characteristics	$V_f = 0.625V$ $I_f = 15\ mA$	$V_a = 22.5\ V$ $V_{g2} = 22.5\ V$ $V_{g1} = -1.05\ V$	$I_a = 0.05$ $I_{g2} = 0.015$	$S = 0.1\ mA/V$ $R_i > 2\ M\Omega$	  Subminiature

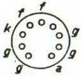
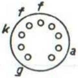
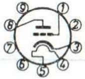
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DF 67 Pentode Typical characteristics A.F.amplifier	$V_f = 0.625V$ $I_f = 13.3mA$	V_a = 22.5 V V_{g2} = 18 V V_{g1} = −1.15 V	I_a = 0.05 I_{g2} = 0.01	S = 0.1 mA/V R_i = 4 MΩ	 Subminiature
		V_b = 22.5 V R_a = 1 MΩ R_{g2} = 3.9 MΩ V_{g1} = 0 V R_{g1} = 10 MΩ R_{g1}' = 5 MΩ	I_a = 0.0117 I_{g2} = 0.0025	g = 31	
DF 70 Pentode Typical characteristics	$V_f = 0.625V$ $I_f = 25$ mA	V_a = 30 V V_{g2} = 30 V V_{g1} = −1.85 V	I_a = 0.05 I_{g2} = 0.018	S = 0.1 mA/V R_i = 2.5 MΩ μ_{g2g1} = 12.5	 Subminiature

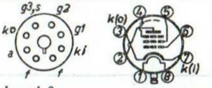
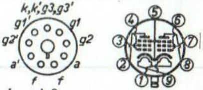
DL 64 Output pentode Typical characteristics	$V_f = 1.25$ V $I_f = 10$ mA	$V_b = 15$ V $V_{g2} = 15$ V $V_{g1} = -1.5$ V	$I_a = 0.16$ $I_{g2} = 0.04$	$S = 0.18$ mA/V $R_i = 0.4$ MΩ $R_a = 100$ kΩ $W_o = 0.95$ mW $W_a = 25$ mW	 Subminiature
DL 65 Output pentode Class A final amplifier	$V_f = 1.25$ V $I_f = 13$ mA	$V_b = V_{g2} = 22.5$ V $R_{g1} = 10$ MΩ $R_k = 0$ Ω	$I_a = 0.34$ $I_{g2} = 0.09$	$S = 0.42$ mA/V $R_i = 0.4$ MΩ $R_a = 0.1$ MΩ $W_o = 1.8$ mW	 Subminiature
		$V_b = V_{g2} = 22.5$ V $R_{g1} = 3$ MΩ $R_k = 4$ kΩ	$I_a = 0.19$ $I_{g2} = 0.07$	$R_a = 0.1$ MΩ $W_o = 1.6$ mW $W_a = 25$ mW	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
DL 66 Output pentode Class A final amplifier	$V_f = 1.25$ V $I_f = 15$ mA	V_b = 22.5 V V_{g2} = 22.5 V V_{g1} = —1.4 V	I_a = 0.30 I_{g2} = 0.075	S = 0.35 mA/V R_i = 0.3 MΩ R_a = 75 kΩ W_o = 2.7 mW	
		V_b = 45 V V_{g2} = 45 V V_{g1} = —3 V	I_a = 0.90 I_{g2} = 0.2	R_a = 50 kΩ W_o = 16.5 mW	
DL 67 Output pentode Class A final amplifier	$V_f = 1.25$ A $I_f = 13$ mA	$V_b = V_{g2}$ = 22.5 V R_{g1} = 10 MΩ R_k = 0 Ω	I_a = 0.34 I_{g2} = 0.09	S = 0.42 mA/V R_i = 0.4 MΩ R_a = 0.1 MΩ W_o = 1.8 mW	
		$V_b = V_{g2}$ = 22.5 V R_{g1} = 3 MΩ R_k = 4 kΩ	I_a = 0.19 I_{g2} = 0.07	R_a = 0.1 MΩ W_o = 1.6 mW W_a = 25 mW	
DL 71 Output pentode Typical characteristics	$V_f = 1.25$ V $I_f = 25$ mA	V_a = 45 V V_{g2} = 45 V V_{g1} = —1.25 V	I_a = 0.6 I_{g2} = 0.15	S = 0.5 mA/V R_i = 0.35 mΩ R_a = 0.1 MΩ W_o = 6 mW W_a = 30 mW	Subminiature
DL 72 Output pentode Typical characteristics	$V_f = 1.25$ V $I_f = 25$ mA	V_a = 45 V V_{g2} = 45 V V_{g1} = —4.5 V	I_a = 1.25 I_{g2} = 0.4	S = 0.5 mA/V R_i = 225 kΩ R_a = 30 kΩ W_o = 23 mW W_a = 60 mW	

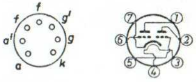
Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
4671 Acorn triode Typical characteristics	V_f = 6.3 V I_f = 0.15 A	V_a = 180 V V_g = —5 V	I_a = 4.5	S = 2 mA/V R_i = 12.5 kΩ μ = 25 freq.=max.430 Mc/s	
4672 Acorn pentode R.F. amplifier	V_f = 6.3 V I_f = 0.15 A	V_a = 250 V V_{g2} = 100 V V_{g1} = —3 V	I_a = 2 I_{g2} = 0.7	S = 1.4 mA/V R_i = 1.5 MΩ C_{ag1} < 7 mpF freq.=max.430 Mc/s	
DC 70 Triode Typical characteristics Oscillator	V_f = 1.25 V I_f = 0.2 A	V_a = 150 V V_g = —4.5 V	I_a = 12	S = 3.4 mA/V R_i = 4 kΩ μ = 14 W_a = 2.4 W	**Subminiature**
		V_a = 150 V	I_k = 20	freq. = 500 Mc/s W_o = 0.45 W	

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EAC 91 Diode triode Typical characteristics	V_f = 6.3 V I_f = 0.3 A	V_a = 200 V V_g = −2.8 V	I_a = 7.5	S = 2.8 mA/V R_i = 12.8 kΩ μ = 36 freq.=max.300Mc/s	 Miniature 
EC 55 Disc seal triode Typical characteristics	V_f = 6.3 V I_f = 0.4 A	V_a = 250 V V_g = −3.5 V	I_a = 20	S = 6 mA/V μ = 30 freq. = max. 3000 Mc/s	
EC 56 Disc seal triode Typical characteristics	V_f = 6.3 V I_f = 0.65 A	V_a = 180 V V_g = −3.5 V	I_a = 30	S = 16 mA/V μ = 35 freq. = max. 4000 Mc/s	 
EC 57 Disc seal triode Typical characteristics	V_f = 6.3 V I_f = 0.65 A	V_a = 180 V V_g = 1.8 V	I_a = 60	S = 19 mA/V μ = 35 freq. = max. 4000 Mc/s	

EC 80 Grounded-grid triode Typical characteristics	$V_f =$ 6.3 V $I_f =$ 0.43 A	$V_a =$ 250 V $V_g =$ −1.5 V	$I_a =$ 15	$S =$ 12 mA/V $\mu =$ 80 freq.=max.750 Mc/s	 Noval 
EC 81 Oscillator triode Typical characteristics	$V_f =$ 6.3 V $I_f =$ 0.2 A	$V_a =$ 150 V $V_g =$ −2 V	$I_a =$ 30	$S =$ 5.5 mA/V $\mu =$ 16 freq.=max.750 Mc/s	 Noval 
EC 91 Grounded-grid triode	see 6 AQ 4				

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
EF 51 Variable mu pentode R.F. or I.F. amplifier	$V_f =$ 6.3 V $I_f =$ 0.35 A	V_a = 250 V V_{g2} = 250 V V_{g1} = −2 V V_{g3} = 0 V	I_a = 14 I_{g2} = 2.6	S = 9.5 mA/V R_i = 0.5 MΩ R_{eq} = 1 kΩ C_{ag1} < 7 mpF freq.=max.150 Mc/s	 Loctal 8 p.
EFF 51 Double pentode Typical characteristics (per system)	$V_f =$ 6.3 V $I_f =$ 0.75 A	V_a = 250 V V_{g2} = 200 V V_{g1} = −2 V	I_a = 6 I_{g2} = 1.2	S = 7.5 mA/V R_i = 0.35 MΩ R_{eq} = 800 Ω C_{ag1} < 0.04 pF freq.=max.150 Mc/s	 Loctal 9 p.

TUBE FOR COMPUTERS

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
E 90 CC Double triode Typical characteristics (per system)	V_f = 6.3 V I_f = 0.4 A	V_a = 100 V V_g = —2.1 V	I_a = 8.5	S = 6 mA/V R_i = 4.5 kΩ μ = 27	
E 92 CC Double triode Typical characteristics (per system)	V_f = 6.3 V I_f = 0.4 A	V_a = 150 V V_g = —1.7 V	I_a = 8.5	S = 6 mA/V R_i = 8.3 kΩ μ = 50	Miniature

CATHODE RAY TUBES

PREFERRED TYPES

PICTURE TUBES

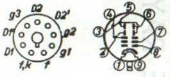
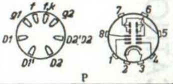
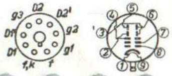
Type of tube		Projection	Direct view	View finder
DIAMETER OF SCREEN	6 cm (2.5″)	**MW 6-2**		
	13 cm (5″)			**MW 13-35**
	36 cm (14″)		**MW 36-44**	
	43 cm (17″)		**MW 43-64**	
	53 cm (21″)		**MW 53-80**	

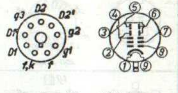
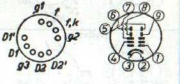
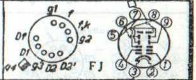
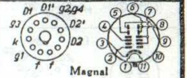
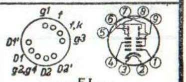
INSTRUMENT AND RADAR TUBES

Screen		Short persistence	Medium persistence	Long persistence	Very long persistence
DIAMETER OF SCREEN	7 cm (3″)	**DB 7-5** **DB 7-6**	**DG 7-5** **DG 7-6**	**DR 7-5** **DR 7-6**	**DP 7-5** **DP 7-6**
	10 cm (4″)	**DB10-2** **DB10-6**	**DG10-2** **DG10-6**	**DR10-2** **DR10-6**	**DP10-2** **DP10-6**
	13 cm (5″)	**DB13-2**	**DG13-2**	**DR13-2**	**DP13-2** **MF13-1**
	31 cm (12″)				**MF31-55**
	41 cm (16″)				**MF41-15**

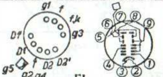
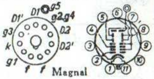
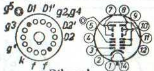
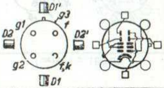
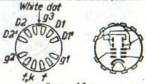
CATHODE-RAY TUBES

INSTRUMENT TUBES

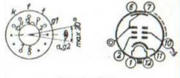
Type	Screen[1])	Deflection system	Heater		Operating characteristics					Sensitivity		Capacitances			Length (excl. pins)		Base connections
	Max. diam. (mm)	Double electro-static	V_f (V)	I_f (A)	V_{g5} (V)	V_{g4} (V)	V_{g3} (V)	V_{g2} (V)	$-V_{g1}$ [2]) (V)	N_1 (mm/V)	N_2 (mm/V)	C_{g1} (pF)	$C_{D_1D_1'}$ (pF)	$C_{D_2D_2'}$ (pF)	max. (mm)	min. (mm)	
DB DG 4-1 DP	44	symmetrical	6.3	0.31			800	200-300	0-50	0.25	0.16	10	0.6	0.8	145	139	 Loctal 9 p. (B9G)
DB DG 4-2 DP	44	D_2D_2' asymmetrical															
DB DG 7-2 DN	71	D_2D_2' asymmetrical	4.0	1.0			800	150-350	0-30	0.22	0.14	7	0.65	2.5	163	151	 P
DB DG 7-3 DR	71	symmetrical	6.3	0.4			800	200-300	0-50	0.25	0.16	9	0.6	0.6	145	139	 [illegible]octal
DB DG 7-4 [illegible]R	71	D_2D_2' asymme- [illegible]											0.5	0.8			

DB DG DP DR 7-5	71	symmetrical	6.3	0.31			800	200-300	0-50	0.25	0.16	10	0.6	0.8	145	139	 Loctal 9 p. (B9G)
DB DG DP DR 7-6	71	D_2D_2' asymmetrical															
DB DG DN 9-3	97.5	D_2D_2' asymmetrical	4.0	1.0			1000	200-400	0-40	0.40	0.31	8	1.1	1.4	327	312	 FJ
DB DG DN 9-4	97.5	symmetrical												1.3			
DB DG DN 9-5	97.5	D_2D_2' asymmetrical with acceleration	4.0	1.0		1000 5000	1000 1000	200-400 230-430	0-40 0-40	0.38 0.18	0.32 0.15	8	1.1	1.4	327	312	 FJ
DB DG DR DP 10-2	97.5	symmetrical	6.3	0.3		2000	400-720	2000	45-100	0.30	0.23	4.6	1.9	2.5	327	312	 Magnal
DB DG DR 10-3	97.5	D_2D_2' asymmetrical	4.0	0.55		1000	200-340	1000	18-46	0.65	0.57	5	1.9	2.6	327	312	 FJ

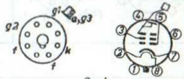
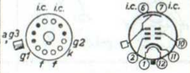
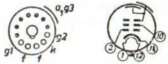
[1]) [2]) See p. 185

Type	Screen[1]) Max. diam. (mm)	Deflection system Double electrostatic	Heater V_f (V)	Heater I_f (A)	Operating characteristics V_{g5} (V)	V_{g4} (V)	V_{g3} (V)	V_{g2} (V)	$-V_{g1}$ (V)	Sensitivity N_1 (mm/V)	N_2 (mm/V)	Capacitances C_{g1} (pF)	$C_{D_1D_1'}$ (pF)	$C_{D_2D_2'}$ (pF)	Length (excl. pins) max (mm)	min. (mm)	Base connections
DB DG DR 10-5	97.5	D_2D_2' asymm. with acceleration	4.0	0.56	1000 2500	1000 1000	200-340 200-340	1000 1000	18-46 18-46	0.65 0.37	0.55 0.32	5	1.9	2.6	327	312	 FJ
DB DG DP DR 10-6	97.5	symm. with acceleration	6.3	0.3	2000 4000	2000 2000	400-720 400-720	2000 2000	45-100 45-100	0.35 0.28	0.27 0.22	4.6	1.9	2.5	327	312	 Magnal
DB DG DP DR 13-2	136	symm. with acceleration	6.3	0.3	2000 4000	2000 2000	400-720 400-720	2000 2000	45-100 45-100	0.47 0.38	0.41 0.33	4.6	1.9	2.5	415	395	 Diheptal
DB DG DN 16-1	167	symmetrical	4.0	1			1000 2000	175-250 350-500	0-20 0-40	0.50 0.25	0.35 0.17	9.5	1.2	2	440	415	
DB DG DN 16-2	167	symmetrical										7.3	2.1	2.7	450	425	 Spec. 12

1) See p. 165

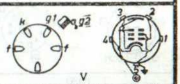
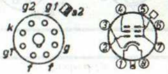
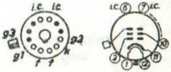
Type	Screen [1])			Deflection system	Heater		Operating characteristics				Capacitances	Length (excl. pins)		Base connections
	Round	Rectangular												
	Useful diam. min. (mm)	Useful diagonal min. (mm)	Useful width min. (mm)	Double magnetic	V_f (V)	I_f (A)	V_{g4} (V)	V_{g3} (V)	V_{g2} (V)	$-V_{g1}$ [2]) (V)	C_g (pF)	max. (mm)	min. (mm)	
MC 13-16	108				6.3	0.3			25000	50-100	6.5	360	342	 Duodecal 7p.

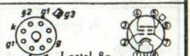
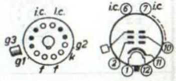
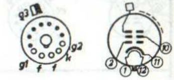
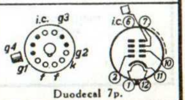
RADAR TUBES

Type	Useful diam. min. (mm)	Useful diagonal min. (mm)	Useful width min. (mm)	Double magnetic	V_f (V)	I_f (A)	V_{g4} (V)	V_{g3} (V)	V_{g2} (V)	$-V_{g1}$ [2]) (V)	C_g (pF)	max. (mm)	min. (mm)	Base connections
MF 13-1	108				6.3	0.3		7000	250	28-63	<10	275	256	 Octal
MF 31-22	287				6.3	0.3		9000	300	32-81	<10	457	441	 Duodecal 7p.
MF 31-55	260				6.3	0.3		12000	300	30-70	<10	506		
MF 41-15	360				6.3	0.3		12000	300	30-70	<10	501		 Duodecal 5p.

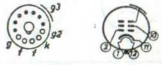
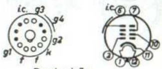
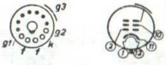
1) 2) See p. 185

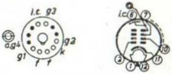
PICTURE TUBES

Type	Screen 1) Round: Useful diam. min. (mm)	Screen 1) Rectangular: Useful diagonal min. (mm)	Screen 1) Rectangular: Useful width min. (mm)	Deflection system: Double magnetic	Heater V_f (V)	Heater I_f (A)	Operating characteristics V_{g4} (V)	V_{g3} (V)	V_{g2} (V)	$-V_{g1}$ 2) (V)	Capacitances C_g (pF)	Length (excl. pins) max. (mm)	Length (excl. pins) min. (mm)	Base connections
MW 6-2 Projection tube	57.5				6.3	0.3			25000	40-90	6.3	268	256	 V
MW 13-35	Viewfinder: = MF 13-1 with W-screen													
MW 22-7	= MW 22-17 with different base and $I_f = 0.6$ A													
MW 22-14	= MW 22-17 with different base													Loctal 8p.
MW 22-16	214			with ion trap type 55400	6.3	0.3		7000 7000 9000 9000	160 200 160 200	20-50 25-60 20-50 25-60	8	366	350	
MW 22-17	= MW 22-16 without ion trap and outer coating													
MW 22-18	= MW 22-16 without ion trap													Duodecal 7p.

MW 31-7	= MW 31-17 with different base and I_f = 0.6 A											457	441	
MW 31-14	= MW 31-17 with different base											457	441	 Loctal 8p.
MW 31-16	287			with ion trap type 55400	6.3	0.3		7000 7000 9000 9000	160 200 160 200	20-50 25-60 20-50 25-60	8	457	441	
MW 31-17	= MW 31-16 without ion trap and outer coating													
MW 31-18	= MW 31-16 without ion trap													
MW 31-74	= MW 31-16 with filter glass													Duodecal 7p.
MW 36-22		318	288	with ion trap type 55402	6.3	0.3		10000	250	33-72	6	416	395	
MW 36-24	= MW 36-22 with filter glass													Duodecal 5p.
MW 36-44		318	288	with ion trap type 55402	6.3	0.3	12000	0-250	250	33-72	7	416	395	 Duodecal 7p.

[1]) [2]) See p. 185

Type	Screen [1] Round: Useful diam. min. (mm)	Screen [1] Rectangular: Useful diagonal min. (mm)	Screen [1] Rectangular: Useful width min. (mm)	Deflection system: Double magnetic	Heater V_f (V)	Heater I_f (A)	Operating characteristics V_{g4} (V)	Operating characteristics V_{g3} (V)	Operating characteristics V_{g2} (V)	Operating characteristics $-V_{g1}$ [2] (V)	Capacitances C_g (pF)	Length (excl. pins) max. (mm)	Length (excl. pins) min. (mm)	Base connections
MW 41-1	365			with ion trap type 55402	6.3	0.3		12000	250	33-72	6	446		 Duodecal 5p.
MW 43-43		388	365	with ion trap type 55402	6.3	0.3	14000	0-250	300	40-86	7	469		 Duodecal 7p.
MW 43-43/02		388	365	with ion trap type 55402	6.3	0.6		14000	300	33-77	7	469		 Duodecal 5p.
MW 43-64	= 43-43 with glass envelope											477	457	

MW 53-20		511	485	with ion trap type 55402	6.3	0.3	16000	0-300	300	40-80	7	574	554	 Duodecal 7p.
MW 53-80		511	482	with ion trap type 55402	6.3	0.3	16000	0-300	300	40-80	7	504	484	

[1]) The second letter of the typenumber indicates the colour of the luminescent screen:

B = blue, short persistence
F = orange, very long persistence
G = green, medium persistence
N = green, long persistence

P = double layer screen. Blue of short persistence followed by greenish yellow of long persistence
R = greenish-yellow, long persistence
W = white, medium persistence

[2]) Grid voltage for visual cutt-off

TRANSMITTING TUBES

Type of tube	QQE 03/12 Tetrode (6360)	QQC 04/15 Double Tetrode (5895)	QQE 03/20 Double Tetrode (6252)	QE 05/40* Tetrode (6146)	QQE 06/40 Double Tetrode (5894)	QEL 1/150 Tetrode (4× 150A)	PE 1/100 Pentode (6083)	TB 2.5/300 Triode (5866)	QB 3/300 Tetrode (6155)	TBL 2/300* Triode
TUBE OUTPUT IN CLASS C TELEGRAPHY AT:	(W)	(W)	(W)	(W)	(W)	(W)	(W)	(W)	(W)	(W)
2 Mc/s	14.5 18.5■	26.6 35	48	52 69	90	195	132	390	375	500
20 Mc/s	14.5 18.5■	26.6 35	48	52 69	90	195	132	390	375	500
30 Mc/s	14.5 18.5■	26.6 35	48	52 69	90	195	132	390	375	500
60 Mc/s	14.5 18.5■	26.6 35	48	52 69	90	195	132	390	375	500
100 Mc/s	14.5 18.5	26.6 35	48	40 53	90	195		390	375	480
120 Mc/s	14.5 18.5■	26.6 35	48	35 47	90	195		390	375	475
150 Mc/s	14.5 18.5■	26.6 35	48	29 40	90	195		390	360	465
200 Mc/s	14.5 18.5■	20 24	48		90	185		197	225	445
300 Mc/s		6.5 8	34.5		75	170				400
430 Mc/s			23		66	155				350
500 Mc/s			22		60	140				325
600 Mc/s			20							290
890 Mc/s										180

■ Intermittent

● Aircooled TAL 12/10

□ Watercooled TAW 12/10

* See p. 200

TYPES

TUBES

TB 3/750 Triode (5867)	QB3.5/750 Tetrode (6156)	TB 4/1250 Triode (5868)	QB 5/1750 Tetrode (6079)	QBL 5/3500 QBW5/3500 Tetrode (6076)(6075)	TBL 6/6000 TBW6/6000 Triode (5924)(5923)	TAL 12/10 TAW12/10 Triode	TAL 12/20 TAW12/20 Triode	TBL12/25* TBW12/25 Triode (6618)(6617)	TAL 12/35 TAW12/35G Triode	TBL 12/100 TBW12/100 Triode (6078)(6077)
(W)	(W)	(W)	(W)	(W)	(kW)	(kW)	(kW)	(kW)	(kW)	(kW)
840	1000	1690	1760	4.1	6.9	10.5● 15 □	22	28	48.5	108
840	1000	1690	1760	4.1	6.9	10.5● 12 □	22	28	48.5	95
840	1000	1690	1760	4.1	6.9	10 ● 11 □	18	28	39	50
840	1000	1690	1760	4.1	6.9	5 ● 5 □				
840	750	1690	1300	3.95	5.7					
600	500	1125		3.7	5.0					
				3.3	4.1					
				2.81	2.8					

HIGH-TENSION RECTIFYING TUBES

	Max. D.C. output current	0.25 A	1.25 A	1.5 A	2.5 A	3 A	15 A
MAX. PEAK INVERSE VOLTAGE	3 kV	DCG 1/250					
	10 kV	DCG 4/1000G (866 A) DCX 4/1000 (3B28)	DCX 4/5000 (4B32)				
	13 kV			DCG 5/5000GB (872A)			
	15 kV					DCG 6/18 (6693)	DCG7/100[1] DCG7/100B[1] (6786)
	21 kV				DCG 9/20 (6508)		
	27 kV				DCG 12/30 (5870)[1]		

[1] Grid controlled

Type	V_f (V)	I_f (A)	V_a max. (V)	V_{g2} max. (V)	W_a max. (W)	Full ratings: Max. freq. (Mc/s)	Full ratings: W_o (W)	Full ratings: η (%)	Operation
MAW 12/15	21.5	79	12000	—	15000	— —	1 950 42 000	16 66	A mod. B mod.[1])
PAL 12/15	22	80	12000	2 000	8000	20 20 20 20	13 000 4 000 2 900 7 500	62 33 37 70	C telegr. B teleph. C g_2g_3 mod. C ag_2 mod.
PAW 12/15	22	80	12000	2 000	12000	20 20 20 20	15 900 3 500 2 900 7 500	61 33 37 70	C telegr. B teleph. C g_2g_3 mod. C ag_2 mod
PB 2/200	12	3.35	2000	400	110	20 20 20 20 20 —	270 45 147 124 43 400	71 29 72 69 32 70	C telegr. B teleph. C ag_2 mod. C an. mod. C g_3 mod. B mod.[1])
PB 2/500	12	7.3	2 500	500	250	10 20 10 20 —	600 90 325 100 1 000	70 26 69 28 70	C telegr. B teleph. C ag_2 mod. C g_3 mod. B mod.[1])
PB 3/800	12	8.5	3000	600	450	10 10 10 10 —	1 200 190 580 200 1 600	72 30 71 35 69	C telegr.[1]) B teleph. C ag_2 mod. C g_3 mod. B mod.[1])
PE 04/10E	12	0.65	500	300	10	20 20 20 20	15 4 10 2	60 31 62 33	C telegr. B teleph. C ag_2 mod. C g_3 mod.
PE 05/25	12.6	0.7	500	300	12	100 100 100 55/165	33 6 20 9	73 33 71 43	C telegr. B teleph. C ag_2 mod. C freq. mult.

[1]) Two tubes ☆ [2]) $V_{g2} = V_{g3}$.

Reduced ratings			Base Socket	Accessories		Dimensions	
Freq. (Mc/s)	W_o (W)	η (%)		Typenumber	Description	max. diam. (mm)	max. length (mm)
— —	2700 —	22 —	— —	K 707 40614 40632 (2×) 62 960 53 62 961 23(2×)	Water jacket Grid bracket Protective cap for grid seal Rubber washer Rubber washer	104	811
50 50 50 50	— — — —	— — — —	— —	K 500 40602 40632 (6×)	Housing Supporting ring Protective cap for grid and filament seals	234	525
50 50 50 50	— — — —	— — — —	— —	K 710 K 712 40607 40632(6×) Z4 287 46 62 960 81	Water jacket Filter Key Protective cap for grid and filament seals Rubber washer Rubber washer	140	541
60 60 60 60 60 —	152 35 77 75 32 —	58 25 51 50 24 —	Spec. 7p. 40207	40600 (2×)	Clip	53	167
60 60 60 60	312 50 175 45	55 22 51 22	Special 40200	40600 (2×)	Clip	82	276
60 60 — — —	488 67 — — —	55 21 — — —	Special 40201	40626 (2×)	Clip	106	293
60 60 60 60	10 2 6.3 1.8	50 17 49 20	Medium 7 p. 40220	28 9060 22	Cap	51	150
167 — — —	15 — — —	55 — — —	Spec. 8p. 40210/02	—		37.6	104

Type	V_f (V)	I_f (A)	V_a max. (V)	V_{g2} max. (V)	W_a max. (W)	Full ratings: Max. freq. (Mc/s)	Full ratings: W_o (W)	Full ratings: η (%)	Operation
PE 06/40 E **PE 06/40 N** **PE 06/4- P**	12.6 6.3 6.3	0.65 1.3 1.3	600	300	25	20 20 20 2/4 —	45 11 40 27 100	69 31 70 52 71	C telegr. B teleph. C ag_2 mod. C freq.mult. B mod.[1]
PE 1/100	12.6	1.35	1000	300	45	60 60 60 60 —	132 23 75 27 194	74 34 78 37 72	C telegr. B teleph. C ag_2 mod. C g_3 mod. B mod.[1][2]
QB 2/250	10	5	2250	1100	100	30 30 30 —	275 50 180 515	76 33 70 73	C telegr. B teleph. C ag_2 mod. B mod.[1]
QB 3/300	5	6.5	3000	600	125	120 120 120 —	375 58 300 550	75 32 79 72	C telegr. B teleph. C ag_2 mod. B mod.[1]
QB 3.5/750	5	14.1	4000	600 1000[6]	250	75 75 75 —	1 000 126 510 1 240	80 33 75 75	C telegr. B teleph. C ag_2 mod. B mod.[1][6]
QB 5/1750	10	9.9	5000	1000	500	60 60 —	1 760 1 200 2 220	80 79 76	C telegr. C ag_2 mod. B mod.[1]
QBL 5/3500 **QBW 5/3500**	6.3	32.5	5000	800	3 000	75 110	4 100 2 700	74 75	C telegr. C ag_2 mod.
QE 04/10	6.3	0.6	300	250	7.5	60 75/150 50/150 60	8 2.3 1.5 5.8	62 25 19 60	C telegr. C freq. mult. C freq. mult. C ag_2 mod.
QE 06/50	6.3	0.9	600	300	25	60 60 60 —	40 12.5 27.5 80	67 33 70 67	C telegr. B teleph. C ag_2 mod. B mod.[1]
QEL 1/150	6	2.6	1250	300	150	165 — 165	195 425 140	78 72 70	C telegr. B mod. C ag_2 mod.
QQC 04/15	6.3	0.68	600	250	2×6 2×8[3]	186 186 93/186 62/186 —	33.6 7.8 8 10 16	70 59 50 38 63	C telegr.[3] C ag mod.[3] C freq.mult.[3][4] C freq.mult.[3] B mod.
QQE 03/12	6.3 12.6	0.82 0.41	300	200	2×5 2×7[3]	200 66.6/200 200	18.5 7.8 9.8	62 40 57	C telegr.[3] C freq.mult.[3] C ag_2 mod.[3]
QQE 03/20	6.3 12.6	1.3 0.65	600	250	2×10	200 66.6/200 200	48 10 31	80 37 77	C telegr. C freq. mult. C ag_2 mod.
QQE 04/20	6.3 12.6	1.6 0.8	750	250	2×7.5	200 200	26 17	72 79	C telegr. C ag_2 mod.
QQE 06/40	6.3 12.6	1.8 0.9	750	250	2×20	200 200 50/150 —	90 50 20 86	75 73 33 71	C telegr. C ag_2 mod. C freq.mult. B mod.

1) Two tubes. 2) $I_{g1} = 0$. 3) Intermittent operation. 4) Per system. 5) In water jacket.
6) A.F. operation as cathode follower. Bottompinseal temp. max. 120° C.

Reduced ratings			Base	Accessories		Dimensions	
Freq. (Mc/s)	W_o (W)	η (%)	Socket	Typenumber	Description	max. diam. (mm)	max. length (mm)
60	36	62	Medium 7p. 40220	28 906 022	Cap	51	146
60 60	6.5 20	20 55	Medium 5p. 40219	28 906 022	Cap	51	146
— —	— —	— —	P 5900/02	28 906 022	Cap	51	134
— — — —	— — — —	— — — —	Septar 40202	—		47	110
120 120 120 —	126 34 80 —	70 30 67 —	Giant 7p.	40619	Cap	66	192
200 — — —	225 — — —	65 — — —	Giant 5p. 40211/01	40624	Clip	62	130
120 — — —	500 — — —	67 — — —	Giant 5p. 40211/01	40624	Clip	87	151
100 — —	1300 — —	72 — —	Super Giant 40216	40626	Clip	118	209
220	2900	69	—	40622 40634 (4×) 40635	Grid connector Filament clip Insulating collar	92	196
			—	K 713 40622 40631 40634 (4×)	Water jacket Grid connector Key Filament clip	70	240
175 — — —	5.4 — — —	42 — — —	Loctal 9p. 40212	—		38	78
125 125 125 —	20 8 14 —	60 30 65 —	Medium 5p. 40219	28 906 022	Cap	51	146
						42	63
300 — — —	8 — — —	34 — — —	Loctal 8p. 40213	—		32	100
—	—	—	Noval 5908/36	40647	Tube retainer	22	78
600 133.3/400 400	20 8 13	50 30 54	Septar 40202	40623	Clip	46	86
250 —	17 —	53 —	Septar 40202	40615 (2×)	Clip	51	84
500 — 75/225 —	60 — 12 —	60 — 23 —	Septar 40202	40623 (2×)	Clip	49	110

Type	V_f (V)	I_f (A)	V_a max. (V)	W_a max. (W)	Full ratings: Max. freq. (Mc/s)	Full ratings: W_a (W)	Full ratings: η (%)	Operation
TA 4/800	23	14.7	4000	500	2 2 2 50	1 530 260 710 510	76 34 76 72	C telegr. B teleph. C an. mod. C osc.[2])
TA 18/100	33	207	20 000	70 000	2 2 2	130 000 31 000 38 000	72 36 70	C telegr. B teleph. C an. mod.
TA 20/250	35	420	20 000	130 000	2 2 2	250 000 60 000 65 000	76 32 64	C telegr. B teleph. C an. mod.
TAL 12/10	22	2×38	12 000	4 000	5 5 5 —	10 500 2 000 7 700 17 000	72 33 77 75	C telegr. B teleph. C an. mod. B mod.[1])
TAL 12/20	21.5	78	12 000	18 000	28 28 28 —	22 000 5 000 9 500 42 000	68 27 68 72	C telegr. B teleph. C an. mod. B mod.[1])
TAL 12/35	28.3	3×48.5	15 000	18 000	— 20 20 20	48 500 9 000 27 000 80 000	77 33 77 74	C telegr. B teleph. C an. mod. B mod.[1])
TAW 12/10	22	2×38	12 000	7 500	5 5 5 —	15 000 3 700 7 700 30 000	73 33 77 73	C telegr. B teleph. C an. mod. B mod.[1])
TAW 12/20	21.5	78	12 000	18 000	28 28 28 —	22 000 5 000 9 5000 42 000	68 27 68 72	C telegr. B teleph. C an. mod. B mod.[1])
TAW 12/35 G	28.3	3×48.5	15 000	30 000	20 20 20 —	48 500 9 000 27 000 107 000	77 33 77 74	C telegr. B teleph. C an. mod. B mod.[1])
TB 1/60 A **TB 1/60 G**	7.5	3.25	1 250	50	60 60 60 —	70 20 58 110	58 28 64 69	C telegr. B teleph. C an. mod. B mod.[1])

[1]) Two tubes. [2]) Diathermy operation. [3]) In housing or jacket.

Reduced ratings			Base Socket	Accessories		Dimensions	
Freq. (Mc/s)	W_o (W)	η (%)		Typenumber	Description	max. diam. (mm)	max. length (mm)
— — — —	— — — —	— — — —	— —	—		118	306
— — —	— — —	— — —	—	K 708 K 709	Water jacket Water jacket for grid connection (freq. $>$ 3Mc/s)	330	1333
20 20 20	125 000 40 000 56 000	65 30 66	—	40610 (3×) 62 960 76 62 961 25 (2×)	Protective cap for grid seal Rubber washer Rubber washer	330	1393
20 20 20 —	10 500 2 000 6 000 —	72 33 75 —	—	K 501 or 40603 40604 (2×) 40632 (2×)	Foot Supporting ring Filament bracket Protective cap for grid seal	194	471
— — — —	— — — —	— — — —	—	K 503/01 40614 40632 (2×)	Housing with canalized outlet Grid backet Protective cap for grid and filament seals	226	730
37.5 — 27 —	26 000 — 26 000 —	62 — 74 —	—	K 505 40606 40632 (6×)	Housing Filament bracket Protective cap for grid and filament seals	226	618
75 20 20 —	3 500 3 300 6 000 —	51 33 75 —	—	K 700 40604 40632 RI 366 43 62 960 81 (2×)	Water jacket Filament bracket Protective cap for grid seal Rubber washer Rubber washer	194	495[3])
— — — —	— — — —	— — — —	—	K 707 40614 40632 (2×) RI 367 50 62 960 53 62 960 81 (2×) 62 961 23	Water jacket Grid bracket Protective cap for grid seal Contact washer Rubber washer Rubber washer Rubber washer	226	730 811[3])
37.5 — 27 —	26 000 — 26 000 —	62 — 74 —	—	K 715 40606 40632 (6×) 89 039 63	Water jacket ("grip-o-matic") Filament bracket Protective cap for grid and filament seals Rubber washer	226	650 720[3])
300 —	18 —	27 —	A 40465	—		72	174
— —	— —	— —	Medium 4p. 40218/03	—			

Type	V_f (V)	I_f (A)	V_a max. (V)	W_a max. (W)	Full ratings: Max. freq. (Mc/s)	Full ratings: W_o (W)	Full ratings: η (%)	Operation
TB 2/200	12	2.7	2 000	130	46 46 46 —	275 60 160 540	72 31 74 75	C telegr. B teleph. C an. mod. B mod.[1])
TB 2/500	12	7.3	2 000	300	20 20 20 —	635 124 430 900	68 29 71 71	C telegr. B teleph. C an. mod. B mod.[1])
TB 2.5/300	6.3	5.4	2 500	135	150 150 150 —	390 65 204 700	76 34 80 78	C telegr. B teleph. C. an. mod. B mod.[1])
TB 3/750	5	14.1	3 000	250	100 100 100 —	840 140 482 1 280	77 36 77 75	C telegr. B teleph. C an. mod. B mod.[1])
TB 3/1000	12	8.5	3 000	500	20 20 20 —	1 200 200 720 1 750	72 30 72 68	C telegr. B teleph. C an. mod. B mod.[1])
TB 3/2000	12	17	3 500	1 100	2 2 2 —	2 900 600 1 625 3 300	72 35 75 66	C telegr. B teleph. C an. mod. B mod.[1])
TB 4/1250	10	9.9	4 000	450	100 100 —	1 690 1 053 2 290	79 78 77	C telegr. C an. mod. B mod.[1])
TBL 6/6000	12.6	33	6 000	5 000	75 75 75 —	6 900 1 900 4 700 13 300	76 32 78 74	C telegr. B teleph. C an. mod. B mod.[1])
TBL 12/100	17.5	196	15 000	45 000	15 15 —	108 000 80 000 202 000	75 76 70	C telegr. C an. mod. B mod.[1])
TBW 6/6000	12.6	33	6 000	6 000	75 75 75 —	6 900 1 900 4 700 13 300	76 32 78 74	C telegr. B teleph. C an. mod. B mod.[1])
TBW 12/25	8	100	13 000	25 000	30	28 000	73	Industr. osc.
TBW 12/100	17.5	196	15 000	50 000[2])	15 15 15 —	108 000 51 500 80 000 202 000	75 35 76 70	C telegr. B teleph. C an. mod. B mod.[1])

[1]) Two tubes. [2]) For B teleph. 100 kW. [3]) In housing or jacket.

Reduced ratings			Base Socket	Accessories		Dimensions	
Freq. (Mc/s)	W_o (W)	η (%)		Typenumber	Description	max. diam. (mm)	max. length (mm)
100 60 60 —	140 47 85 —	57 30 59 —	Spec. 2p. 40206	40600 (2×) 40608	Clip Key	63	174
150 — — —	250 — — —	46 — — —	Spec. 2p. 40204	40608 40626	Key Clip	86	243
200 — — —	200 — — —	57 — — —	Giant 5p. 40211/01	40624	Clip	62	132
143 — — —	425 — — —	61 — — —	Giant 5p. 40211/01	40624	Clip	87	151
75 — 60 —	450 — 562 —	37 — 72 —	Spec. 2p. 40204	40608 40626 (2×)	Key Clip	106	262
20 20 20 —	2 600 520 1 300 —	70 32 74 —	Spec. 2p. 40205	40608 40626 (2×)	Key Clip	154	334
120 — — —	1 125 — — —	71 — — —	Super Giant 40216	40626	Clip	118	213
220 — — —	2 500 — — —	50 — — —	—	40622 40630 40634 (3×)	Grid connector Insulating collar Clip	122.6	195
27.5 27.5 —	75 000 58 000 —	75 78 —	—	K 506 40628 (6×)	Housing Filament clip	286 510[3])	635 1130[3])
220 — —	2 500 — —	50 — —	—	K 713 40622 40631 40634 (3×) R1 15 811	Water jacket Grid connector Key Filament clip Rubber washer	70.5	192 260[3])
				K 717 40644 (2×) 40643	Cooling jacket Grid ring Filament connector	160[3])	425[3])
27.5 — 27.5 —	75 000 — 58 000 —	75 — 78 —	—	K 714 40628 (6×) 89 039 63	Water jacket Filament clip Rubber washer	240	620 710[3])

RECTIFYING TUBES FOR

Type	V_f (V)	I_f (A)	$V_{a\,invp}$ (kV)	I_a max. (A)	Circuit: Number of secondary phases	Circuit: Rectification	Number of tubes
DCG 1/250	4	2.5	3	0.25	2 3 3	half wave half wave full wave	2 3 6
DCG 1.5/250	4	2.5	4.25	0.25	2 3 3	half wave half wave full wave	2 3 6
DCG 4/1000 ED **DCG 4/1000 G**	2.5	4.8	10	0.25	2 3 3	half wave half wave full wave	2 3 6
DCG 4/5000	4	7	13	1.25	2 3 3	half wave half wave full wave	2 3 6
DCG 5/30	5	30	13	6	2 3 3	half wave half wave full wave	2 3 6
DCG 5/500 EG **DCG 5/5000 GB**	5	7	13	1.5	2 3 3	half wave half wave full wave	2 3 6
DCG 6/6000	5	6.5	13	1	2 3 3	half wave half wave full wave	2 3 6
DCG 7/100	5	20	15	10	2 3 3	half wave half wave full wave	2 3 6
DCG 9/20	5	12.5	21	2.5	2 3 3	half wave half wave full wave	2 3 6
DCG 12/30	5	13.5	27	2.5	2 3 3	half wave half wave full wave	2 3 6
DCX 4/1000	2.5	5	10	0.25	2 3 3	half wave half wave full wave	2 3 6
DCX 45/000	5	7.1	10	1.25	2 3 3	half wave half wave full wave	2 3 6

V_{tr} (kV)	V_o (kV)	I_o (A)	W_o tot. (kW)	Base Socket	Accessories: Typenumber	Accessories: Description	Dimensions: max. diam. (mm)	Dimensions: max. length (mm)
1.1 1.2 2.1	0.96 1.4 2.8	0.5 0.75 0.75	0.48 1.1 2.2	A 40465	—		48	115
1.5 1.7 3.0	1.3 2.0 4.1	0.5 0.75 0.75	0.7 1.5 3.0	A 40465	—		47	138
3.5 4.1 7.1	3.2 4.8 9.6	0.5 0.75 0.75	1.6 3.6 7.2	Edison E3 000 22	—		49	147
				Medium 4p. 40218/03	40619	Cap	49	157
4.6 5.3 9.2	4.1 6.2 12.4	2.5 3.75 3.75	10.3 23.3 46.6	Goliath 65909BG/01	40619	Cap	53	225
4.6 5.3 9.2	4.1 6.2 12.4	12 18 18	50 112 224	—	40612 08 281 72	Anode cap Plug pin for grid connection	225	581
4.6 5.3 9.7	4.1 6.2 12.4	3 4.5 4.5	12.4 27.9 55.8	Goliath 65909BG/01	40619	Cap	52	235
				Jumbo 4p. 40408	40619	Cap	52	213
4.6 5.3 9.2	4.1 6.2 12.4	2 3 3	8.3 18.6 37.2	Jumbo 4p. 40408	40616	Anode cap	120	232
5.3 6.1 10.6	4.8 7.2 14.4	20 30 30	96 216 432	Spec. 4p. 40409	40620	20 mm Cap M8-screw	117	417
7.4 8.6 14.8	6.7 10.0 20.0	5 7.5 7.5	34 75 150	Spec. 3p. 40209	40616 40620	Anode cap Cap	120	381
9.5 11 19.1	8.6 12.9 25.8	5 7.5 7.5	43 97 194	Spec. 3p. 40209	40616 40620	Anode cap Cap	120	384
3.5 4.1 7.1	3.2 4.8 9.6	0.5 0.75 0.75	1.6 3.6 7.2	Medium 4p. 40218/03	40619	Cap	53	156
3.5 4.1 7.1	3.2 4.8 9.6	2.5 3.75 3.75	8 18 36	Jumbo 4p. 40408	40619	Cap	59	216

TRANSMITTING

Type	V_f (V)	I_f (A)	V_a max. (V)	V_{g2} max. (V)	W_a max. (W)	Full ratings: Max. freq. (Mc/s)	Full ratings: W_o (W)	Full ratings: η (%)	Operation
QE 05/40	6.3	1.25	600	250	20 25²)	60 60 —	69 52 90	76 76 72	C telegr.²) C ag_2 mod.²) B mod.¹)
TBL 2/300	3.4	19.5	2500	—	300	200	440	72	C telegr.
TBL 12/25	8	100	13000	—	15000	30	28000	73	Industr. osc.

RECTIFYING TUBES FOR

Type	V_f (V)	I_f (A)	$V_{a\,invp}$ (kV)	I_o max. (A)	Circuit: Number of secondary phases	Circuit: Rectification	Number of tubes
DCG 6/18	5	11.5	15	3	2 3 3	half wave half wave full wave	2 3 6
DCG 7/100B	5	20	15	10	2 3 3	half wave half wave full wave	2 3 6

¹) Two tubes. ²) Intermittent operation.

TUBES

Reduced ratings			Base Socket	Accessories		Dimensions	
Freq. (Mc/s)	W_o (W)	η (%)		Typenumber	Description	max. diam. (mm)	max. length (mm)
175	35	58	Octal 8 p.			44	97
890	180	37	Coaxial			41.3	69
				40644 40643 (2×)	Grid ring Filament connector	260	350

TRANSMITTING PURPOSES

V_{tr} (kV)	V_o (kV)	I_o (A)	W_o tot. (kW)	Base Socket	Accessories		Dimensions	
					Typenumber	Description	max. diam. (mm)	max. length (mm)
5.3 6.1 10.6	4.8 7.2 14.4	6 9 9	28.8 64.8 129.6	super jumbo 4 p. 40403	40619	Medium cap. M6 screw	72	308
5.3 6.1 10.6	4.8 7.2 14.4	20 30 30	95 215 432		40620	20 mm cap M8 screw	117	387

INDUSTRIAL TUBES

PREFERRED TYPES

IGNITRONS

	Single phase welding service		
Type	PL 5551	PL 5552	PL 5555
Max. Demand Power	600 kVA	1200 kVA	2400 kVA
Max. RMS Line Voltage	600 V	600 V	2400 V

	Three phase welding service			
Type	PL 5551		PL 5822	
Max. Peak Anode Volt.	1200 V	1500 V	1200 V	1500 V
Max. Peak Anode Current	600 A	480 A	1500 A	1200 A

Rectifier service		
Type	PL 5555	
Peak Anode Voltage	900 V	2100 V
Peak Anode Current	1800 A	1200 A
Average Anode Current	200 A	150 A

INDUSTRIAL RECTIFYING TUBES

Max. D.C. output current per tube		Double-anode types								
		1.3 A	2 A	3 A	4 A	6 A	15 A	25 A	50 A	60 A
MAX. A.C. ANODE VOLTAGE	28 V	**328**								
	45 V			**1119**		**367**				
	55 V									**1069K[1])**
	60 V	**1010**	**1110**			**1048**	**1039**	**1049**		
	115 V						**1838**	**1849**	**1859**	
	150 V	**1725A**		**1710**						
	275 V				**1173[2])**	**1174[2])**	**1176[2])**	**1177[2])**		

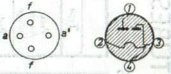
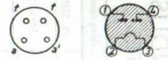
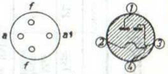
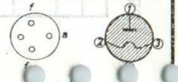
[1]) To be used only for D.C. arc welding apparatus. [2]) Single-anode types.

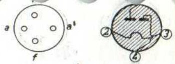
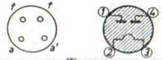
THYRATRONS

Max. D.C. output current		Mercury and rare gas								Hydrogen		
		0.1 A	0.5 A	2.5 A	3.2 A	6.4 A	12.5 A	15 A	25 A	35 A[1])	90 A[1])	325 A[1])
MAX. FORWARD PEAK ANODE VOLTAGE	240 V							**PL 150**				
	650 V	**PL21**	**PL 1607**									
	1000 V			**PL57**								
	1500 V				**PL 5544**	**PL 5545**	**PL 255**		**PL 260**			
	2500 V		**PL 17**			**PL 105**						
	3000 V									**3C45**		
	8000 V										**4C35**	
	16000 V											**5C22**

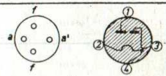
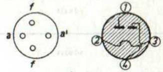
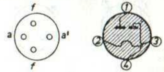
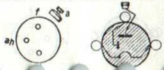
[1]) Max. peak anode current

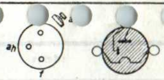
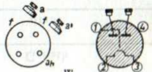
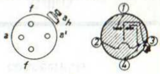
INDUSTRIAL RECTIFYING TUBES

Type	m	Filament data		Voltages		Currents		Typical characteristics			Dimensions		Base connections
		V_f (V)	I_f (A)	V_{tr} max. (V)	V_{invp} max. (V)	I_a max. (A)	I_{ap} max. (A)	R_t min. (Ω)	V_{ign} max. (V)	V_{arc} (V)	Diam. max. (mm)	Height max. (mm)	
328	2	1.9	3.0	28	90	0.65	4	3	16	7	33	112	 A
354	1	1.9	5.5	20 130	65 400	2 0.25	10 1.25	4 50	16	8	62	125	Edison
367	2	1.9	8.0	45	140	3	18	1	16	9	81	170	 W
451	2	1.9	2.8	16	50	0.65	4	3	11	7	33	112	 A
1002	1	1.9	2.8	160	500	0.1	0.6	15	16	7	39	121	 A

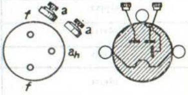
1010	2	1.9	3.5	60	185	0.65	4	10	16	9	37	120	 A
1037	2	1.9	11	60	185	3	18	1.75	16	9	85	240	Goliath
1039	2	1.9	20	60	185	7.5	45	0.75	16	9	94	264	Goliath
1048	2	1.9	7	60	185	3	18	1.75	16	9	81	170	 W
1049	2	1.9	28.5	60	185	12.5	75	0.3	16	9	101	280	straps
1053	2	1.9	45	48	150	12.5	75	0.25	16	9	101	287	straps
1054	2	1.9	68	48	150	20	120	0.18	16	9	111	350	straps
1059	2	1.9	40	60	185	20	120	0.2	11	9	111	350	straps
1063A	3	1.9	11	250	770	2	12	—	—	15	175	255	Edison
1069K [1]	2	3.25	70	55	170	30 [2]	200	0.12	16	10	114	365	straps

[1]) For welding equipment. [2]) With fan cooling.

Type	m	Filament data		Voltages		Currents		Typical characteristics			Dimensions		Base connections
		V_f	I_f	V_{tr} max.	V_{invp} max.	I_a max.	I_{ap} max.	R_t min.	V_{ign} max.	V_{arc}	Diam. max.	Height max.	
		(V)	(A)	(V)	(V)	(A)	(A)	(Ω)	(V)	(V)	(mm)	(mm)	
1089	2	1.9	11	60	185	5	30	1.2	11	9	94	259	Goliath
1110	2	1.9	3.5	60	185	0.85	5	4	16	9	39	131	 A
1119	2	1.9	5.8	45	140	1.5	9	1.8	16	9	71	124	 A
1129	2	1.9	5.5	60	185	1.5	9	2.5	16	9	71	140	 A
1138	1	2.5	27	85	275	15	85	0.3	16	10	115	269	Goliath
1163	1	2.25	17	130	375	6	36	0.5	16	9	83	178	Goliath
1164	1	2.5	25	80	225	15	90	0.3	16	9	98	220	Goliath
1173	1	1.9	13	275 220	850 685	4	20 24	0.75	22[1])	12	62	189	 Spec. [illegible]p.

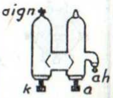
1174	1	1.9	12	275 220	850 685	6	30 36	0.5	22 ¹)	12	77	218	 Spec. 3p.
1176	1	1.9	28	275 220	850 685	15	75 90	0.2	22 ¹)	12	92	301	straps
1177	1	1.9	60	275 220	850 685	25	135 150	0.1	28 ¹)	12	128	362	straps
1533	3	1.9	23	275	850	5	45	0.6	45 ²)	15	192	270	straps
1534	2	1.9	23	275	850	7.5	45	—	45 ²)	15	197	270	straps
1543	3	1.9	36	275	850	8.3	70	0.4	50 ²)	15	207	265	cables
1544	2	1.9	36	275	850	12,5	70	—	50 ²)	15	242	278	cables
1553	3	1.9	70	275	850	13,3	135	0.25	50 ²)	15	297	355	cables
1554	2	1.9	70	275	850	20	135	—	50 ²)	15	317	355	cables
1564	2	1.9	70	275	850	30	135	—	50 ²)	15	372	390	cables
1710	2	1.9	7	150	470	1.5	9	2.5	22 ³)	10	69.5	205	 W
1725A	2	1.9	3.5	150	470	0.65	4	5	22 ³)	10	71	135	 A

¹) With auxiliary ignition unit type 1289 (40 V, 10 mA). ²) With auxiliary ignition unit type E3 108 03 (100 V, 25 mA).
³) Screen connected with filament via a resistor of 10000 Ω, 0.5 W.

Type	m	Filament data		Voltages		Currents		Typical characteristics			Dimensions		Base connections
		V_f (V)	I_f (A)	V_{tr} max. (V)	V_{invp} max. (V)	I_a max. (A)	I_{ap} max. (A)	R_t min. (Ω)	V_{ign} max. (V)	V_{arc} (V)	Diam. max. (mm)	Height max. (mm)	
1729	2	1.9	8	95	300	3	18	0.4	30 [1]	10	81	240	Goliath
1738	2	1.9	18	95	300	7.5	45	0.2	20	9	94	284	Goliath
1749A	2	1.9	25	95	300	12.5	75	0.1	22	10	101	290	straps
1759	2	1.9	60	95	300	25	150	0.05	22	10	141	435	straps
1768	2	1.9	11	285	880	3	10	—	—	15	176	240	straps
1788	2	1.9	11	95	300	5	30	0.3	22 [1]	9	94	284	Goliath
1838	2	1.9	21.5	115	360	7.5	45	0.25	22 [2]	10	97	262	 Spec. 3p.
1849	2	1.9	29	115	360	12.5	75	0.2	22 [2]	10	105	294	straps
1859	2	1.9	60	115	360	25	150	0.1	28	12	143	436	straps

[1] Screen connected with filament via resistor of 10000 Ω, 0.5 W.
[2] Wi[illegible] aux[illegible]ary [illegible]itio[illegible] unit [illegible]pe [illegible]39 ([illegible] V, [illegible] mA.

RELAY TUBE

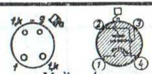
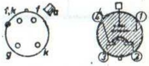
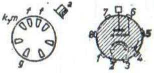
Type	Filament data V_f (V)	I_f (A)	T_h (sec)	Voltages max. (V)	Currents max. (A)	Typical characteristics	Dimensions Max. diam. (mm)	Max. height (mm)	Base connections
PL 5 Triode with capacitive ignition	—	—	—	V_{ainvp} = 1500 V_{arms} = max. 500 = min 20	I_a = 3.5 [1] I_a = 0.5 I_{ap} = 1000	V_{arc} = 20 V T_{av} = max. 1 sec V_{ign} = max. 25 V freq. = max. 300 c/s V_{ignp} = max. 8 15 kV [3] t_{Hg} = +10-40 °C	135	190	

THYRATRONS

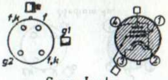
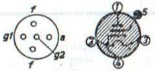
Type	Filament data V_f (V)	I_f (A)	T_h (sec)	Voltages max. (V)	Currents max. (A)	Typical characteristics	Dimensions Max. diam. (mm)	Max. height (mm)	Base connections
3C 45 Triode hydrogen filled	6.3	2.25	120	V_{ap} = 3000 V_{ainvp} = 3000 V_{gp} = min. 175 V_{ginvp} = 200	I_a = 0.045 I_{ap} = 35	T_{imp} = max. 6 μsec [3] $V_{ap} \times I_{ap} \times$ freq. $< 0.3 \times 10^9$ [4]	40	127	Medium 4p.

[1]) With fan cooling. [2]) Ignitor voltage. [3]) Measured at half amplitude. [4]) Freq. = pulse repetition frequency.

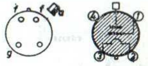
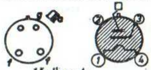
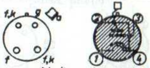
THYRATRONS

Type	Filament data			Voltages	Currents	Typical characteristics	Dimensions		Base connections
	V_f (V)	I_f (A)	T_h (sec)	max. (V)	max. (A)		Max. diam. (mm)	Max. height (mm)	
4C 35 Triode hydrogen filled	6.3	6.1	180	V_{ap} = 8000 V_{ainvp} = 8000 V_{gp} = min.175 V_{ginvp} = 200	I_a = 0.1 I_{ap} = 90[1]	T_{imp} = max. 6 μsec[3] $V_{ap} \times I_{ap} \times$ freq. $< 2 \times 10^9$ [4]	65	175	 Medium 4p.
5C 22 Triode hydrogen filled	6.3	10.6	300	V_{ap} = 16000 V_{ainvp} = 16000 V_{gp} = min.200 V_{ginvp} = 200	I_a = 0.2 I_{ap} = 325[1]	T_{imp} = max. 6 μsec[3] $V_{ap} \times I_{ap} \times$ freq. $< 3.2 \times 10^9$ [4]	65	222	
4690 Triode inert-gas filled	4	1.3	—	V_{ap} = 500	I_a = 0.01 I_{ap} = 0.75[2]	V_{arc} = 50 V freq. = max. 150 kc/s	43	98	Super Jumbo
EC 50 Triode inert-gas filled	6.3	1.3	10	V_{ap} = 1000 V_{ginvp} = 1000	I_a = 0.01 I_{ap} = 0.75[2] I_g = 0.0002 I_{gp} = 0.0014	V_{arc} = 33 V freq. = max. 150 kc/s T_{dion} = 1 μsec	43	108	
PL 2D 21 Tetrode inert-gas filled	6.3	0.6	10	V_{ap} = 650 V_{ainvp} = 1300 V_{g2p} = —100 $V_{g2(arc)}$ = —10 V_{g1ip} = —100 $V_{g1(arc)}$ = —10	I_k = 0.1 I_{kp} = 0.5 I_{g2} = 0.01 I_{g1} = 0.01	V_{arc} = 8 V T_{dion} = 30-75 μsec T_{av} = max. 30 sec t_{amb} = —75-+90 °C t_{rec} = +20 °C	19	54	P
PL 10 Triode for pulse and relay circuits	1.85	3.4	—	V_{ap} = 400 V_{ainvp} = 400 V_{gp} = 1800 V_{gp} = 1800	I_a = 0.1 I_{ap} = 4	V_{arc} = 20—35 V T_{av} = max. 10 sec freq. = max. 100 c/s t_{amb} = —75-+90 °C	21.5	108	**mignon**

[1]) With fan cooling. [2]) Freq. ≤ 20 c/s. [3]) Measured at half amplitude. [4]) Freq. = pulse repetition frequency.

PL 105 Tetrode mercury- vapour filled	5	10	300	V_{ap} = 2500 V_{ainvp} = 2500 V_{g2} = −500 $V_{g2(arc)}$ = −10 V_{g1} = −1000 $V_{g1(arc)}$ = −10	I_a = 6.4 I_{ap} = 40 I_{g2} = 0.5 I_{g2p} = 2 I_{g1} = 0.25 I_{g1p} = 1	V_{arc} = 12 V T_{dion} = 1000 µse T_{av} = max. 15 secc t_{Hg} = +40-+80 °C t_{rec} = +40 °C	123	289	 Super Jumbo
PL 150 Triode mercury- vapour and inert gas filled	1.9	26	120	V_{ap} = 240 V_{ainvp} = 500 V_g = −150[1] V_g = −50[2]	I_a = 15 I_{ap} = 90 I_g = 0.25 I_{gp} = 1	V_{arc} = 12 V T_{dion} = 1000 µsec T_{av} = max. 15 sec t_{Hg} = +40-+80 °C t_{rec} = +40 °C	92	293	straps
PL 255 Triode mercury vapour filled	5	14	300	V_{ap} = 1500 V_{ainvp} = 2500 V_{g1} = −300 $V_{g1(arc)}$ = −10	I_a = 12.5 I_{ap} = 80 I_g = 0.25 I_{gp} = 1	V_{arc} = 10 V T_{dion} = 1000 µsec T_{av} = max. 15 sec t_{Hg} = +40-+80 °C t_{rec} = +60 °C	102	334	straps
PL 260 Triode mercury vapour filled	5	25	600	V_{ap} = 1500 V_{ainvp} = 2500 V_{g1} = −300 $V_{g1(arc)}$ = −10	I_{ap} = 25 I_{ap} = 160 I_g = 0.25 I_{gp} = 1	V_{arc} = 10 V T_{dion} = 1000 µsec T_{av} = max. 15 sec t_{Hg} = +40-+80 °C t_{rec} = +60 °C	127	405	straps
PL 1607 Triode inert-gas filled	2	2.6	60	V_{ap} = 650 V_{ainvp} = 650 V_{g2} = −100 $V_{g2(arc)}$ = −10 V_{g1} = −100 $V_{g1(arc)}$ = −10	I_a = 0.5 I_{ap} = 2 I_{g2} = 0.05 I_{g2p} = 0.25 I_{g1} = 0.05 I_{g1p} = 0.25	V_{arc} = 15 V T_{dion} = 500 µsec T_{av} = max. 15 sec t_{amb} = −75-+90 °C t_{rec} = +20 °C	48	142	 O

[1]) At negative anode voltage. [2]) At positive anode voltage.

Type	Filament data			Voltages	Currents	Typical characteristics	Dimensions		Base connections
	V_f (V)	I_f (A)	T_h (sec)	max. (V)	max. (A)		Max. diam. (mm)	Max. height (mm)	
PL 6755 Triode mercury-vapour and inert-gas filled	2.5	11	60	V_{ap} = 1500[1] V_{ainvp} = 1500[1] V_g = −500 $V_{g(arc)}$ = −10	I_a = 3.2 I_{ap} = 20 I_g = 0.25 I_{gp} = 1	V_{arc} = 12 V T_{dion} = 500 µsec T_{av} = max 15 sec t_{Hg} = +20-+80 °C t_{amb} = 0-40 °C	59	222	
PL 5544 Triode inert-gas filled	2.5	12	60	V_{ap} = 1500 V_{ainvp} = 1500 V_g = −250 $V_{g(arc)}$ = −10	I_a = 3.2 I_{ap} = 40 I_g = 0.2 I_{gp} = 2.5	V_{arc} = 12 V T_{dion} = 40-400 µsec T_{av} = max. 15 sec t_{amb} = −55-+70 °C	67	190	
PL 5545 Triode inert-gas filled	2.5	21	60	V_{ap} = 1500 V_{ainvp} = 1500 V_g = −250 $V_{g(arc)}$ = −10	I_a = 6.4 I_{ap} = 80 I_g = 0.2 I_{gp} = 2.5	V_{arc} = 12 V T_{dion} = 50—500 µsec T_{av} = max. 15 sec t_{amb} = −55-+70 °C	67	229	Super Jumbo
PL 5557/ PL 17 Triode mercury-vapour filled	2.5	5	5	V_{ap} = 2500 V_{ainvp} = 5000 V_g = −500 $V_{g(arc)}$ = −10	I_a = 0.5 I_{ap} = 2 I_g = 0.05 I_{gp} = 0.25	V_{arc} = 12 V T_{dion} = 1000 µsec T_{av} = max. 15 sec t_{Hg} = +40-+80 °C t_{rec} = +40 °C	62	169	 Medium 4p.
PL 5559/ PL 57 Triode mercury vapour filled	5	4.5	300	V_{ap} = 1000 V_{ainvp} = 1500 V_g = −500 $V_{g(arc)}$ = −10	I_a = 2.5 I_{ap} = 15 I_g = 0.25 I_{gp} = 1	V_{arc} = 12 V T_{dion} = 1000 µsec T_{av} = max. 15 sec t_{Hg} = +40-+80 °C t_{rec} = +45 °C	74	185	 Medium 4p.

[1]) At $V_{ap} = V_{ainvp} = 1000$: $I_a = 3{,}6$ $I_{ap} = 15$ $V_g = -300$

IGNITRONS

Type	A.C. control (two tubes in inverse parallel connection)					
	V_{arms} (V)	Maximum demand (kVA)		I_a (A)	I_a max. (A)	T_{av} max. (sec)
PL 5551	220	530	—	30.2	—	18
		—	180	—	56	
	250	600	—	30.2	—	18
		—	200	—	56	
	600	600	—	30.2	—	7.5
		—	200	—	56	
PL 5552	220	1060	—	75.6	—	14
		—	350	—	140	
	250	1200	—	75.6	—	14
		—	400	—	140	
	600	1200	—	75.6	—	5.8
		—	400	—	140	
PL 5555	max. 2400	2400	—	135	—	1.66
		—	1105	—	207	

[1]) Design values only. Max. duration 0.15 sec.

Ignitor ratings: I_{ign} min = 30 A
I_{ign} max. = 100 A
V_{ign} min = + 200 V
V_{ign} max.: anode voltage

PL 5555

Rectifier (continuous operation, phase control angle = 0)				
V_{ap} max. (V)	V_{ainvp} max. (V)	I_a max. (A)	I_{ap} max. (A)	Freq. (c/s)
900	900	200	1800	25-60
2100	2100	150	1200	

FREQUENCY CHANGER RESISTANCE WELDING SERVICE

Type	V_{ap} max. (V)	V_{ainvp} max. (V)	I_{ap} max. (A)	I_a corresp. (A)	T_{av} (sec)	I_a/I_{ap}[1] max. (A)	Freq. input (c/s)	Freq. output min. (c/s)
PL 5822	1200	1200	1500 420	20 70	6.25	0.166	50-60	5
	1500	1500	1200 336	16 56	6.25	0.166	50-60	5

[1]) $T_{av} = 0.2$ sec.

Type	V_{ap} max. (V)	V_{ainvp} max. (V)	I_{ap} max. (A)	I_a corresp. (A)	T_{av} max. (sec)	I_a/I_{ap}[1] max.	Freq. input (c/s)	Freq. output min. (c/s)
PL 5551	1200	1200	600 135	5 22.5	10	0.166	50-60	5
	1500	1500	480 108	4 18	10	0.166	50-60	5

[1]) $T_{av} = 0.2$ sec.

X-RAY TUBES

DIAGNOSTIC RAYPROOF TUBES

Type	Max. peak anode voltage (kV) Circuit[1]) 1	2	3	4	5	6	Focus (mm)	Max. ratings Radiography (kW)	Max. ratings Fluoroscopy HU/sec	Insulation	Cooling	Anode Type	Anode Heat capacity (HU)
20610	100	—	—	—	—	—	1.7	2	450				
20611	—	110	110	110	—	—							
20620	100	—	—	—	—	—	3.1	6	450				
20621	—	110	110	110	—	—							
20630	100	—	—	—	—	—	4.1	10	450	air	air	stationary	—
20631	—	110	110	110	—	—							
20650/01	100	—	—	—	—	—	1.7/3.1	2/6	450				
20650/02	—	110	110	110	—	—							
20651/01	100	—	—	—	—	—	1.7/4.1	2/10	450				
20651/02	—	110	110	110	—	—							

[1]) 1 = self-rectified operation.
2 = one- and two-valve circuit (half-wave)
3 = single-phase full-wave circuit
4 = three-phase full-wave circuit
5 = Villard circuit
6 = Greinacher circuit

21825	—50	—	—	—	—	—	0.8	0.3	32				11000
21836	—83	—	—	—	—	—	1.0	0.8	240				25000
21837	—90	—	—	—	—	—	1.5	1.0	240			sta-	25000
21838	—95	—	—	—	—	—	1.5	1.0	240	oil	oil	tion-	25000
21839	—85	—	—	—	—	—	1.5	1.0	225			ary	12000
21840	—100	—	—	—	—	—	2.3	2.6	240				60000
21905							1.5	2					
21906							2.3	4					
21907							3.1	6				sta-	
21908	—110	+110	+110	—	—	—	4.1	10	500	oil	oil	tion-	85000
21910							1.5/3.1	2/6				ary	
21911							1.5/4.1	2/10					
21912							2.3/4.1	4/10					
21920							1.5/3.1	2/6				sta-	
21921	—110	+125	+125	—	—	—	1.5/4.1	2/10	500	oil	oil	tion-	150000
21922							2.3/4.1	4/10				ary	

Type	Max. peak anode voltage (kV) Circuit 1	2	3	4	5	6	Focus (mm)	Max. ratings Radiography (kW)	Fluoroscopy HU/sec	Insulation	Cooling	Anode Type	Heat capacity (HU)
21933 **21934** **21935** **21936** **21937** **21938**	—100	+100	+100	+100	—	—	1/2 0.3/1 0.3/2 1 2 1.5/1.5	21/42 2.2/21 2.2/42 21 42 32/32	500[1])	oil	oil	rotating	80 000[2])
21940 **21941** **21942**	—110	+110	+110	+110	—	—	1 1.5 0.8/1.8	10 17 10/23	500	oil	oil	rotating	60 000
21943 **21944** **21945** **21952**	—110	+125	+125	+125	—	—	1/2 0.3/1 0.3/2 0.8/1.8	21/42 2/21 2/42 10/23	500[1])	oil	oil	rotating	80 000[2]) 60000

[1]) 425 in circuit 1. [2]) 50000 in circuit 1.

Type	Max. peak operating voltage (kV)	Heat capacity (HU)	Cooling capacity (HU/min)		Angle between cables and central beam	Receptacles[2])
			with air circulator	without air circulator		
22116/13[1]) **22116/23**[1]) **22116/63**[1]) **22116/73**[1])	100	1 500 000	30 000	25 000	90° 90° 135° 135°	tri-polar both sides bi-polar anode side tri-polar both sides bi-polar anode side
22117/33	100	1 000 000	18 000	30 000	90°	tri-polar both sides
22118/03 **22118/53**	125	1 500 000	30 000	25 000	90° 135°	tri-polar both sides bi-polar anode side
22120/08 **22120/28**	125	1 750 000	39 000	25 000	90° 135°	tri-polar both sides
22156/13 **22156/23**	100	500 000	12 500	25 000	90°	tri-polar both sides bi-polar anode side
22157/03	125	750 000	15 000	30 000	90°	tri-polar both sides
MV 0276/01	140	2 300 000	70 000	70 000	90° or 135°	tri-polar both sides

1) Built-in exposure counter optional.
2) The cores of the bi- or tri-polar anode cables are shortcircuited in the receptacles.

INSERTTUBES FOR THERAPY

Type	Max.peak anode voltage (kV) Circuit 1	2	3	4	5	6	Focus (mm)	Max. ratings (mA)	Insulation	Cooling	Anode material
23400	—220	—	—	—	—	—	5×5	10	oil	oil	—
23405	—260	—	—	—	—	—	6×6	18			
23604	—	—	—	—	+220	+220	5 Ø	15	air	water	—
23605	—	—	—	—	+220	+220	7 Ø	30			
24008	—	—	—	—	—	+50	—	2	air	air	—
MV 0675	—	+140	+140	—	—	—	4×4	8	oil	oil	—

INSERTTUBES FOR INDUSTRIAL PURPOSES

Macrostructure

25250	—	—	—	—	150	150	8	20			
25252	—	—	—	—	150	150	4	12	air	water	W
25275	—	—	—	—	—	300	8	10			

Diffraction and Spectrography ¹)

25293/32								850			Cu
25294/32								850			W
25295/32								850			Mo
25296/32	50	50	50	—	—	—	1	350	air	water	Co
25297/32								350			Fe
25298/32								300			Cr

¹) All types have 4 windows of Mica-Be.

Type	V_f max. (V)	I_f max. (A)	V_{invp} max. (kV)	I_a max. (mA) intermittent	I_a max. (mA) continuous	Total length max. (mm)	Base	Insulation	Vacuum or gas-filled	Filament type
28000	17	8	125	500	200	478	DE	air	vacuum	tungsten
28001	19.5	8.5	125	1 000	200	478	DE	air		
28115	12.5	8	160	300	50	685	DE	air		
28117	12	8	180	300	50	825	DE	air		
28118	12	8	200	300	50	825	DE	air		
28119	12	8	220	300	50	825	DE	air		
28121	12	8	150	300	50	500	DE	oil		
28125	13	8	125	300	50	250	DE	air		
28129	12	12.5	140	700	70	285	E, DE, K	oil		
28130	12	12.5	125	700	70	268	E, DE, K	oil		
28136	6.5	6.0	125	1 400	500	267	D, DE, K	oil	vacuum	thoriated tungsten
28137			150	1 000	400	285	D, DE, K			

MISCELLANEOUS

VOLTAGE STABILIZING TUBES

	Current	1—10 mA	5—15 mA	5—30 mA	1—40 mA
OPERATING VOLTAGE	85	**85A2** [1]			
	90				**90C1**
	108			**OB2**	
	150		**150B2**	**OA2**	

[1]) Voltage reference tube

PHOTO TUBES

Colour	Red sensitive	Blue sensitive
HIGH VACUUM	**58 CV** **90 CV** **3545**	**90 AV**
GAS-FILLED	**58 CG** **90 CG** **3546** **3554**	**90 AG**

RADIATION COUNTER TUBES

Radiation	Type
γ	**18503**
α, β, γ	**18504** **18505** **18506**

TRIGGER TUBES

PL 1267	**Z 50 T**	**5823**

H.V. SURGE LIMITING DIODE

8020

GAS NOISE SOURCE

3 cm Band	**K50A**

DECADE COUNTER TUBE

E1T

CAMERA TUBE

5854

SURGE ARRESTERS

	Max. temporary current	2.5A/1 sec	5A/1 sec	5A/3 sec	10A/1 sec	10A/3 sec
STARTING VOLTAGE	80—120 V					4378
	130—180 V			4349		
	150—200 V			4371		4369
	280—350 V	4372				4379
	400—500 V		4397			
	700—850 V				4390	

MAGNETRONS

	Minimum peak output	7 kW	15 kW	40 kW	225 kW	360 kW	400 kW	500 kW
FREQUENCY IN Mc/s	1220—1350							5J26 [1])
	2940—3060						55100	
	3450—3614					55085		
	8750—8900			2J50				
	9000—9160			2J49				
	9003—9168				55032			
	9168—9345				55031			
	9210—9270	CV370						
	9345—9405	2J42	2J42A	725A	4J50 55030			
	9405—9505				55029			

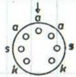
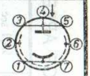
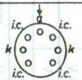
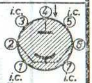
Tunable

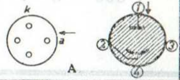
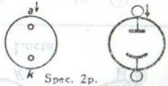
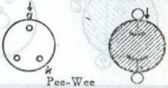
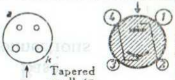
KLYSTRONS

	Max. continuous output	20 mW	10 W	200 W
FREQUENCY	8702—9548 Mc/s	723A/B, 2K25		
	3320—3450 Mc/s		55334 [1])	
	8600—10,000 Mc/s			55395

[1]) Fixed frequency.

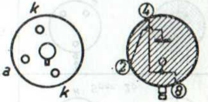
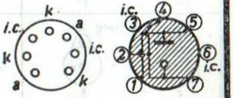
PHOTOTUBES

Type	Vacuum	Gas-filled	Radiation sensitivity	Cathode: Type	Cathode: Projected area (cm^2)	Typical characteristics: V_b (V)	Typical characteristics: Dark current max. (µA)	Typical characteristics: N[1]) (µA/lm)	Typical characteristics: R_a (MΩ)	Max. ratings: V_b (V)	Max. ratings: I_k per cm^2 (µA)	Max. ratings: t_{amb} (°C)	C_{ak} (pF)	Dimensions: Tot. height max. (mm)	Dimensions: Diameter max. (mm)	Base connections
58 CG	—	G	red	caesium on oxidized silver	1.1	85	0.1	85	1	90	1.5	100	3.0	33	16	
58 CV	V	—				50	0.05	20	1	100	3					
90 AG	—	G	blue	caesium on antimony	4	85	0.1	130	1	90	0.6	70	0.7	54	19	  Miniature [2])
90 AV	V	—				85	0.05	45	1	100	1.25					
90 CG	—	G	red	caesium on oxidized silver	2.4	85	0.1	125	1	90	0.7	100	1.1	54	19	  Miniature [2])
90 CV	V	—				50	0.05	20	1	100	3					
3530	—	G	red	caesium on oxidized silver	—	100	—	150	1	100	7.5 [3])	5	3.0	76	18	  Spec.

3533	—	G	red	caesium on oxidized silver	—	85	—	120	1	100	2	50	3.4	80	28	 A
3538	—	G	red	caesium on oxidized silver	—	85	—	120	1	100	2	50	2.5	73	23	 Spec. 2p.
3545	V	—	red	caesium on oxidized silver	0.8	90	0.05	20	1	250	5	50	2	73 64 (PW)	16.5	 Spec. 2p.
3546	—	G	red	caesium on oxidized silver	0.8	85	0.1	150	1	90	2	50	2	73 64 (PW)	16.5	 Pee-Wee
3554	—	G	red	caesium on oxidized silver	4.5	85	0.1	150	1	90	2	50	3.4	103	30	 Tapered small 4p.

[1]) Measured with a lamp of colour temperature 2700 °K.
[2]) All cathode connections must be interconnected externally.
[3]) Total cathode current.

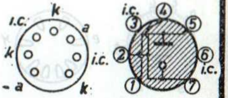
VOLTAGE REFERENCE TUBES

Type	V_a (V)	$I_{a\,rec}$ (mA)	V_{ign}[1]) max. (V)	V_a[3]) spread (V)	I_a (mA)	ΔV_a max. (V)	Dimensions: Total heihgt max. (mm)	Dimensions: Diam. max. (mm)	Base connections
85 A1	85 [2])	4	125	83—87	1—8	4	80	32	 Loctal
85 A2	85 [2])	6	125	83—87	1—10	4	54	19	 Miniature

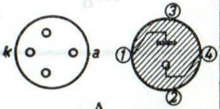
[1]) In complete darkness V_{ign} may have a higher value.
[2]) Variation of V_a ($I_a = I_{a\,rec}$): max. 0.3% during the first 300 hours of live
max. 0.2% during the subsequent 1000 hours
[3]) $I_a = I_{a\,rec}$ max. 0.1% in short term (100 hours max.) after the first 300 hours

VOLTAGE STABILIZERS

OA2	150	17.5	180	144—164	5—30	6	67	19	
OB2	108	17.5	127	106—111	5—30	4	67	19	Miniature
90 C1	90	20	125	86—94	1—40	14	54	19	
100 E1	100	125	140	90—105	50—200	4	168	55.5	A

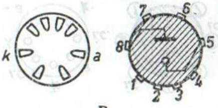
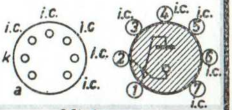


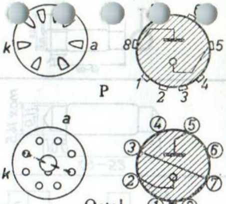
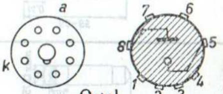
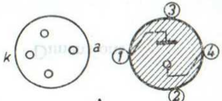
Miniature



A

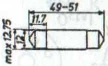
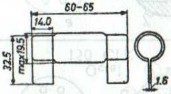
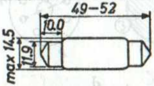
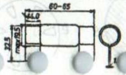
VOLTAGE STABILIZERS

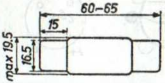
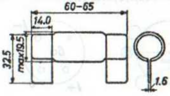
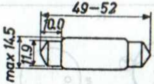
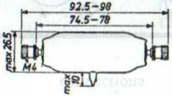
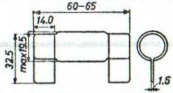
Type	V_a (V)	$I_{a\ rec}$ (mA)	V_{ign} 1) max. (V)	V_a 2) spread (V)	I_a (V)	ΔV_a max (V)	Dimensions: Total height max. (mm)	Dimensions: Diam. max. (mm)	Base connection
150 A1	156	4	205	146—166	1—8	8	72	27	 P
150 B2	150	10	180	146—154	5—15	5	54	19	 Miniature

150 C1	156	20	205	146—166	5—40	8	99 (P) 114 (K)	43 (P) 43 (K)	 P Octal 150 C1K
4687	90	20	125	85—100	10—40	10	94 (P) 109 (K)	43 (P) 29 (K)	 Octal 4687 K.
7475	100	4	140	90—110	1—8	4	84	26	 A
13201	100	100	140	90—110	15—200	20	154	54	

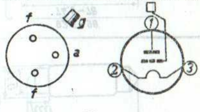
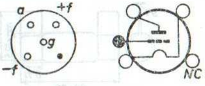
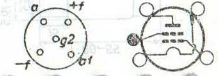
[1]) In complete darkness V_{ign} may have a higher value. [2]) $I_a = I_{a\ rec.}$

SURGE ARRESTERS

Type	Ignition voltage (Vd.c.)	Extinguishing voltage (Vd.c.)	Max. ratings: Temporary I (A)	Max. ratings: Temporary I (sec)	Max. ratings: Fuse in series (A)	Max. ratings: Capacitive discharge (repeatedly) (Ws)	Mains voltage: D.C. max. (V)	Mains voltage: A.C. value r.m.s. max. (V)	Dimensions
4349	130—180	110	5	3	6	10	70	75	
4369	150—200	110	10	3	10	10	70	75	
4370	80—120	60	10	3	10	10	36	50	
4371	150—200	110	5	3	6	10	70	75	
4372	280—300	250	2.5	1	6	10	200	180	

4373	150—200	110	10	3	10	10	70	75	
4378	80—120	60	10	3	10	10	36	50	
4379	280—350	130	10	3	10	10	50	180	
4380	280—350	250	2.5	1	6	10	200	180	
4383	280—350	130	5	3	6	10	50	180	
4390	460—660 (Veff.)	400 (Veff.)	10	1	25	500	—	300	
4397	400—500	200	5	1	10	10	150	230	

ELECTROMETER TUBES

Type	V_f (V)	I_f (mA)	V_a (V)	V_{g2} (V)	I_a (µA)	V_{g1} (V)	S (µA/V)	µ	I_{g2} (A)	I_{g1} (A)	Base connections
4060 Triode	0.7	300	4	—	100	−2.5	28	0.5	—	$<10^{-14}$	 H
4065 Triode	1.25	13	9	—	100	−2.5	80	2	—	$<12.5\times10^{-14}$	 Subminiature
4066 Tetrode	1.25	13	4.5	−3.2	20	3	17	1	2.5×10^{-15}		 Sub[illegible]niat[illegible]

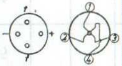
Type	Execution [1]	Photocathode eff. diam. (mm)	Screen diam. (mm)	N [2] (µA/lm)	Voltages V_a (kV)	V_g (kV)	$-V_g$ [3] (V)	V_a max. (kV)	V_g max. (kV)	V_{ag} max. (kV)	Linear magnification	Picture resolution (lines/cm)	Dimensions Tot. length max. (mm)	Diam. max. (mm)
18120 Diode	AA AB AG	30	116	20	6	—	—	6	—	—	3—7	200	240	117
	CA CB CG			15										
18121 Diode	AA AB AG	28	28	20	5	—	—	6	—	—	1	200—500	97	65
	CA CB CG			15										
18130 Triode	AA AB AG	25	115	20	6	3	20	6	6	6.1 [4] 5 [5]	2.5-3.5	200	240	117

[1] The first letter indicates the type of photocathode:
A = caesium on antimony, blue sensitive.
C = caesium on oxidized silver, red sensitive.
The second letter indicates the colour of the luminescent screen:
A = blue, very short persistence.
B = blue, short persistence.
G = green, medium persistence.

[2] At a colour temperature of 2700 °K.
[3] Grid cut-off voltage.
[5] At picture extinction.
[4] At exposure.

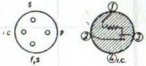
All types are magnetically focused.

THERMOCOUPLES

Type	E.M.F. = approx. 12mV	I_f (mA) Limit of proportionality	Max. continuous	Max. dwing 1 min.	R_f (Ω)	R_E (Ω)	Dimensions Tot. length max. (mm)	Diam. max. (mm)	Base connections
TH 1	10	5	20	20	75	5.5	63	24	 A
TH 2	20	10	30	40	23	3.0			
TH 3	40	20	75	100	7.3	3.0			
TH 4	100	50	150	200	2.2	3.0			
TH 5	200	100	300	350	1.1	3.0			

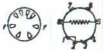
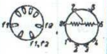
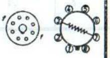
[1]) The E.M.F. is proportional to the square of I_f up to the stated current values (max. deviation ± 2%).

BIMETAL RELAY

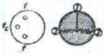
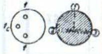
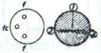
Type	Typical characteristics	Max. current Mains voltage	At switching on	At switching off	Base connections
4152	I_f = 92 mA (± 13%) R_f = 340—372 Ω Timing = 80 sec (I_f = 92 mA)	220 V D.C.	1.5 A	0.25 A	 A
		220 V A.C.	1.5 A	0.25 A	
		380 V A.C.	0.7 A	0.075 A	

CURRENT REGULATORS

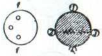
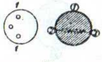
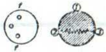
General applications

Type	V_{contr} (V)	I_{reg} (mA)	Base connections
C 8	80—200	200	 P
C 10	35—100	200	 P
C 12	f_1—f_2: 80—200 f_1—f_1f_2: 35—100	200	 P
U 30	70—125	100	 Octal

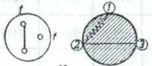
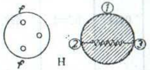
Industrial applications

Type	V_{contr} (V)	I_{reg} (mA)	Base connections
329	10—30	1150	 H
340	3—10	5900	Edison
452	7—20	1150	 H
1012	6—18	5700	Edison
1120	6—18	3200	Edison
1331	15—40	1450	 H

Special applications

Type	V_{contr} (V)	I_{reg} (mA)	Base connections
1904	30—80	100	 H Swan
1905	2—6	1000	Edison
1908	5—15	800	 H
1909	15—45	625	 H

Special applications

Type	V_{contr} (V)	I_{reg} (mA)	Base connections
1909A	15—45	625	 H
1910	5—15	1400	 H
1913	4—12	2000	Edison
1918-01	4—10	100	Edison Mignon
1923	15—45	430	Edison

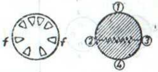
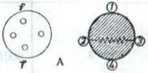
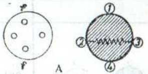
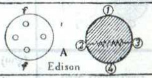
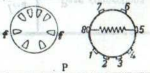
Type	V_{contr} (V)	I_{reg} (mA)	Base connections
1926	8—26	180	
1927	40—120	180	 A
1928	80—240	180	 A
1941	80—200	300	 A Edison
1945	80—120	275	 P

IMAGE ICONOSCOPE

Type	V_f (V)	I_f (A)	Scanning system	Image system	Operating characteristics	
5854	6.3	0.63	Focusing: magn. Deflection: magn. Cut-off voltage: —30 to —70 V	Photocath: 12×16 mm Signal electrode: 45×60 mm Focusing: magn.	Cathode voltage Voltage of g_2 and collector Voltage of signal electrode Voltage of photocathode Beam current Current of focusing coil Current of image coil Signal electrode resistor Required illumination for average scene, at F : 2	—930 V [1] 0 V [1] 0 V [1] —1000 V [1] 0.1—0.2 μA 10 mA 25 mA 0.1 MΩ 1500 Lux.

[1]) Measured with respect to earth

RADIATION COUNTER TUBES

Type	Description	Radiation sensitivity	Wall thickness mg/cm²	Threshold voltage (V)	Operating voltage (V)	Plateau length min. (V)	Plateau slope (% per 100 V)	Dead time (μsec)	Back-ground (counts/min)	Dimensions Tot. length (mm)	Dimensions Diam. (mm)
18500	Non self quenching	X-ray, γ and neutron	250	900	1050	150	< 2	< 75	< 20[3])	max. 135	max. 19
18501	Non self quenching	γ, β and neutron	75	900	1050	150	< 2	< 75	< 20[3])	max. 135	max. 19
18502	Self quenching	γ, β	75	max. 300	350	100	< 15	< 150	< 40	max. 118	max. 19
18503	Self quenching	γ and neutron	250	> 275	[1])	225	< 2	< 100	< 20[3])	49	17
18504	Self quenching Mica window	α, β, γ and neutron	2-3[2])	> 275	[1])	225	< 2	< 100	< 20[3])	49	17
18505	Self quenching Mica window	α, β, γ	1.6-2[2])	> 300	[1])	225	< 2	< 125	< 25[3])	55	25.5
18506	Self quenching Mica window	α, β, γ	2.5-3.5[2])	> 325	[1])	250	< 2	< 225	< 40[3])	55	33.5
18509-01	Self quenching	β, γ	90-75	> 320	[1])	100	< 15	< 50	< 5	max. 30	max. 6.5
18513	Self quenching Mica window	α, β and photon	1.6-2.1[2])	575	725	150	< 15	< 70	< 6[3])	max. 86	max. 12.8
18514	Self quenching Mica window	α, β and photon	3.5-4[2])	600	750	200	< 15	< 250	< 40[3])	max. 99	max. 33.5

[1]) Arbitrary within plateau. [2]) Window thickness. [3]) Shielded.

MAGNETRONS

Type	Interchangeable with type	Wave-length band (cm)	Frequency (Mc/s)	Peak output power min. (kW)
2J 42 **2J 42A** **2J 49** **2J 50** **4J 50** **4J 78**	— — — CV 2793 CV 2284 —	3	9345-9405 9345-9405 9000-9160 8750-8900 9345-9405 9003-9168	7 20 40 40 225 225
5J 26 Tunable	—	25	1220-1350	500
CV 370 **725 A**	— CV 722	3	9210-9270 9345-9405	7 40
55029 **55030** **55031** **55032**			9405-9505 9345-9405 9168-9345 9003-9168	at 1 µs 225 at 0.1 µs 180
55085-01 **55085-02** **55085-03** **55085-04**	CV 1483 CV 1484 CV 1485 CV 1486	8.5	3570-3614 3530-3570 3490-3530 3450-3490	360
55100-01 **55100-02** **55100-03** **55100-04**	CV 1479 CV 1480 CV 1481 CV 1482	10	3030-3060 3005-3030 2980-3005 2940-2980	400

TR AND ATR SWITCHES

Type	Interchangeable with type	Application	Frequency (Mc/s)
1B 24A	CV 725	TR	8490-9600
1B 35	CV 369	ATR	9000-9600

HIGH-VACUUM DIODE

Type	Interchangeable with type	V_f (V)	I_f (A)	T_h (sec)	Application	Typical characteristics	
8020	CV 2967	5	6	5	Rectifier	V_{ainvp} = max. 40 kV I_o = max. 100 mA I_{ap} = max. 750 mA	
					Limiter	V_f = 5.5 V V_{ap} = 10 kV I_{ap} = min. 2A	$V.$ = max. 5.8 V V_{ap} = max. 12.5 kV W_a = max. 75 W

KLYSTRONS

Type	Interchangeable with type	Wave-length band (cm)	Frequency (Mc/s)	Output power (W)
2K 25 reflex	CV 2792	3	8500-9660	0.025
723 AB reflex	CV 1795	3	8702-9548	0.03
55334 multi reflex fixed freq.	—	8.8	3320-3450	10
55395 Tunable 2-cavity water cooled	—	3	8600/10000	50/180

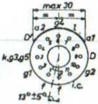
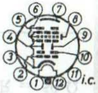
IONISATION VACUUM GAGE

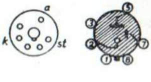
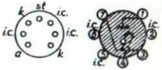
FOR MEASUREMENT OF GAS PRESSURES

Type	Supply voltage	Gas pressures	Field intensity of required permanent magnet
95322 Cold cathode	2000 V_{dc}	10^{-3}—10^{-5} mm Hg	abt 370 Gauss

Type	V_f (V)	I_f (A)	λ (cm)	V_{ign} (V)	V_d (V)	I_d (mA)	Noise level (d.b.)
K 50 A Neon filled noise diode	2	2	3	6000	165	125	19.3 R = 2700 Ω
K 81 A Noise diode	1.85	2.7			100	15	13 R = 50 Ω

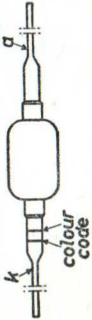
DECADE COUNTER TUBE

Type and Application	Filament data	Voltages Resistors	Currents (mA)	Characteristic data	Base connections
E1T Decade counter tube	$V_f = 6.3$ V $I_f = 0.3$ A	$V_b = 300$ V $V_{bg1} = 11.9$ V $V_{bD} = 156$ V $R_k = 15\ \Omega$	$I_k = 0.95$	$R_{a1} = 39\ k\Omega$ $R_{a2} = 1\ M\Omega$ $R_{g4} = 47\ k\Omega$	 Duodecal 

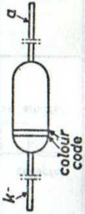
Type	Typical characteristics		Maximum ratings Currents	Dimensions Tot. length max. (mm)	Dimensions Diam. max. (mm)	Base connections
Z 50 T Gas-filled triode	$V_{st.\,ign}$ = 71 V $V_{st.\,ign}$ = min. 66 V $V_{st.\,ign}$ = max. 80 V V_{ap} = max. 175 V	V_a (I_a = 2-6 mA) = 61 V V_a I_a = 2-6 mA) = min. 54 V V_a (I_a = 2-6 mA) = max. 67 V	I_a = max. 6 mA I_{ap} = max. 24 mA	92	13	
PL 1267/ Z 300 T Gas-filled triode	V_a = 105-130 V_{eff} $V_{a\,ign}$ (V_{st} = 0 V) = 255 V = min. 225 V = max. 310 V V_a (I_a ≈ 25 mA) = 70 V $I_{st.\,transf}$ (V_a = 140 V) = max. 100 µA	$V_{st.\,ign}$ = 85 V $V_{st.\,ign}$ = min. 70 V $V_{st.\,ign}$ = max. 90 V $V_{st.}$ ($I_{st.}$ > 0) = 60 V	I_a = max. 25 mA I_{ap} = max. 100 mA	99	33	 **Octal**
5823/ Z 900 T Gas-filled triode	$V_{a\,ign}$ (V_{st} ≥ 0V) = 290 V V_a (I_a = 25 mA) = 62 V $V_{st.}$ (V_a ≥ 0 V) = 80 V $V_{st.}$ ($I_{st.}$ > 0) (I_a = 25 mA) = 61 V	$V_{st.\,ign}$ = min. 73 V $V_{st.\,ign}$ = max. 105 V $V_{st.\,transf}$ (V_a = 140 V) = min. 400 µA	I_a = max. 25 mA I_{ap} = max. 100 mA	54	19	 **miniature**

SEMI-CONDUCTORS

GERMANIUM DIODES

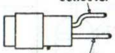
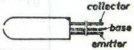
Type	Description	I_d min. (mA) $V_d = +1$V	$-I_d$ max. (μA) $V_d = -3$V	$V_d = -10$V	$V_d = -50$V	$V_d = -100$V	I_d max. (mA)	I_{dp} max. (mA)	I_{surge} max. (mA)	V_{dinv} max. (V)	Turn over voltage (V)	C_{dk} (pF)	t_{amb} (°C)	Base connections
OA 50	General purpose diode	5	—	30	500	—	50	150	500	60 [1])	75	1	—50 to +60	
OA 51	High back resistance diode	5	—	7	100	—	50	150	500	50 [1])	75	1	—50 to +60	
OA 53	100-volt diode	4	—	—	—	600	50	150	500	100 [1])	120	1	—50 to +60	
OA 55	100-volt diode	4	5	—	—	500	50	150	500	100 [1])	120	1	—50 to +60	
OA 56	General purpose diode	4	—	50	800	—	50	150	400	70 [1])	85	1	—50 to +60	
OA 60	Video detector diode	η = 60% and $R_{damping}$ = 3000 Ω [3])					5	—	—	25 [2])	30	1	—50 to +60	
OA [illegible]	D.C. re[illegible]er diode	[illegible].5	—	—	1[illegible]	—	5[illegible]	15[illegible]	[illegible]00	[illegible]5 [2])	[illegible]0	[illegible]	—[illegible] to +[illegible]	

OA 70	Video detector diode	V_d at I_d = 0.1 mA max. + 0.25 V	$-I_d$ at V_d = −1.5 V max. 30 μA				50	150	400	22.5 p 15 d.c.		1	−50 to +75	
OA 71	General purpose diode	V_d at I_d = 3 mA max. + 1.05 V	$-I_d$ at V_d = −1.5 V max. 7 μA			$-I_d$ at V_d = −90 V max. 250 μA	35	150	200	90 p. 60 d.c.			−50 to +60	
2 OA 72	Matched pair for ratio detector circuits	V_d at I_d = 0.1 mA + 0.2 V	$-I_d$ at V_d = −1.5 V 0.8 μA			$-I_d$ at V_d = −45 V 130 μA	10	100	200	45 p. 30 d.c.		1	−50 to +60	
OA 73	Video detector general purpose	V_d at I_d = 0.1 mA max. + 0.2 V	$-I_d$ at V_d = −1.5 V max. 18 μA	100		$-I_d$ at V_d = −30 V max. 1200	50	150	400	30 p. 20 d.c.			−50 to +75	
OA 74	General purpose	V_d at I_d = 4 mA max. + 1.05 V	$-I_d$ at V_d = −1.5 V max. 12 μA			$-I_d$ at V_d = −60 V max. 400 μA	35	150	200	60 p. 40 d.c.			−50 to +75	



[1]) The diode should not be operated at the max. values for voltage, current and temperature simultaneously. [2]) The diode should not be operated at the max. values for voltage and temperature simultaneously. [3]) Diode in series with parallel circuit consisting of R = 3900 Ω and C = 10 pF. Freq. = 30 Mc/s. Peak input voltage = 5 V. Capacitance of oscillator = 17 pF, temp. = 20 °C. The oscillator must have a negligible internal impedance at its harmonic frequencies. [4]) When soldering, the metal diode extension should be held with a pair of cool pliers in order to avoid damage to the diode through excessive heat.

TRANSISTORS *

Type	Description	$-V_{c(dc)}$ max. (V)	$-V_{c(p)}$ max. (V)	$-I_c$ max. (mA)	I_e max. (mA)	W_c max. (mW)	T_{amb} max. (°C)	$-V_e$ max. (V)	W_e max. (mW)	Noise (1000 c/s) (d.b)	Base connections
OC 50	Point contact	20	30			75	35	20	15	53	
OC 51	Point contact	30				75	35	30	15	53	
OC 70	Junction (all-glass)	4.5	10	10	10	6	45			10—15	 17
OC 71	Junction (all-glass)	4.5	10	10	10	6	45			10—22	

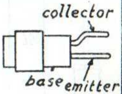
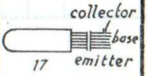
*) Provisional data.

GERMANIUM DIODES

Type	Description	I_d min. (mA) $V_d = +1V$	$-I_d$ max. (µA) 25 °C				I_d max. (mA)	I_{dp} max. (mA)	I_{surge} max. (mA)	V_{dinv} max. 60 °C (V)	Turn over voltage (V)	C_{dk} (pF)	t_{amb} (°C)	Base connections
			$V_d = -3V$	$V_d = -10V$	$V_d = -50V$	$V_d = -100V$								
OA 81	General purpose	V_d at I_d = 2.5 mA max. +1 V		11		275	50	150	500	115 p 90 d.c.			75	
OA 85	General purpose	V_d at I_d = 5 mA max. 1 V	5	7		250	50	150	500	115 p 90 d.c.			75	

See note 4 page 251.

TRANSISTORS*

Type	Description	$-V_{c(dc)}$ max. (V)	$-V_{c(p)}$ max. (V)	$-I_c$ max. (mA)	I_e max. (mW)	W_c max. (mA)	T_{amb} max. (°C)	$-V_e$ max. (V)	W_e max. (mW)	Noise (1000 c/s) (d.b.)	Base connections
OC 50	Point contact	20	30			75	35	20	15	53	
OC 51	Point contact	30				75	35	30	15	53	
OC 70	Junction (all-glass)	4.5	10	10	10	25	45			8 dB average	
OC 71	Junction (all-glass)	4.5	10	10	10	25	45			8 dB average	
2-OC 72	Junction (all-glass)	13	26	45	45						

* Provisional data.

INTRODUCTION

In the first column of this interchangeability list only those electronic tube types are indicated for which equivalent types exist. The second column lists the CV numbers and the third the corresponding Philips type numbers.

With respect to the third column it must be noted that the type numbers without brackets are **direct** equivalents whereas those between brackets are **near** equivalents. It can be assumed, however, that in practically all cases the near equivalents can replace the types indicated in the first column.

The fact that a tube is listed does not imply that it can always be supplied.

Type number	Alternative CV number	Philips type
0517		(PL5557)
OA2	1832	OA2
OA4		(Z300T/PL1267)
OA4G	752	(Z300T/PL1267)
OB2	1833	OB2
OD3	216	OD3
OE3	431	85A1; OE3
OG3	449	85A2; OG3
1A3	753	1A3; DA90
1A7GT	1802	1A7GT; (DK32)
1AB6		DK96; 1AB6
1AC6		DK92; 1AC6
1AD4	2237	1AD4
1AH5		DAF96; 1AH5
1AJ4		DF96; 1AJ4
1C1		DK91; 1R5
1C2		DK92; 1AC6
1C3		DK96; 1AB6
1C5GT	1805	1C5GT; DL35
1C21		(PL1267/Z300T)
1D13		1A3; DA90
1F1		DF96; 1AJ4
1F2		1L4; DF92
1F3		DF91; 1T4
1FD1		DAF96; 1AH5
1FD9		DAF91; 1S5
1H5GT	1820	1H5GT; (DAC32)
1L4	1758	1L4; DF92
1M1		DM70; 1M3
1M3	2980	DM70; 1M3
1N5GT	1823	1N5GT; (DF33)
1N34		(OA85)
1N34A		(OA85)
1N38		(OA85)
1N38A		(OA85)
1N43		(OA85)
1N44		(OA85)
1N45		(OA85)
1N46		(OA85)
1N47		(OA85)
1N48		(OA85)
1N50		(OA85)
1N51		(OA85)
1N52		(OA85)
1N54		(OA85)

Type number	Alternative CV number	Philips type
1N54A		(OA85)
1N57		(OA85)
1N58		(OA85)
1N58A		(OA85)
1N60		(OA70); (OA73)
1N61		(OA85)
1N62		(OA85)
1N63		(OA84)
1N64		(OA73); (OA70)
1N65		(OA81)
1N66		(OA85)
1N67A		(OA84)
1N68		(OA85)
1N68A		(OA85)
1N69		(OA85)
1N70		(OA85)
1N75		(OA85)
1N81		(OA85)
1N86		(OA85)
1N87		(OA70)
1N88		(OA81)
1N89		(OA85)
1N90		(OA85)
1N111		(OA85)
1N112		(OA85)
1N113		(OA81)
1N114		(OA81)
1N115		(OA81)
1N116		(OA85)
1N126		(OA85)
1N127		(OA85)
1N128		(OA85)
1N135		(OA85)
1N191		(OA86)
1N192		(OA87)
1N198		(OA85)
1P1		DL96; 3C4
1P10		DL92; 3S4
1P11		DL94; 3V4
1P23		(3554)
1P32		(3546PW)
1Q5GT	1826	1Q5GT; DL36
1R5	782	DK91; 1R5
1S2		DY86; 1S2
1S5	784	DAF91; 1S5

Type number	Alternative CV number	Philips type
1T4	785	DF91; 1T4
1U5		1U5; DAF92
1V6		1V6; DCF60
1X2A 1X2B		(DY86)
2B35	1092	EA50
2D4A	795	(AB2)
2D21	797	2D21; PL2D21
2D21W		PL5727
2J42	3676	2J42
2J42A		(JP9-15)
2J49	3687	2J49
2J50	2793	2J50
2K25	2792	2K25
2N115		OC15; 2N115
2V/400A		DCC4/1000G
3A4	807	3A4; DL93
3A5	808	3A5; DCC90
3B4	2240	3B4
3B28	1835	DCX4/1000
3C4		DL96; 3C4
3C23		PL3C23; 3C23
3C45	372	PL345
3NP4		(MW6-2)
3Q4	818	3Q4; DL95
3Q5GT	819	3Q5GT; DL33
3S4	820	DL92; 3S4
3V4	2983	DL94; 3V4
3V340B		(PL 5557)
3V390B		(PL5559)
3V420B		(PL5559)
3V490A		(PL105)
3WP1		(DG7-36)
4-65A	1905	QB3/200
4/100BU		AZ50
4-125A	2130	(QB3/300); (6155)
4-250A	2131	(QB3.5/750); (6156)
4B26	1836	1163
4B32	2518	DCX4/5000
4C35	1787	6268/4C35; PL435
4D21	2130	(QB3/300); (6155)
4G/280K		PL2D21; 2D21
4GTP		(3546PW)
4H135M	2519	QEL1/150
4J50	2284	4J50
4J78		4J78
4PR60A	2752	QEP20/18
4X150A	2519	QEL1/150
4X500A		QBL4/800
5AR4		GZ34; 5AR4
5B21		1164
5B/250A		QE06/50; 807
5C22	2520	6279/5C22; PL522
5C/100A		QB2/250
5CP1A		(DG13-2)
5CP7A		(DP13-2)
5D22		(QB3.5/750); (6156)
5FP4A		(MW13-35)
5FP7A		(MF13-1)
5J26	3602	5J26
5T4	1846	(GZ34)
5U4G	575	5U4G; (GZ34)
5UP1		(DG13-32)
5V4G	729	(GZ34)
5X4G	1851	(GZ34)
5Y3GT	1856	5Y3GT
5Z4GT	2748	(GZ34)
6A8GT	580	(EK32)
6AB4		(EC92)
6AB8		ECL80; 6AB8
6AF4		(EC93)
6AF4A		(EC93)
6AG6G		EL33
6AJ8	2128	ECH81; 6AJ8
6AK5	850	6AK5; EF95
6AK8		EABC80; 6AK8
6AL5	283	EAA91; 6AL5; (EB91)
6AM5	136	EL91: 6AM5
6AM6	138	EF91; 6AM6
6AQ5	1862	6AQ5
6AQ8		ECC85; 6AQ8
6AT6	452	6AT6
6AU6	2524	6AU6
6AV6	2526	6AV6
6B8	1894	(EBF32)
6B8G	1893	(EBF32)
6BA6	454	6BA6
6BD7A		EBC81; 6BD7A
6BE6	453	6BE6
6BE7		EQ80; 6BE7

Type number	Alternative CV number	Philips type	Type number	Alternative CV number	Philips type
6BL8		ECF80; 6BL8	6M6G		EL33
6BM8		ECL82; 6BM8	6N3		EY82; 6N3
6BQ5	2975	EL84; 6BQ5	6N8		EBF80; 6N8
6BQ7A		(ECC84)	6P8G		(ECH35)
			6P28		(EL38)
6BR5		EM80; 6BR5	6Q4	1886	EC80; 6Q4
6BS4		EC93; 6BS4	6Q7G	587	(EBC33)
6BT4	3891	EZ40; 6BT4	6R3		EY81; 6R3
6BX6		EF80; 6BX6	6R4	1865	EC81; 6R4
6BY6		(E91H)	6R7G	1962	(EBC33)
6BY7		EF85; 6BY7	6SA7GT	1967	6SA7GT
6BZ7		(ECC84)	6SK7GT	1982	6SK7GT
6C4	133	6C4; EC90	6SN7GT	1988	6SN7GT
6C10		ECH42	6SQ7GT	1991	6SQ7GT
6C31		(ECH35)	6T8		(EABC80)
6CA7	1741	EL34; 6CA7	6U3		EY80; 6U3
6CB6		6CB6	6U7G	706	(EF39)
6CD7	394	EM34; 6CD7	6U8		(ECF80)
6CJ5	3886	EF41; 6CJ5	6V3		(EY81)
6CJ6	2721	EL81; 6CJ6	6V3A		(EY81)
6CK5	3889	EL41; 6CK5	6V4		6V4; (EZ80)
6CK6	2726	EL83; 6CK6	6V6GT	511	6V6GT
6CM5		EL36; 6CM5	6W2		(EY51)
6CN6	450	EL38; 6CN6	6X2	426	EY51; 6X2
6CQ6	131	EF92;6CQ6	6X4	493	6X4
6CS6		EH90;6CS6	6X5GT	574	(EZ35)
6CT7	3883	EAF42; 6CT7	7AHP1		DG16-22; 7AHP1
6CU7	3888	ECH42; 6CU7	7AN7		PCC84; 7AN7
6CV7	3882	EBC41; 6CV7	7D9	136	EL91; 6AM5
6CW7		ECC84; 6CW7	7F16		EF41
6D1	1092	EA50	8A		(3554)
6D2	140	EB91; 6AL5; (EAA91)	8D3		EF91; 6AM6
6DA6		EF89; 6DA6	9A8		PCF80; 9A8
6E8G		(ECH35)	9AK8		PABC80; 9AK8
6F1		(EF42)	9AQ8		PCC85; 9AQ8
6F12		EF91; 6AM6	9D6		EF92; 6CQ6
6F13	1839	(EF42)	10F1		(UF42)
6F16		EF41	10F3		(UF42)
6H6G/GT		(EB34)	10F9		(UF41)
6J6	858	6J6; ECC91	10LD3		UBC41
6J7GT	1937	(EF37A)	10M2		UM4
6J8G	859	(ECH35)	10M75		MC1/60
6K7GT	1943	(EF39)	12AC5		UF41; 12AC5
6LD3		EBC41	12AT6		12AT6
6M2		EM34; 6CD7	12AT7	455	ECC81; 12AT7

Type number	Alternative CV number	Philips type	Type number	Alternative CV number	Philips type
12AU6	1961	12AU6	44IU		(1561)
12AU7	491	ECC82; 12AU7	45A5		UL41; 45A5
12AV6		12AV6	50C5	1959	50C5; (HL94)
12AX7	492	ECC83; 12AX7	50L6GT	571	50L6GT
12BA6	1928	12BA6	51A		(3546PW)
12BE6		12BE6; (HCH81); (12D8)	51AV		(3545PW)
			53CG		58CG/PW
12D8		HCH81; 12D8	53CV		58CV/PW
12S7		UAF42; 12S7	53KU	378	(GZ34)
12SA7GT	538	12SA7GT	54KU		GZ32; (GZ34)
12SK7GT	544	12SK7GT	57		PL5559
12SN7GT	925	12SN7GT	59A		(3554)
12SQ7GT	547	12SQ7GT	62DDT		EBC41
12XP4A		MW31-74	62TH		ECH42
14K7		UCH42; 14K7	62VP		EF41
14KP4A		(MW36-44)	63SPT		EF50
14L7		UBC41; 14L7	63TP		ECL80; 6AB8
14LP4		(MW36-44)	64ME		EM34; 6CD7
15A6		PL83; 15A6	64SPT		EF80; 6BX6
16A5		PL82; 16A5	65ME		EM80; 6BR5
16A8		PCL82; 16A8	66KU		EZ40
16AP4		(MW41-1)	67PT		EL41
17	2957	PL5557	80	617	80
17BP4A		(MW43-64)	85A1	431	85A1; OE3
17BP4B		(MW43-64)	85A2	449	85A2; OG3
17CP4		(MW43-43)	90AG	2270	90AG
17Z3		PY81; 17Z3	90AV	2132	90AV
19BD		PY80; 19X3	90CC	2133	90CG
19D8		UCH81	90CV	2134	90CV
19SU		PY82; 19Y3	100TH	2552	TB3/350
19X3		PY80; 19X3	105		PL105
19Y3		PY82; 19Y3	105A		(PL105)
20A3		PL2D21; 2D21	108C1		OB2
21A6		PL81; 21A6	112K		(MW31-74)
21AMP4A		(MW53-80)	121K		(MW31-74)
21ZP4B		(MW53-20)	121VP		UF41
25E5		PL36; 25E5	141DDT		UBC41
25L6GT	533	25L6GT	141K		(MW36-44)
30A5		HL94; 30A5	141TH		UCH42
30C1		PCF80; 9A8	150B2	2225	150B2; 6354
30L1		PCC84; 7AN7	150C1K		(OD3)
31A3		UY41; 31A3	150C2	1832	OA2
35C5		(HL94)	150C3	216	OD3
35Z5GT	568	35Z5GT	171DDP		UBF80
43IU		(1561)	171K		(MW43-64)

Type number	Alternative CV number	Philips type
172		(PL105)
172K		MW43-64
213Pen		PL81; 21A6
238B		PL5555
250TH	2589	TB4/800
267B		(DCG5/5000GB)
272		PL5557
311SU		UY41
323B		PL3C23; 3C23
393A		PL3C23; 3C23)
408BU		(1805)
442BU		(1561)
451PT	1977	UL41
451U		AZ50
460BU	2644	1561
502A		(PL2D21); (2D21)
575A		(DCG5/5000GB)
651		PL5552
652		PL5551
653B		PL5555
655		(PL5553B)
656		PL5552
657		PL5551
658		(PL5553B)
676		(PL105)
681		(PL5550)
686		(PL5550)
723A/B	1795	723A/B
725A	722	725A
807	124	QE06/50
813	26	QB2/250
816		(DCG4/1000G)
828	631	(PB1/150)
829		(QQE06/40)
829B	2666	5894; (QQE06/40)
832		{QQE04/20; (QQE03/20)}
832A	788	{QQE04/20; (QQE03/20)}
833A		(5868); (TB4/1250)
834		TB1/60G
837	637	(PE04/10E)
857B		(DCG7/100)
866		DCG4/1000G
866A, 866AX	32	DCG4/1000G

Type number	Alternative CV number	Philips type
866B		(DCG4/1000G)
868	2680	(3554)
869A		(6508); (DCG9/20)
869B	2723	(6508); (DCG9/20)
872		DCG5/5000GB
872A, 872AX	642	DCG5/5000GB
873		(DCG6/6000)
884		(PL2D21); (2D21)
885		(PL2D21); (2D21)
891		(TAW12/10)
891R		(TAL12/10)
892		(TAW12/10)
892R		(TAL12/10)
918		(3554)
927		3546PW/02
928		(3533G)
966		DCG4/1000G
967		PL5557
1163	1836	1163
1257		PL5559
1267/OA4G	1992	Z300T/PL1267
1295		(PL5559)
1625	659	(PE06/40E)
1657		(PL2D21); (2D21)
1665		(PL2D21); (2D21)
1672		(PL15)
1701		PL5557
1877	1134	1877
1904		(PL5559)
2000		1163
2050		(PL2D21); (2D21)
2183		1164
3078A		6508; DCG9/20
3304B		TB1/60G
3572		DCG4/1000G
3861B		QEL1/150
3874A	26	QB2/250
3885A		DCX4/1000
4261		PL5557
4636	1324	4636
4687	2766	4687
5544	2210	PL5544
5545	2215	PL5545
5551		PL5551

Type number	Alternative CV number	Philips type	Type number	Alternative CV number	Philips type
5552		PL5552'	6086		18042; 6086
5553B		PL5553B	6146	3523	QE05/40
5555		PL5555	6155	2130	6155; QB3/300
5557/17	2957	PL5557	6156	2131	6156; QB3.5/750
5559/57	612	PL5559	6218		E80T; 6218
5560		(PL5559)	6227		E80L; 6227
5561		(PL5559)	6252	2799	6252; QQE03/20
5632		(PL5559)	6267	2901	EF86; 6267
5651	2573	[1]85A2; 5651	6268	1787	6268/4C35; PL435
5654	4010	5654	6279	2520	6279/5C22; PL522
5672	2238	5672	6347		(PL5552A)
5676	2239	5676	6354	2225	150B2; 6354
5678	2254	5678	6360	2798	6360; QQE03/12
5726		5726	6370		E1T; 6370
5727	4018	PL5727	6374	2235	EY84; 6374
5762/7C24		(5924); (TBL6/6000)	6375	2275	DC70; 6375
5763	2129	QE03/10	6508		6508; DCG9/20
5800/VX41		(4066)	6617		6617; TBW12/25
5802/VX32		(4065)	6618		6618; TBL12/25
5822		PL5822	6686		E81L; 6686
5823		Z900T/5823	6687		E91H; 6687
5861	273	EC55; 5861	6688		E180F; 6688
5866	1924	5866; TB2.5/300	6689		E83F; 6689
5867		5867; TB3/750	6693		6693; DCG6/18
5868		5868; TB4/1250	6755		PL6755; 6755
5869		5869; (DCG6/6000)	6778		EC70; 6778
5870		5870; DCG12/30	6779		Z803U; 6779
5894	2797	5894; QQE06/40	6786		6786; DCG7/100B
5895	1838	5895; QQC04/15	7475	1070	7475
5915		(E91H)	8008		DCG5/5000GS
5920		E90CC; 5920	8020	2967	8020
5923		5923; TBW6/6000	18042		18042; 6086
5924		5924; TBL6/6000	38116		1163
6007		DL67; 6007	38166		DCG4/1000G
6008		DF67; 6008	38172		DCG5/5000GB
6050		(PL5559)	38217		PL5557
6075		6075; QBW5/3500	38250		OD3
6076		6076; QBL5/3500	38807		QE06/50
6077		6077; TBW12/100	38837		(PE04/10E)
6078		6078; TBL12/100	55035		2J42
6079	3522	6079; QB5/1750	55038		2J50
6083		6083; PE1/100	55039		2J49
6084	2729	E80F; 6084	55040		725A
6085		E80CC; 6085	55390	2792	2K25
			55391	1795	723A/B

[1]) Philips 85A2 fulfils the requirements of the 5651

Type number	Alternative CV number	Philips type
56000	2967	8020
68506	2775	1163
68508		1164
178148		(1163)
187149		(1163)
180238		(1164)
189048		(1163)
189049	1836	1163
217283		1164
289414		(1163)
289416		(1163)
766776		1164
A11B/C/D		(1561)
AA61		ECC40
AG866A		DCG4/1000G
AG869B		(6508); (DCG9/20)
AG872A		(DCG5/5000GB)
AG8008		(DCG5/5000GB)
AGR9950		5869; (DCG6/6000)
AGR9951		5870; DCG12/30
AH201		(DCG4/1000G)
AH213		(DCG9/20)
AH217		DCG5/5000GB
AH221	5	(DCG4/5000)
AJ5552		(PL5552)
APP4Bs		(AL4)
APV4	1039	(1561)
AR10		(PL5552)
AR21	1055	EBC33
ARP34	1053	EF39
ARP35	1091	EF50
ARTH2		ECH35
ASG5017		PL5557
ASG5023		PL3C23; 3C23
ASG5045A		(PL105)
ASG5055		(PL255)
ASG5121		PL2D21
ASG5155		(PL255)
ASG5544		PL5544
ASG5545		PL5545
AX4-125A	2130	QB3/300;6155
AX4-250A	2131	QB3.5/750; 6156
AX224	1835	DCX4/1000
AX228		(DCX4/5000)
AX230	2518	DCX4/5000

Type number	Alternative CV number	Philips type
AX9900	1924	5866; TB2.5/300
AX9901		5867; TB3/750
AX9902		5868; TB4/1250
AX9903	2797	5894; QQE06/40
AX9904		5923; TBW6/6000
AX9904R		5924; TBL6/6000
AX9905	1838	5895; QQC04/15
AX9906		6077; TBW12/100
AX9906R		6078; TBL12/100
AX9907		6075; QBW5/3500
AX9907R		6076; QBL5/3500
AX9908	3522	6079; QB5/1750
AX9909		6083; PE1/100
AX9910	2799	6252; QQE03/20
AX9911	1787	6268/4C35; PL435
AX9912	2520	6279/5C22;PL522
B36		12SN7GT
B65		6SN7GT
B142	1927	(5868); (TB4/1250)
B152		ECC81; 12AT7
B309		ECC81; 12AT7
B319		(PCC84)
B329		ECC82; 12AU7
B339		12AX7; ECC83
B719		ECC85; 6AQ8
BK24		(PL5552)
BK34		(PL5553B)
BK42		(PL5551)
BK46		(PL5555)
BR191		(TBL6/6000)
BT5		(PL5559)
BT5A		(PL5559)
BT19		PL5557
BT27		PL105
BT29		(PL255)
BT35		(PL5559)
BT65		(PL5559)
BT69		DCG7/100B
BT91		PL5544
BVA243		EF 39
BVA246		EF39
BVA247		EF39
BVA264		EL 33
BVA265		EL 33
BVA266		EL 33

Type number	Alternative CV number	Philips type
BVA267		EL 33
BVA274, BVA275, BVA276		ECH35
C1C	1400	C1C
C3J		(PL5559)
C3M		C3M
C6A		(PL5545)
C6J		(PL5545)
C6JA		(PL5545)
C6L		(PL5545)
C6M		(PL5545)
C6P		(PL5545)
C12FM		MW31-74
C143	26	QB2/250
C144	2666	(QQE06/40)
C180	788	QQE04/20
C350		(QE06/50)
C866A		DCG4/1000G
C872		DCG5/5000GB
C1108		6155; QB3/300
CE1AB		(3554)
CE1C		(3554)
CE1D		(3554)
CE-1P23		(3554)
CE-1P32		(3546PW)
CE5AB		(3546PW)
CE5C		(3546PW)
CE5D		(3546PW)
CE25AB		(3546PW)
CE25C		(3546PW)
CE25D		(3546PW)
CE25E		(3546PW)
CE25VAB		(3545PW)
CE25VC		(3545PW)
CE30Q		PL5557
CE36AB		(3546PW)
CE36C		(3546PW)
CE36D		(3546PW)
CE56		(3546PW)
CE57		(3546PW)
CE225		(1163)
CE226		1163
CE235		1164
CE306		(PL105)
CE309		PL5557
CE866A		DCG4/1000G
CE868		(3554)
CE872A		DCG5/5000GB
CE918		(3554)
CE927		3546PW/02
CEA1		(3554)
CEB25C		(3546PW)
CEB25D		(3546PW)
CEB25VAB		(3545PW)
CEB25VC		(3545PW)
CE-B36		(3546PW)
CK705		(OA85)
CK707		(OA85)
CK708		(OA85)
CK713A		(OA85)
CK5672		5672
CK5678		5678
CK5726		5726
CR1100		QBL5/3500
CST2/12		(PL255)
CT1/2500		PL5559
CV nrs. see page 23		
D2M9		EAA91; 6AL5;(EB91)
D63		(EB34)
D77		EAA91; 6AL5;(EB91)
D121		(UAF42)
D152		EAA91; (EB91)
DA90	753	1A3; DA90
DAF91	784	DAF91; 1S5
DAF92		1U5; DAF92
DAF96		DAF96;1AH5
DAF191		(DAF91)
DC70	2275	DC70;6375
DCC90	808	3A5; DCC90
DCF60		1V6; DCF60
DCG1/250	3667	DCG1/250
DCG1.5/250	1072	DCG1.5/250
DCG4/1000ED	1625	DCG4/1000ED
DCG4/1000G	32	DCG4/1000G
DCG5/5000EG		DCG5/5000EG

Type number	Alternative CV number	Philips type
DCG5/5000GB	642	DCG5/5000GB
DCG6/18		6693; DCG6/18
DCG6/6000		DCG6/6000; (5869)
DCG7/100B		6786; DCG7/100B
DCG9/20		6508; DCG9/20
DCG12/30		5870; DCG12/30
DCX4/1000	1835	DCX4/1000
DCX4/5000	2518	DCX4/5000
DD6 (Ferr. Coss.)		EB91
DD6S		(EB91)
DDPP4BS		ABL1
DDPP6S		EBL1
DDPP39S		CBL1
DDR2	173	EF55
DDR3	135	EY91
DDR7		EL91; 6AM5
DDT4S		ABC1
DDT6S		EBC3
DET12	1288	TB1/60G
DET22	273	EC55; 5861
DF11		(DF91)
DF64	2260	DF64
DF66	2107	DF66
DF67		DF67; 6008
DF91	785	DF91; 1T4
DF92	1758	1L4; DF92
DF96		DF96; 1AJ4
DF191		(DF91)
DG7-5	2175	DG7-5
DG13-2	2191	DG13-2
DH77		6AT6
DH142		UBC41
DH147		EBC33
DH149		(EBC21)
DH150		EBC41
DH719		EABC80; 6AK8
DK32		DK32; (1A7GT)
DK91	782	DK91; 1R5
DK92		DK92; 1AC6
DK96		DK96; 1AB6
DK192		(DK92)

Type number	Alternative CV number	Philips type
DL33	819	3Q5GT; DL33
DL35		1C5GT; DL35
DL36		1Q5GT; DL36
DL66	2106	DL66
DL67		DL67; 6007
DL68	2259	DL68
DL91	783	(DL92)
DL92	820	DL92; 3S4
DL93	807	3A4; DL93
DL94	2983	DL94; 3V4
DL95	818	3Q4; DL95
DL96		DL96; 3C4
DL98	2240	3B4
DL192		(DL92)
DL193		(DL94)
DM70	2980	DM70; 1M3
DN143		EBL21
DP6		(OA71)
DP6C		(OA71)
DP61		6AK5; EF95
DQ2		866A; DCG4/1000G
DQ2a		DCG4/1000ED
DQ4		872A; DCG5/5000GB
DQ4a		DCG5/5000EG
DQ6		6508; DCG9/20
DS60		(OA71); (OA85)
DS61		(OA85)
DS61A		(OA85)
DS62		(OA85)
DS77		(EAA91); (EB91)
DS604		(OA81)
DS611		(OA81)
DS621		(OA81)
DT3		(1561)
DT30		(1561)
DW2		(1805)
DW3		(1561)
DW4		1561
DW4-350	1796	1561
DW4-500		1561
DY86		DY86; 1S2
DX2		DCX4/1000
E1T		E1T; 6370
E2d111		AL4
E60M		MC1/60
E80CC		E80CC; 6085

Type number	Alternative CV number	Philips type
E80F	2729	E80F; 6084
E80L		E80L; 6227
E80T		E80T; 6218
E81L		E81L; 6686
E83F		E83F; 6689
E90CC		E90CC; 5920
E91H		E91H; 6687
E125A		6155; QB3/300
E180F		E180F; 6688
E250A		6156; QB3.5/750
E900		TB4/800
E1200		TB3/1000
E2385		(EY86)
EA50	1092	EA50; 2B35
EAA91	283	EAA91; 6AL5; (EB91)
EAA171		(EAA91); (EB91)
EABC80		EABC80; 6AK8
EAC91	137	EAC91
EAF42	3883	EAF42; 6CT7
EB34	1054	EB34
EB41	3881	EB41
EB91	140	EB91; (6AL5); (EAA91)
EBC3	1428	EBC3
EBC33	1055	EBC33
EBC41	3882	EBC41; 6CV7
EBC81		EBC81; 6BD7A
EBC90	452	6AT6
EBC91	2526	6AV6
EBF2	2925	EBF2
EBF32	501	EBF32
EBF80		EBF80; 6N8
EBF171		(EBF80)
EC55	273	EC55; 5861
EC56		EC56
EC80	1886	EC80; 6Q4
EC81	1865	EC81; 6R4
EC90	133	6C4; EC90
EC93		EC93; 6BS4
EC94		(EC93)
ECC32	181	ECC32
ECC35	569	ECC35
ECC40	3884	ECC40
ECC81	455	ECC81; 12AT7

Type number	Alternative CV number	Philips type
ECC82	491	ECC82; 12AU7
ECC83	492	ECC83; 12AX7
ECC84		ECC84; 6CW7
ECC85		ECC85; 6AQ8
ECC91	858	6J6; ECC91
ECF80		ECF80; 6BL8
ECH3	2929	ECH3
ECH35	1347	ECH35
ECH42	3888	ECH42; 6CU7
ECH71		(ECH21)
ECH81	2128	ECH81; 6AJ8
ECH171		(ECH81)
ECL80		ECL80; 6AB8
ECL82		ECL82; 6BM8
EE17		PL5557
EE866		DCG4/1000G
EF9	1427	EF9
EF22	303	EF22
EF36	1056	(EF37A)
EF37A	358	EF37A
EF39	1053	EF39
EF40	3885	EF40; 6CJ5
EF41	3886	EF41
EF42	3887	EF42
EF50	1091	EF50
EF55	173	EF55
EF80		EF80; 6BX6
EF85		EF85; 6BY7
EF86	2901	EF86; 6267
EF89		EF89; 6DA6
EF91	138	EF91; 6AM6
EF92	131	EF92; 6CQ6
EF93	454	6BA6
EF94	2524	6AU6
EF95	850	6AK5; EF95
EF174		(EF80)
EF175		(EF85)
EF804		(EF86)
EF8045		(E80F)
EH90		EH90; 6CS6
EK2	1426	EK2
EK32	1057	EK32
EK90	453	6BE6
EL2	1429	EL2
EL33	2938	EL33

Type number	Alternative CV number	Philips type	Type number	Alternative CV number	Philips type
EL34	1741	EL34; 6CA7	F872B		DCG5/5000GB
EL36		EL36; 6CM5	F2219		6279/5C22; PL522
EL38	450	EL38; 6CN6	FG17	2957	PL5557
EL41	3889	EL41; 6CK5	FG27A		(PL5559)
EL42	3890	EL42	FG33		(PL5559)
			FG57		PL5559
EL81	2721	EL81; 6CJ6	FG67	742	(PL5557)
EL83	2726	EL83; 6CK6	FG95		(PL5559)
EL84	2975	EL84; 6BQ5	FG97		(PL5557)
EL90	1862	6AQ5	FG98A		(PL5557)
EL91	136	EL91; 6AM5	FG105		PL105
EL171		(EL84)	FG172		(PL105)
EL-C3J		(PL5559)	FG235A		PL5552
EL-C3JA		(PL5559)	FG238B		PL5555
EL-C6A		(PL5545)	FG258A		(PL5553B)
EL-C6J		(PL5545)	FG271		PL5551
EL-C6JA		(PL5545)	FW4/500		AZ50
EL-C6L		(PL5545)	FX219	2520	6279/5C22; PL522
EM4	1434	EM4	FX225	1787	6268/4C35; PL435
EM11		(EM34)	FX227	372	PL345
EM34	394	EM34; 6CD7	Fz12/G		(3554)
EM35		(EM34)	Fz9011/V		90AV
EM80		EM80; 6BR5	Fz9011/G		90AG
EM171		(EM34)	G1		(3554)
EN91		PL2D21; 2D21	G3S2		(PL2D21); (2D21)
EQ80		EQ80; 6BE7	G3S2B		(PL2D21); (2D21)
ESU200		(DCG4/5000)	G4		(3546PW)
ESU300	2947	DCG4/5000	G4S5		PL2D21); (2D21)
ESU866		DCG4/1000G	G4S5B		(PL2D21); (2D21)
ESU872		DCG5/5000GB	G7.5/06D		(DCG4/1000G)
ESU8008		(DCG5/5000GB);	G8		(3554)
ET1000		TB4/800	G9		(3554)
EY51	426	EY51; 6X2	G10/4d		(DCG5/5000GB)
EY80		EY80; 6U3	G15F		(3546PW)
EY81		EY81; 6R3	G16		(3546PW)
EY82		EY82; 6N3	G16B		(3546PW)
EY84	2235	EY84; 6374	G20/5d		(6508); (DCG9/20)
EY91	135	EY91	G23		(3554)
EZ40	3891	EZ40; 6BT4	G26		(OA85)
EZ90	493	6X4	G49		1163
F353		DCG5/5000GB	G180/2M		OD3
F353A		DCG5/5000GB	G4120[1])		1561
F366A		DCG4/1000G	GD1E		(OA85)
F369A		(6508)	GD1Q		(OA85)
F369B		(6508)	GD2E		(OA85)

[1]) Triotron

Type number	Alternative CV number	Philips type
GD2Q		(OA85)
GD3E		(OA85)
GD4E		(OA85)
GEX45/1		(OA85)
GEX55/1		(OA81)
GL2D21		PL2D21; 2D21
GL57		PL5559
GL414		(PL255)
GL415		PL5550
GL502A		(PL2D21)
GL807		QE06/50
GL813		QB2/250
GL832		QQE04/20
GL834		TB1/60G
GL837		(PE04/10E)
GL866A		DCG4/1000G
GL868		(3554)
GL872A		DCG5/5000GB
GL884		(PL2D21); (2D21)
GL885		(PL2D21); (2D21)
GL918		(3554)
GL927		3546PW/02
GL2050		(PL2D21); (2D21)
GL5551/ FG271		PL5551
GL5552/ FG235A		PL5552
GL5555/ FG238B		PL5555
GL5557/ FG17		PL5557
GL5559/ FG57		PL5559
GL5632		(PL5559)
GL5720		(PL5559)
GL5727		PL5727
GL5822		PL5822
GL5855		(PL255)
GL6011		(PL5559)
GLE10000/ 025/1		DCG4/1000ED
GLE 15000/1/4		(DCG5/5000GB)
GR1		TA4/800
GRG5		(PL105)
GS17		(3533)
GS47X		3546PW/02
GS146		(3554)
GT4A		(EC50)
GTE 125000		TA18/100
GU12		(DCG4/1000G)
GU20/21		(DCG4/5000)
GU21SP	152	(DCG4/5000)
GXU1		DCX4/1000
GXU2		DCX4/5000
GZ30		(GZ34)
HBC90		12AT6
HBC91		12AV6
HCH81		HCH81; 12D8
HD14		DAC32
HD51		OA2
HD52		OB2
HD2053		(OA85)
HD2057		(OA85)
HD2060		(OA85)
HD2063		(OA85)
HF61		EF41
HF62		EF42
HF93	1928	12BA6
HF94	1961	12AU6
HF121		UF41
HF258B		(DCG4/1000G)
HK90		12BE6
HL92	1959	50C5
HL94		HL94; 30A5
HM04		6BE6
HVR2		1877
HY60		(QE06/50)
HY61		QE06/50
HY90		35W4
IW3		(1561)
IW4/500		(1561)
JP9-7		2J42
JP9-7A	370	JP9-7A
JP9-7D		JP9-7D
JP9-15		JP9-15
JP9-250	2284	4J50
K2		DCG4/1000ED
K322		(723A/B)
KB2	3515	KB2
KD25	216	OD3

Type number	Alternative CV number	Philips type	Type number	Alternative CV number	Philips type
KS9-20		723A/B	N18		3Q4; DL95
KS9-20A		2K25	N19		DL94; 3V4
KT8		PE06/40E	N77		(EL91); (6AM5)
KT32		25L6GT	N142		UL41
KTZ63		(EF37A)	N144		EL91; 6AM5
KU676		(PL105)	N147		EL33
L77		6C4; EC90	N150		EL41
LN152		ECL80; 6AB8	N151		EL42
LN309		(PCL82)	N152		PL81; 21A6
LZ319		(PCF80); (9A8)	N153		PL83; 15A6
M501		(55100)	N154		PL82; 16A5
M502		4J50	N155		EL85; 6BN5
M503	1866	JP9-7D	N309		(PL83); (15A6)
M506		(725A)	N329		PL82; 16A5
M508		JP9-7A	N709		EL84; 6BQ5
M513	3528	JP9-15	N727		6AQ5
M519		(55085)	NL714		(PL5557)
M550		(OA85)	NL715		PL5557
M550A		(OA85)	NL730		(6755)
M550B		(OA85)	NL5822		PL5822
M3100		(OA85)	NU1AB		(3554)
MC2/250M	200	MC2/250M	NU1C		(3554)
			NU1D		(3554)
ME1001	273	EC55; 5861	NU5		(3546PW)
ME1100	2792	2K25	NU25AB		(3546PW)
ME1101		2J42	NU25C		(3546PW)
ME1101A		JP9-15	NU25D		(3546PW)
ME1101D		JP9-7D	NU25VAB		(3545PW)
ME1401	495	4065	NU25VC		(3545PW)
ME1402		4066	NU25VD		(3545PW)
ME1503		(6268/4C35); (PL435)	NU34		(OA85)
MT17	1144	PL5557	NU36AB		(3546PW)
MT57	612	PL5559	NU36C		(3546PW)
MT105		PL105	NU36D		(3546PW)
MT5544	2210	PL5544	NU38		(OA85)
MT5545	2215	PL5545	NU58		(OA85)
MX113		18513	NU807		QE06/50
MX114		18514	NU813		QB2/250
MX204		21933	NU832		QQ04/20
MX205		21936	NU866A		DCG4/1000G
MX206		21937	NU872A		DCG5/5000GB
N14		(DL35)	OA70		OA70; 1N87G
N15		(3Q5GT); (DL33)	OA71	448[1]	OA71; (OA85)
N16		3Q5GT; DL33	OA73	442	OA73
N17		DL92; 3S4	OA74		OA74; (OA85)

[1] Special CV Version.

Type number	Alterna-tive CV number	Philips type
OA150		(OA71); (OA85)
OA159		(OA73)
OA160		(OA70)
OA161		(OA71); (OA81)
OA172		(OA72)
OC15		OC15; 2N115
OC601		(OC70)
OC602		(OC71)
OM3		EB34
OM4		EBC33
OM5A		(EF37A)
OM5B		EF37A
OM6		EF39
OM7		(EF39)
OM9		EL33
OM10		(ECH35)
OS12/500		PE04/10E
OS70/1750		(PB1/150)
P2-12		QQE04/20
P2-40B		(5894); (QQE06/40)
P6		1163
P15		1164
PA5021		DCG4/1000G
PABC80		PABC80; 9AK8
PC1.5/100	1221	PC1.5/100
PCC84		PCC84; 7AN7
PCC85		PCC85; 9AQ8
PCF80		PCF80; 9A8
PCF82		(PCF80); (9A8)
PCL41		(PCL82)
PCL81		(PCL82)
PCL82		PCL82; 16A8
PCL83		(PCL82)
PE1/100		6083; PE1/100
PJ23		(3554)
PL2D21	797	2D21; PL2D21
PL21		2D21; PL2D21
PL36		PL36; 25E5
PL57		PL5559
PL81		PL81; 21A6
PL82		PL82; 16A5
PL83		PL83; 15A6
PL345	372	PL345
PL435	1787	6268/4C35; PL435
PL522	2520	6279/5C22; PL522

Type number	Alterna-tive CV number	Philips type
PL1267	1992	PL1267/Z300T
PL5544	2210	PL5544
PL5545	2215	PL5545
PL5557	2957	PL5557
PL5559	612	PL5559
PL5727	4018	PL5727
PL6755		PL6755; 6755
PM04		6BA6
PM05		6AK5; EF95
PM07	138	EF91; 6AM6
PP2s		KL4
PP6As		EL2
PP6BG		EL33
PP6Bs		EL3
PT6	1221	PC1.5/100
PV4		(1561)
PV30s		CY2
PV100/2000		(866A)
PV495		(1805)
PV4100		1805
PV4200		1561
PY80		PY80; 19X3
PY81		PY81; 17Z3
PY82		PY82; 19Y3
PZ1/75	1221	PC1.5/100
QA2400		(EF92); (6CQ6)[1]
QA2401		(6C4); (EC90)[1]
QA2402		(EL91); (6AM5)[1]
QA2403		(EF91); (6AM6)[1]
QA2404		(EAA91); (EB91)[1]
QA2406		(ECC81); (12AT7)[1]
QA2407		(6X4)[1]
QA2408		6SN7GT[1]
QB2/250	26	QB2/250
QB3/300	2130	6155; QB3/300
QB3.5/750	2131	6156; QB3.5/750
QB5/1750	3522	6079; QB5/1750
QBL5/3500		6076; QBL5/3500
QBW/3500		6075; QBW5/3500
QE04/10	1510	QE04/10
QE05/40	3523	QE05/40
QE06/50	124	QE06/50
QEL1/150	2519	6360; QQE03/12

[1]) No special quality tube.

Type number	Alternative CV number	Philips type
QQC04/15	1838	5895; QQC04/15
QQE03/12	2798	6360; QEL1/150
QQE03/20	2799	6252; QQE03/20
QQE04/20	788	QQE04/20
QQE06/40	2797	5894; QQE06/40
QQV03-10	2798	6360; QQE03/12
QQV03-20A	2799	6252; QQE03/20
QQV06-40A	2797	5894; QQE06/40
QQV07-40	2666	(5894); (QQE06/40)
QQZ04-15	1838	5895; QQC04/15
QS83/3		85A2; OG3
QS92/10	1881	(7475)
QS95/10	286	95A1
QS150/40		OD3
QS1200	2225	150B2; 6354
QS1205		(4687K)
QS1207	1832	OA2
QS1208	1833	OB2
QV03-12	2129	QE03/10
QV04-7	1510	QE04/10
QV05-25	124	QE06/50
QV06-20	3523	QE05/40
QV1-150A	2519	QEL1/150
QV20-P18	2752	QEP20/18
QY2-100	26	QB2/250
QY3-65	1905	QB3/200
QY3-125	2130	6155; QB3/300
QY4-250	2131	6156; QB3.5/750
QY5-500	3522	6079; QB5/1750
QY5-3000A		6076; QBL5/3500
QY5-3000W		6075; QBW5/3500
R1		(1805)
R2		(1561)
R3		1561
R4		(1561)
R4A		(1561)
R6A		1163
R12 / R12A		EY51; 6X2
R15A		1164
R41(Ekco)		1561

Type number	Alternative CV number	Philips type
R42		(1561)
R51A		(3546PW)
R51AV		(3545PW)
R52		(GZ34)
R58A		(3546PW)
R58AV		(3545PW)
R59A		(3554)
R120		(1725A)
R121		(EF37A)
R243	273	EC55; 5861
R290		K81A
R1-125		(DCG4/1000G)
RG1-250	3667	DCG1/250
RG3-250A	32	DCG4/1000G
RG3-1250		DCG4/5000
RG4-1250		(DCG4/5000)
RG5-12GC		DCG7/100B
RG250/1000		DCG1/250
RG250/3000		DCG4/1000G
RG1000/3000		DCG5/5000GB
RGN1064		1805
RGN2004		1561
RGN4004		(AZ50)
RGQ7.5/06		(DCG4/1000G)
RGQ7.5/2.5		(DCG5/5000GB)
RHK6332		723A/B
RK44		(PE04/10E)
RK45		(PE04/10E)
RK48A		(QB2/250)
RK64		(QE06/50)
RK807		QE06/50
RK837		(PE04/10E)
RK866		DCG4/1000G
RL7		EF54
RL17		PL5557
RL21		PL2D21; 2D21
RL31		(OA81)
RL32		(OA81)
RL43		(OA81)
RL57		PL5559
RL105		PL105

Type number	Alternative CV number	Philips type
RL143		(OA81)
RL150		PL150
RL1267		Z300T/PL1267
RL1607		PL1607
RL5551		PL5551
RL5552		PL5552
RL5555		PL5555
RR3-250	1835	DCX4/1000
RR3-1250	2518	DCX4/5000
RS329		TA4/800
RS1006		5866; TB2.5/300
RS1007		6155; QB3/300
RS1009		QQE06/40
RS1011L		(TBL6/20)
RS1011W		(TBW6/20)
RS1016		5868; TB4/1250
RV120/350		1561
RV120/350s		1561
RV120/500		1561
RV120/500s		AZ4
RV200/600		(AZ50)
RX120A		1164
S856		OA2
S860		OB2
SAS		(PL5551)
SBS		PL5551
SCR		(PL5555)
SCS		PL5552
SD61		EA50
SDR		PL5555
SDS		PL5553B
SK60		(3554)
SK63		(3554)
SP4	1324	4636
SP6		EF91; 6AM6
SRU1		(TA4/800)
Ste1000/2.5/15		PL5559
Ste1000/20/120		(PL260)
Ste1300/01/05		PL2D21; 2D21
Ste2500/6/40		PL105

Type number	Alternative CV number	Philips type
Ste15000/15/45		DCG7/100
SU61		EY51; 6X2
T2M05		6J6; ECC91
T6D		EA50
T249B		(DCG4/1000G)
T300-1		TB3/1000; (TB4/1250)
T813		QB2/250
T866A		DCG4/1000G
T872A		DCG5/5000GB
T900		(MW41-1)
T901		(MW41-1)
T901B		(MW41-1)
TB1/60A	1235	TB1/60A
TB1/60G		TB1/60G
TB2.5/300	1924	5866; TB2.5/300
TB3/350	2552	TB3/350
TB3/750		5867; TB3/750
TB4/800	2589	TB4/800
TB4/1250		5868; TB4/1250
TBL6/6000		5924; TBL6/6000
TBL12/25		6618; TBL12/25
TBL12/100		6078; TBL12/100
TBW6/6000		5923; TBW6/6000
TBW12/25		6617; TBW12/25
TBW12/100		6077; TBW12/100
TD03-10	273	EC55; 5861
TG57		PL5559
TH100TH		TB3/350
TH108		TA18/100
TH250TH		TB4/800
TH813	26	QB2/250
TH5021B	32	DCG4/1000G
TH5021V		DCG4/1000ED
TH5031B	642	DCG5/5000GB
TH5031V		DCG5/5000EG
TH5040		(6508); (DCG9/20)
TH5221V/B	1835	DCX4/1000
TH6011		PL5557
TH6031		PL5559
TH6050		(PL5559)

Type number	Alternative CV number	Philips type
TH6120		PL105
TH6220		PL5545
TH7010		(PL5551)
TH7020		PL5551
TH7030		PL5552
TH7040		(PL5553B)
TQ1/2		PL3C23
TQ2		PL5557
TQ2/3		(PL5544); (PL6755)
TQ2/6		(PL5545)
TQ2/12		(PL255)
TR14/21		(MW36-44)
TS49		C3M
TS51/ EF95		6AK5; EF95
TS52/ ECC91		6J6; ECC91
TS53/ 18042		18042
TS54/ E83F		E83F
TT10		QB2/250
TT16		6155; QB3/300
TT16D		6155; QB3/300
TT17		PL5557
TX2/3		PL5544
TX2/6		PL5545
TXM100		PL2D21; 2D21
TY1-50	1235	TB1/60A
TY2-125	1924	5866; TB2.5/300
TY3-250		5867; TB3/750
TY4-500		5868; TB4/1250
TY6-5000A		5924; TBL6/6000
TY6-5000W		5923; TBW6/6000
TY12-50A		6078; TBL12/100
TY12-50W		6077; TBW12/100
TY76		(PL5559)
TY77		(PL5559)
TY79		(PL5559)
TY6030		(PL5559)
TY6050		(PL5559)
TY6100		(PL5559)

Type number	Alternative CV number	Philips type
TY6120		(PL105)
TY6220		(PL5545)
U9	1443	(1805)
U10		(1805)
U12		(1561)
U12/14		1561
U14		1561
U18		AZ50
U18/20		(AZ50)
U43		EY51; 6X2
U50		(5Y3GT)
U52		(GZ34); 5U4G
U54		(GZ34)
U70		(EZ35)
U78		6X4
U142		UY41
U143		AZ31
U145		(UY41)
U147		EZ35
U150		EZ40
U151		EY51; 6X2
U152		PY80; 19X3
U153		PY81; 17Z3
U154		PY82; 19Y3
U319		PY82; (19Y3)
U404		(UY41)
U709		EZ81
U2410/P		U30
UAF42		UAF42; 12S7
UBC41		UBC41; 14L7
UCH42		UCH42; 14K7
UCH71		(UCH21)
UCH81		UCH81; 19D8
UCH171		(UCH81)
UE966		DCG4/1000G
UE966A		DCG4/1000G
UE967		PL5557
UE972A		DCG5/500GB
UF41		UF41; 12AC5
UF174		(UF80)
UF175		(UF85)
UH50		TB1/60G
UL41		UL41; 45A5
UL905		PL5559
UM11		(UM4); (UM34)
UM35		(UM34)

Type number	Alternative CV number	Philips type
UM171		(UM34)
UU3;UU4; UU5		(1561)
UU9	1855	(EZ40)
UU60/250		(1561)
UU120/350		(1561)
UU120/350A		(1561)
UU120/500 (Ediswan)		(1561)
UX866		DCG4/1000G
UY41		UY41; 31A3
V2M70		6X4
V15F		(3545PW)
V41		AZ41
V61		EZ40
V100		(AZ50)
V311		UY41
V312 (MazdaFr)		UY42
V884		EF92;6CQ6
VH550		DCG4/1000ED
VH550A		DCG4/1000G
VH7400		DCG5/5000GB
VH7400A		DCG5/5000EG
VP6(Coss)		EF92; 6CQ6
VR53	1053	EF39
VR55	1055	EBC33
VR56	1056	(EF37A)
VR57	1057	EK32
VR91	1091	[3]) EF50
[2])VR91A	1578	EF50
VR92	1092	EA50
[2])VR123	1123	EF8
VR150		OD3
VR150/30	216	OD3
VS34		(3545)
VS70	1070	7475
[1])VT39		(6508); (DCG9/20)
VT39A		(6508); (DCG9/20)
VT42	642	(DCG5/5000GB)
VT42A		(DCG5/5000GB)
VT46		(DCG4/1000G)
VT46A	32	DCG4/1000G
VT60A	1572	(QE06/50)

Type number	Alternative CV number	Philips type
VT74	1864	(GZ34)
[2])VT75	1075	(EL34)
[2])VT79	1079	(PE06/40N)
VT80	617	80
[2])VT88	1088	(QQE04/20)
VT88A		QQE04/20
VT91	1936	(EF37A)
VT91A	1937	(EF37A)
VT92	588	(EBC33)
VT92A	587	(EBC33)
VT93	1894	(EBF32)
VT93A	1893	(EBF32)
VT100		QE06/50
VT100A		(QE06/50)
VT101	637	(PE04/10E)
VT103	1990	(6SQ7GT)
VT104	546	(12SQ7GT)
VT107	510	(6V6GT)
VT107A	511	(6V6GT)
VT107B	509	(6V6GT)
VT117	1981	(6SK7GT)
VT117A	1982	6SK7GT
VT118	1088	(QQE04/20)
VT125	1805	(DL35)
VT126	573	(EZ35)
VT126A	572	(EZ35)
VT126B	574	(EZ35)
VT131	543	(12SK7GT)
VT139		OD3
VT144		QB2/250
VT146	1823	(DF33)
[2])VT146	1625	DCG4/1000ED
VT147	1802	(DK32)
VT150	1966	(6SA7GT)
VT150A	1967	6SA7GT
VT151	578	(EK32)
VT151B	580	(EK32)
VT161	537	(12SA7GT)
VT171	782	DK91; 1R5
VT172	784	DAF91; 1S5
VT173	785	DF91; 1T4
VT174	820	DL92; 3S4
[2])VT180	1053	EF39
[2])VT194	587	(EBC33)
[2])VT195	1863	(GZ34)
[2])VT196	509	(6V6GT)
[2])VT197	1629	(DCG4/5000)

Typenumbers between brackets are **near** equivalents.
[1]) American Army VT-numbers unless otherwise stated.
[2]) British VT-number.
[3]) Small mechanical differences.

Type number	Alternative CV number	Philips type
VT197A	1856	5Y3GT
[1])VT198	1075	(EL34); (6CA7)
[1])VT199	124	QE06/50
VT201	552	(25L6GT)
[1])VT201	1056	(EF37A)
VT201C	553	25L6GT
VT206A	729	(GZ34)
[1])VT207	1091	[2])EF50
VT218	2552	TB3/350
VT220	2589	TB4/800
VT221	819	3Q5GT; DL33
VT223	1820	(DAC32)
VT231	1988	6SN7GT
[3])VT244	575	(GZ34)
VT245		(PL2D21); (2D21)
VT250		[2])EF50
VT259		(5894); (QQE06/40)
VT264	818	3Q4; DL95
VT267	2967	8020
VT286	788	QQE04/20
[4])VT510	1510	QE04/10
VU64	1064	(1561)
VU134	1134	1877
VX550A		DCX4/1000
VX7400		DCX4/5000
W17		DF91; 1T4
W77		EF92; 6CQ6
W142		UF41
W143		EF22
W147		EF39
W148		(EF22)
W150		EF41
W719		EF85; 6BY7
W727		6BA6
WD142		UAF42
WD150		EAF42
WD709		EBF80; 6N8
WE12		EM4
WE17		PL5557
WE249A		(DCG4/1000G)
WE255B		(6508)
WE304B		(TB1/60G)
WE307A		(PE04/10E)
WE319A		(DCG5/5000GB)
WL2D21		PL2D21; 2D21
WL17		PL5557
WL105		PL105

Type number	Alternative CV number	Philips type
WL172		(PL105)
WL414		(PL255)
WL502A		(PL2D21); (2D21)
WL624		(PL105)
WL631		PL5559
WL632A		(PL5559)
WL651/656		PL5552
WL652/657		PL5551
WL653B		PL5555
WL655/658		(PL5553B)
WL676		(PL105)
WL681/686		PL5550
WL735		(3554)
WL739		(3546PW)
WL868		(3554)
WL884		(PL2D21); (2D21)
WL885		(PL2D21); (2D21)
WL918		(3554)
WL927		(3546PW)
WL2050		(PL2D21); (2D21)
WL5551/652		PL5551
WL5552/651		PL5552
WL5555/653B		PL5555
WL5557/17		PL5557
WL5559/57		PL5559
WL5685		(PL105)
WL5720		(PL5559)
WL8020		8020
WT210-0001		PL2D21; 2D21
WT210-0015		PL5557
WT210-0018		OD3
WT210-0056		PL5559
WT210-0062		PL5557
WT210-0069		PL5557
WT210-0071		PL5551

[1]) British VT-number
[2]) Small mechanical differences.
[3]) American VT-numbers unless otherwise stated.
[4]) British VT-number.

Type number	Alternative CV number	Philips type
WT210-0072 } WT210-0073 } WT210-0074		PL5552 (PL5553B) PL105
WT210-0079 } WT210-0091		PL105 (Z300T/PL1267)
WT272		(PL5557)
WT272A		(PL5557)
WT294		OD3
WTT118		PL105
X14		(DK32)
X17		DK91; 1R5
X18		DK92; 1AC6
X61M		(ECH35)
X142		UCH42
X143		ECH21
X147		ECH35
X150		ECH42
X719		ECH81; 6AJ8
X727		6BE6
XB767A		(PL2D21); (2D21)
XG1-2500	612	PL5559

Type number	Alternative CV number	Philips type
XG2-12		PL255
XG2-25		PL260
XG2-6400		PL105
XG5-500	2957	PL5557
XG15-12		DCG7/100B
XGQ2-6400 }		PL105
XH3-045	372	PL345
XH8-100	1787	6268/4C35; PL435
XH16-200	2520	6279/5C22; PL522
XR1-3200	2210	PL5544
XR1-6400	2215	PL5545
Z14		(DF33)
Z77		EF91; 6AM6
Z90		EF50
Z142		UF42
Z150		EF42
Z152		EF80; 6BX6
Z225		(DCG4/1000G)
Z300T		Z300T/PL1267
Z719		EF80; 6BX6
Z729		EF86; 6267
Z900T		Z900T/5823
ZD17		DAF91; 1S5
ZD152		EBF80; 6N8

Type number	Philips type	Type number	Philips type
CV5	(DCG4/5000)	CV495	4065
CV12	(6279/5C22)	CV501	EBF32
CV26	QB2/250	CV509	(6V6GT)
CV32	DCG4/1000G	CV510	(6V6GT)
CV124	QE06/50	CV511	6V6GT
CV131	EF92; 6CQ6	CV537	(12SA7GT)
CV133	6C4; EC90	CV538	12SA7GT
CV135	EY91	CV543	(12SK7GT)
CV136	EL91; 6AM5	CV544	12SK7GT
CV137	EAC91	CV546	(12SQ7GT)
CV138	EF91; 6AM6	CV547	12SQ7GT
CV139	(EC91)	CV551	(25L6GT)
CV140	EB91; (EAA91)	CV552	(25L6GT)
CV152	(DCG4/5000)	CV553	25L6GT
CV173	EF55	CV567	(35Z5GT)
CV181	ECC32	CV568	35Z5GT
CV200	MC2/250M	CV569	ECC35
CV216	OD3	CV571	50L6GT
CV273	EC55; 5861	CV572	(EZ35)
CV283	EAA91; 6AL5	CV574	(EZ35)
CV303	EF22	CV575	5U4G; (GZ34)
CV309	(QE04/10)	CV580	(EK32)
CV354	(EC55)	CV587	(EBC33)
CV358	EF37A	CV593	GZ32; (GZ34)
CV370	JP9-7A	CV600	(DG13-2)
CV372	PL345	CV612	PL5559
CV375	(EA50)	CV617	80
CV378	(GZ34)	CV631	(PB1/150)
CV394	EM34; 6CD7	CV637	(PE04/10E)
CV424	(5894); (QQE06/40)	CV642	DCG5/5000GB
CV425	(OA71)	CV659	(PE06/40E)
CV426	EY51; 6X2	CV706	(EF39)
CV429	MF31-55	CV718	(MF13-1)
CV431	85A1; OE3	CV722	725A
CV442	OA73	CV729	(GZ34)
CV448	OA71[1])	CV742	(PL5557)
CV449	85A2; OG3	CV752	(Z300T/PL1267)
CV450	EL38; 6CN6	CV753	1A3; DA90
CV452	6AT6	CV782	1R5; DK91
CV453	6BE6	CV784	DAF91; 1S5
CV454	6BA6	CV785	DF91; 1T4
CV455	ECC81; 12AT7	CV788	QQE04/20
CV491	ECC82; 12AU7	CV795	(AB2)
CV492	ECC83; 12AX7	CV797	PL2D21; 2D21
CV493	6X4	CV807	3A4; DL93

[1]) Special CV version

Type number	Philips type	Type number	Philips type
CV808	3A5; DCC90	CV1485	(55085/03)
CV818	3Q4; DL95	CV1486	(55085/04)
CV819	3Q5GT; DL33	CV1510	QE04/10)
CV820	DL92; 3S4	CV1570	(EK32)
CV838	(DP13-2)	CV1572	(QE06/50)
CV850	6AK5; EF95	CV1578	(EF50)
CV858	6J6; ECC91	CV1581	(ECH35)
CV859	(ECH35)	CV1625	DCG4/1000ED
CV877	(EF22)	CV1629	(DCG4/5000)
CV925	12SN7GT	CV1741	EL34; 6CA7
CV1039	(1561)	CV1758	1L4; DF92
CV1053	EF39	CV1787	6268/4C35; PL435
CV1054	EB34	CV1795	723A/B
CV1055	EBC33	CV1796	(1561)
CV1056	(EF37A)	CV1800	(DK32)
CV1057	EK32	CV1802	(DK32)
CV1060	(QE06/50)	CV1803	(DL35)
CV1062	TB1/60A(2x)	CV1805	1C5GT; DL35
CV1064	(1561)	CV1818	(DAC32)
CV1070	7475	CV1820	(DAC32)
CV1075	(EL34); (6CA7)	CV1821	(DF33)
CV1088	(832A); (QQE04/20)	CV1823	(DF33)
CV1091	EF50	CV1824	(DL36)
CV1092	EA50	CV1826	1Q5GT; DL36
CV1134	1877	CV1832	OA2
CV1221	PC1.5/100	CV1833	OB2
CV1235	TB1/60A	CV1835	DCX4/1000
CV1261	(DCG4/1000G)	CV1836	1163
CV1262	(DCG1/250)	CV1838	5895; QQC04/15
CV1264	AZ50	CV1839	(EF42)
CV1324	4636	CV1846	(GZ34)
CV1347	ECH35	CV1851	(GZ34)
CV1400	C1C	CV1854	(5Y3GT)
CV1404	(EF37A)	CV1855	(EZ40)
CV1426	EK2	CV1856	5Y3GT
CV1427	EF9	CV1862	6AQ5
CV1428	EBC3	CV1863	(GZ34)
CV1429	EL2	CV1864	(GZ34)
CV1434	EM4	CV1865	EC81; 6R4
CV1479	(55100/01)	CV1866	(JP9-7D)
CV1480	(55100/02)	CV1886	EC80; 6Q4
CV1481	(55100/03)	CV1893	(EBF32)
CV1482	(55100/04)	CV1894	(EBF32)
CV1483	(55085/01)	CV1905	(6083); (PE1/100)
CV1484	(55085/02)	CV1924	5866; TB2.5/300

Type number	Philips type	Type number	Philips type
CV1927	(5868); (TB4/1250)	CV2240	3B4
CV1928	12BA6	CV2259	DL68
CV1935	(EF37A)	CV2260	DF64
CV1936	(EF37A)	CV2270	90AC
CV1937	(EF37A)	CV2275	DC70; 6375
CV1942	(EF39)	CV2284	4J50
CV1943	(EF39)	CV2518	DCX4/5000
CV1944	(ECH35)	CV2519	QEL1/150
CV1945	(ECH35)	CV2520	6279/5C22; PL522
CV1946	(ECH35)	CV2524	6AU6
CV1947	(EL34)	CV2526	6AV6
CV1959	5OC5	CV2552	TB3/350
CV1961	12AU6	CV2573	(85A2)
CV1966	(6SA7GT)	CV2589	TB4/800
CV1967	6SA7GT	CV2644	1561
CV1971	(DF91)	CV2666	(5894); (QQE06/40)
CV1976	MV6-5	CV2680	(3554)
CV1977	UL41	CV2721	EL81; 6CJ6
CV1981	(6SK7GT)	CV2723	(DCG9/20); (6508)
CV1982	6SK7GT	CV2726	EL83; 6CK6
CV1985	(ECC35)	CV2729	E80F; 6084
CV1988	6SN7GT	CV2730	4066
CV1990	(6SQ7GT)	CV2748	GZ30; (GZ34)
CV1991	6SQ7GT	CV2752	QEP20/18
CV1992	Z300T/PL1267	CV2765	4673
CV2106	DL66	CV2766	4787
CV2107	DF66	CV2775	1163
CV2128	ECH81; 6AJ8	CV2792	2K25
CV2129	QE03/10	CV2793	2J50
CV2130	6155; QB3/300	CV2797	5894; QQE06/40
CV2131	6156; QB3.5/750	CV2798	6360; QQE03/12
CV2132	90AV	CV2799	6252; QQE03/20
CV2133	90CG	CV2860	AZ1
CV2134	90CV	CV2862	AZ31
CV2166	(4J50)	CV2901	EF86; 6267
CV2175	DG7-5	CV2925	EBF2
CV2191	DG13-2	CV2929	ECH3
CV2195	(EF91)	CV2938	EL33
CV2210	PL5544	CV2947	DCG4/5000
CV2215	PL5545	CV2957	PL5557
CV2225	150B2; 6354	CV2967	8020
CV2235	EY84; 6374	CV2975	EL84; 6BQ5
CV2237	1AD4	CV2980	DM70; 1M3
CV2238	5672	CV2983	DL94; 3V4
CV2239	5676	CV3515	KB2

Type number	Philips type
CV3522	6079; QB5/1750
CV3523	QE05/40
CV3602	5J26
CV3659	55100-01
CV3660	55100-02
CV3661	55100-03
CV3662	55100-04
CV3667	DCG1/250
CV3676	2J42
CV3687	2J49
CV3881	EB41
CV3882	EBC41
CV3883	EAF42
CV3884	ECC40
CV3885	EF40
CV3886	EF41
CV3887	EF42
CV3888	ECH42
CV3889	EL41
CV3890	EL42
CV3891	EZ40
CV3892	AZ41
CV4010	5654
CV4018	PL5727

REPLACEMENT GUIDE FOR OBSOLETE TYPES

This list gives the most suitable replacement types for obsolete tubes. In a number of cases the replacement proposed can be carried out without important alterations being required in the equipment. In some cases, however, it will be necessary to rewire or change the socket, to use an adapter and or to modify the circuit. If a triode is replaced by a pentode the latter may be used in triode connection.

Obsolete type	Replacement type	Obsolete type	Replacement type	Obsolete type	Replacement type	Obsolete type	Replacement type
373	1805	B240	DLL21	DN9-5	DR10-5	FZ1	EZ2
505	1805	B252	KF3	DN10-3	DR10-3	KC1	KBC1
06, 506K	1805	B255	KF3	DN10-5	DR10-5	KC3	KBC1; KF3
1038	328	B262	KF3	DN10-6	DG10-6; DR10-6	KC4	KBC1
1326	1010	C243N	KL4			KCH1	KK2
560	80	C453	AL4	E406N	4613	KDD1	DLL21
708	367	CB1	EB4; UB41; EBF2	E408N	4613	KF1	KF3
1759	1859 +1289			E409	4614	KF2	KF3
1789	1788	CB2	EB4; UB41; EBF2	E424N	ABC1	KF4	KF3
801	1805			E424R	ABC1	KH1	KK2
1802	1805	CBC1	EBC3	E428	ABC1	KL1	KL4
1803	1805	CBL6	CBL1	E438	ABC1	KL5	KL4
1807	1805	CC2	EBC3; UBC41	E442	AF7	MA4/500	TB4/1250
315	AZ50			E443H	AL4	MC2.5/75	TB2.5/300
1817	AZ50	CF1	CF7; EF6	E443N	4688	MF31-22	MF31-35
1821	1805	CF2	CF3; EF9; UF9	E444	ABC1; AF7	MW22-7	MW22-16
323	1805			E444S	ABC1	MW22-14	MW22-16
832	4646	CK1	ECH3	E445	AF3	MW31-7	MW31-74
3541	3533	CK3	ECH3	E445S	AF3	MW31-14	MW31-74
4612	4613	CL1	EL2	E446	AF7	MW31-16	MW31-74
523	EA50	CL2	CBL1; EL2	E447	AF3	MW31-22	MW31-74
4635	4614	CL4	CBL1	E448	AK2	MW31-23	MW31-74
4652	AX50	CL6	CBL1	E449	AK2	MW31-24	MW31-74
670	DLL21	CY1	CY2	E452T	AF7	MW36-22	MW36-44
90	EC50	D404	4613	E453	AL4	MW36-24	MW36-44
4696	EEP1	DAC25	DAF91; DAF96	E455	AF3	MW43-40	MW43-64
5854/00	5854/03			E462	AF7	MW43-43	MW43-64
854/02	5854/03	DB7-1	DB7-5	E463	AL4	MW53-43	MW53-20
3038	1805	DB7-2	DB7-6	E499,	4657; AF7	OA50	OA81; OA85
18502	18512	DB7-3	DB7-5	EAB1	EBC3; EB4; EBC81	OA51	OA81; OA85
21940; 21941	21991 (0,8); 21993 (1,8); 21942 (0,8 1,8); 21997 (1,2)	DB7-4	DB7-6	EAF41	EAF42	OA52	OA81; OA85
		DB9-3	DB10-3	EB1	EBF2	OA53	OA81; OA85
		DB9-4	DB10-2	EC40	EC80	OA54	OA81; OA85
		DB9-5	DB10-5	ECH2	ECH3	OA55	OA81; OA85
		DC25	DF91; DF96	EE1	EEP1	OA56	OA81; OA85
22117	22119	DC80	DC70	EF1	EF6	OA57	OA81; OA85
24006	24008	DCH25	DK92; DK96	EF2	EF9	OA58	OA81; OA85
8117	28110	DDD25	DLL21	EF5	EF9; EF89	OA60	OA70
118	28111	DE2/200	DCG1/250; DCG4/1000	EF8	EF9; EF89	OA61	OA81
28119	28112			EF13	EF9; EF89	OA71	OA81
28138	28139	DF26	DAF91; DAF96	EF37	EF37A	OA74	OA81; OA85
000	8020			EFF50	EFF51	PE08/40	PE06/40
5210	MW13-35	DG7-1	DG7-5	EH2	ECH3; ECH4	PL17	PL5557
95384/00	95384/03	DG7-2	DG7-6	EK1	EK2	PL57	PL5559
95384/02	95384/03	DG7-3	DG7-5	EK3	ECH3; EK2	TA12/20000K	TAW12/20
B1	AB2; ABC1	DG7-4	DG7-6	EL1	EL2	UAF41	UAF42
AC2	ABC1	DG9-3	DG10-3 '	EL5	4689	UY1	UY1N; UY85
ACH1	AK2	DG9-4	DG10-2	EL6	4699		
D1	4683	DG9-5	DG10-5	EL43	EL83	UY21	UY1N; UY85
F2	AF3	DL25	DL94; DL92; DL96	EL44	EL81		
AH1	AK2			EM3	EM4		
AK1	AK2	DL91	DL94; DL92; DL96	EM11	EM34		
L2	4682; AL4			EZ1	EZ2		
AL5	4688	DN7-1	DR7-5	EZ3	EZ80		
AM1	EM4	DN7-3	DR7-5	EZ4	GZ34	EM1	EM4; EM34
X1	AX50; AZ50	DN7-4	DR7-6	EZ11	EZ2		
AZ21	AZ1; AZ41; 1561	DN7-5	DG7-5; DR7-5	EZ12	GZ34		
				F410	4650		
B217	KBC1	DN9-3	DR10-3	F443N	4650		
228	KBC1	DN9-4	DR10-2	F460	6743		

Note: All cathode-ray tubes with N-screen are obsolete, to be replaced by tubes with G- or R-screen.

INDUSTRIAL COMPONENTS AND MATERIALS

COMPONENTS

PROFESSIONAL COMPONENTS

Capacitors

- Hermetically sealed paper capacitors, tubular and box-type
  - High-tension capacitors
  - Power factor capacitors
  - Smoothing capacitors
- Mica capacitors
- Ceramic capacitors
- Polystyrene capacitors
- Professional electrolytic capacitors
- Fixed air-gap and variable capacitors
- Air-gap and ceramic trimmers

Resistors and Potentiometers

- Wire-wound precision resistors
- Precision cracked-carbon resistors
- Load resistors
- Wire-wound low-power potentiometers
- Load potentiometers
- NTC and VDR resistors

Electromechanical Components

- Holders for lamps, tubes and fuses
- Components for mounting and control
- Switches and relays

Variable Transformers

Quartz Crystal Units

Telephone Capsules

COMPONENTS FOR RADIO AND TELEVISION

Paper capacitors
Mica capacitors
Ceramic capacitors
Polystyrene capacitors
Low-power wire-wound resistors
Carbon resistors and potentiometers
NTC resistors
Tube sockets
Miniaturized components of advanced design

CERAMIC MATERIALS

Ferroxcube
Ferroxdure
Dielectrics
Insulating materials

TROPIC-PROOF PAPER CAPACITORS

Type	Cat. sheet	Working voltage at 40 °C	Capacitance	Tol.	Instability	Capacitive power	Losses	Ambient temp.	Insulation resistance at 20 °C	Remarks
Tubular rubber-sealed metal casing	EP 2006	Max. 125, 250, 500, 1000 V D.C	1000 pF—1 μF	± 10%	Max. ± 5%			—40 to +85 °C	R = min. 10,000 MΩ (C < 0.2 μF) RC = min. 2,000 sec (C ≥ 0.2 μF)	Available with insulating coat
Tubular rubber-sealed metal casing, one end earthed to can	EP 2004	Max. 125, 250, 500, 1000 V D.C	1000 pF—1 μF	± 10%	Max. ± 5%			—40 to +85 °C	R = min. 10,000 MΩ (C < 0.2 μF) RC = min. 2,000 sec (C ≥ 0.2 μF)	Supplied with mounting ring
Tubular ceramic casing	EP 2010	Max. 125—10,000 V D.C	1000 pF—1 μF	± 10%	Max. ± 2%			—40 to +70 °C	R = min. 20,000 MΩ (C < 0.1 μF) RC = min. 2,000 sec (C ≥ 0.1 μF)	Suitable at high altitudes
D.C. all-metal box-type	EP 2105 (2)	Max. 250, 500, 1000, 2000, 3400 V D.C	0.1—25 μF	± 10%	Max. ± 5%		Max. 0.40% at 50—300 c/s	—40 to +70 °C	R = min. 10,000 MΩ (C < 0.2 μF) RC = min. 2,000 sec (C ≥ 0.2 μF)	Glass or ceramic bushing insulators
D.C. all-metal box-type (metallized paper)	EP 2113	Max. 125, 350, 500 V D.C	1—100 μF	± 20%	Max. ± 5%		Max. 1% at 50 c/s	—20 to +70 °C	RC = min. 250 sec (125 V) = min. 1000 sec (higher voltages)	Glass bushing insulators
Smoothing capacitors	EP 2107 EP 2123	Max. 2—27 kV D.C.	1—16 μF	± 10%	Max. ± 5%		Max. 0.40% at 50—300 c/s	—40 to +70 °C	RC = min. 2000 sec	Ceramic bushing insulators
A.C. all-metal box-type	EP 2104	Nom. 220, 275, 380, 500, 750, 10000 V (50 c/s)	1—35 μF	± 10%	Max. ± 5%	24—942 var	Max. 0.36%	—40 to +70 °C		Glass or ceramic bushing insulators; discharge resistors built-in
Can-type for fluorescent lamps	EP 2124	Max. 350 V (50 c/s)	2.9, 3.4, 4, 6.3 μF	± 5%	Max. ± 5%		Max. 0.40% at 25—65 °C	—20 to +85 °C	RC = min. 2000 sec	Complies with Underwriters Test
Power factor capacitors	EP 2103	Nom. 220, 380, 400, 440, 500 V (50 c/s)	7—924 μF	—5 to +10%	Max. ± 5%	1—20 kvar	Max. 0.33% at 20 °C	—40 to +40 °C		Single-phase or three-phase; discharge resistors built-in
Power factor capacitors with chlorinated impregnant	EP 2120	Nom. 220, 380, 500 V (50 c/s)	8—1320 μF	—5 to +15%	Max. ± 5%	1.25—25 kvar	Max. 0.33% at 20 °C	—20 to +40 °C		Single-phase or three-phase; discharge resistors between terminals
Pressurized power factor capacitors	EP 2110	Nom. 0.5—10 kV (50—60 c/s)				50—100 kvar	Max. 0.33% at 20 °C	—40 to +50 °C		Manufactured to order
Hi[illegible]nsion [illegible]i-tor[illegible]	E[illegible]2	M[illegible] 20—2[illegible] V DC	[illegible] to 0.[illegible]	± [illegible]		C[illegible]at: 1[illegible] 300 W[illegible]			[illegible] = m[illegible].000 s[illegible]	N[illegible]ted u[illegible] to spe[illegible]cation

FIXED AIR-GAP AND VARIABLE CAPACITORS

Type	Cat sheet	Peak voltage * stator-rotor (V)	Variable cap. (pF)	Tol.	Max. zero cap. (pF)	Apparent power	Ambient temp.	Temp. coeff.	Insulation resistance	Torque gcm	Remarks
Air-gap trimmers	EP 2614(2) —2620/3	150—500 (350—1000)	2.5—250 (1—40)	+10% (min. 1 pF)	3—11.5 (2—5.5)		—40 to +85 °C	Max. 150 to 250×10^{-6}	Min. 1000 MΩ	200—600	Available with split stator and in differential design
Concentric air-gap trimmers	EP 2631	150—350	6.4—25	+20%	4		—40 to +85 °C	Max. 100×10^{-6}	Min. 10,000 MΩ	100—500	Highly stable Suitable for V.H.F.
Tubular ceramic trimmers	EP 2633	800	Min. 2.5, 5, 10		0.65—1		—40 to +85 °C	Max. 1.5 to 4×10^{-4}	Min. 10,000 MΩ	100—500	Small cross section Suitable for V.H.F.
Correcting capacitors	EP 2602/ 1—3	200—500 (500—1300)	2.5—100 (1.6—10)	+10% (min. 1 pF)	2—4 (1—2)		—40 to +85 °C	Max. 200×10^{-6}	Min. 1000 MΩ	150—350	Available with split stator and in differential design
Tuning capacitors (single to quadruple)	EP 2621 —2625	150—800 (250—1500)	1—4×16 (6.4) to 1—4×640(125)	+4% (min. 1 pF)	9—15 (4.5—11)		—40 to +85 °C	Max. 100 to 150×10^{-6}	Min. 5000 MΩ	50—800	Available with split stator and in differential design
Transmitting capacitors	EP 2607 —2612	250—3500 (500—5000)	16—250 (16—100)	+10%	13—85 (5—22)	5, 25, 60 kVA at 20 Mc/s	—40 to +60 °C	Max. 100×10^{-6}	Min. 1000 MΩ	200—2000	Available with split packs
Standard capacitors	EP 2613	300	Capacitance: 25—1000 pF ± 0.15%				15—25 °C	Appr. 25×10^{-6}			For highly accurate measurements

* Relative air humidity max. 80%, pressure min. 700 mm mercury
The values between brackets apply to split stator types

MICA, POLYSTYRENE AND ELECTROLYTIC CAPACITORS

Type	Cat. sheet	Max. working voltage	Capacitance	Tol.	Instability	Losses	Ambient temp.	Temp. coeff.	Insulation resistance at 20 °C	Remarks
Moulded midget mica capacitors	EP 2417	500 V D.C.	5.6—2700 pF	± 10, 5, 2, 1% or 1 pF	Max. ± 0.5%	Max. 0.10—0.20% at 1.5 Mc/s	—40 to +85 °C	0 to + 60 × 10^{-6}	Min. 100,000 MΩ	Silvered mica sheets
Polystyrene cap (tubular rubber-sealed metal casing)	EP 2003	50, 250, 700 V D.C. at 40 °C	1000 pF—0.18 μF	± 5, 2%	Max. ± 0.5%	Max. 0.15—0.35% at 100 kc/s	—10 to +60 °C	—50 to -200×10^{-6}	R = min. 100,000 MΩ ($C < 0.1$ μF) RC = min 10,000 sec ($C \geq 0.1$ μF)	Available with insulating coat
Electrolytic cap with octal base	EP 2202	12.5—500 V D.C.	12.5—2×500 μF	—10 to +30/50%	Max. —25 to +30%	Max. 0.10—0.15% at 50—100 c/s and 20 °C	—40/0 to +60 °C		I_{leak} = max. 200—1700 μA	Shock-resistant; suitable at high altitudes

CAPACITORS FOR RADIO AND TELEVISION

Type	Cat. sheet	Max. working voltage	Capacitance	Tol.	Instability	Max. losses	Ambient temp.	Temp. coeff.	Insulation resistance at 20 °C	Remarks
Insulated tubular *paper* capacitors	EP 2019	125, 400, 600, 800, 1000 V D.C. at 65 °C	1000 pF— 0.47 μF	±20, 10%	Max. ±5%		−20 to +85 °C		R=min. 25,000 MΩ ($C \leqq$ 20,000 pF) RC=min. 500 sec ($C>$20,000 pF)	Widely used for coupling and decoupling purposes
Tubular anti-interference capacit.	EP 2024	70 V D.C. 250 V A.C	0.5—2 μF, and triple	−10 to +20%			Max. 70 °C		Min. 100—15,000 MΩ	For motor-operated appliances, car radio, fluorescent lighting
Tubular H.T. paper capacitors in synthetic resin casing	EP 2008	15 kV D.C at 40 °C	600 pF	−20 to +50%	Max. ±2%		−40 to +70 °C		Min. 500,000 MΩ	For smoothing the final anode voltage of picture tubes
Insulated *mica* capacitors	EP 2415	500 V D.C	22— 10,000 pF	±10, 5, 2, 1%	Max. ±0.5%	0.14% at 1.5 Mc	−20 to +65 °C	0 to +50 $\times 10^{-6}$	Min. 4800 MΩ ($C \leqq$ 1250 pF), min. 3000 MΩ ($C >$ 1250 pF)	For use in tuned circuits
Tubular *polystyrene* capacitors	EP 2017	50, 250, 700 V D.C. at 40 °C	1000 pF— 0.18 μF	±5, 2%	Max. ±0.5%	0.15—0.35% at 100 kc/s	−10 to +65 °C	−100 to -200×10^{-6}	R = min. 100,000 MΩ ($C <$0.1 μF) RC = min. 10,000 sec ($C \geqq$0.1 μF)	Suitable as filter capacitors
Tubular *ceramic* capacitors	EP 2302	350, 500, 700 V D.C.	0.8—820 pF	±20, 10, 5, 2, 1%		0.10—0.20% at 1.5 Mc/s	Max. 85 °C	−800 to $+160\times 10^{-6}$	Min. 50,000 MΩ	For use in tuned circuits
		250, 350, 500 V D.C.	680— 22,000 pF	−20 to +50%		2% at 1.5 Mc/s	Max. 85 °C	variable	Min. 10,000 MΩ	For coupling and decoupling
Midget tubular ceramic capacitors	EP 2306	70 V A.C	10—200 pF	±5, 2%	Max. ±1%	0.10% at 475 kc/s	Max. 85 °C	−150 to $+150\times 10^{-6}$	Min. 10,000 MΩ (humidity $\leqq$ 70%), min. 1000 MΩ (humidity > 70%)	For building into small filters
Wire trimmers	EP 2303	250 V D.C	C_{tot} = 6—575 pF C_o = 1—360 pF	+40%		0.10—0.15% at 1.5 Mc/s	Max. 70 °C	−1100 to $+200\times 10^{-6}$	Min. 50,000 MΩ	Very suitable for trimming receiving sets

PROFESSIONAL RESISTORS AND POTENTIOMETERS

Type	Cat. sheet	Resistance	Tol.	Instability	Rating at 40 °C ambient temp.	Temperature coefficient	Remarks
Standard resistors	EP 1005	1—10,000 Ω	±0.1, 0.05%	Max. ±0.015%	0.9—1.6 W at 20 °C	Max. 0.01%/10 °C between 10 and 50 °C	For highly accurate measurements
-wound preci- ..l resistors	EP 1001	1—56,000 Ω	±5, 2, 1, 0.5, 0.25%	Max. ±0.25%	0.4—1.8 W	Max. 0.05 or 0.14%/10 °C	Dependable, accurate and consistent
Low-reactive wire-wound precision res.	EP 1003	10—3200 Ω	±5, 2, 1, 0.5%	Max. ±0.25	0.8—1.8 W	Max. 0.05 %/10 °C	For high frequencies
bin resistors	EP 1007	135—120,000 Ω	± 2, 1, 0.5, 0.25%	Max. ±0.25%	1.2 W	Max. 0.025 %/10 °C	For measuring equipment
Low-power wire-wound resistors with ..de-terminals	EP 1009	1.5—19,000 Ω	±5, 2, 1, 0.5%	Max. ±0.15%	1—4 W	Max. 0.1 %/10 °C	Dependable, accurate and consistent
d resistors with ..re-terminals	EP 1018/1	4.7—100,000 Ω	±10, 5%		3.5—10 W	—0.5 to +1.4 %/100 °C	Vitreous enamelled wire-wound
Load resistors with side-terminals	EP 1018/2	1.5—680,000 Ω	±10, 5%		8—250 W	—0.5 to +1.4 %/100 °C	Vitreous enamelled wire-wound, adjustable or non-adjustable
d resistors with terrule-terminals	EP 1012	1.5—100,000 Ω	±10, 5%		16—150 W at 25 °C	Max. 1.4 %/100 °C	Comply with JAN-R-26A, style RW10-RW16, and BS/RCS111, style RWV1-M
Precision cracked ..bon resistors	EP 1103	10 Ω—1.5 MΩ	±2, 1%	Max. 1—4%	0.125—2 W at 70 °C	Max. —0.3 to —0.6%/10 °C	Noise potential: max. 0.5—1 μV/V
e-wound trimming potentiometers	EP 1201	50—200 Ω	±10%		1 W		For casual adjustments
Dust-proof wire-..und potentio-..ers	EP 1202	10—50,000 Ω	±10, 5%		3 W		Reliability and long life
Load potentiometers	EP 1209	3.5—10,000 Ω	±20, 10%		40—630 W		Vitreous enamelled wire-wound

NTC temperature dependent resistors

D.. to their high negative temperature coefficient (—3 to —4.5%/°C at 20 °C), the resistance value of these ceramic resistors drops rapidly with temperature. They are widely used as measuring, regulating and compensating elements for temperatures, voltages and currents, as retarding e...ents, starting resistors, indicators of liquid levels and suchlike.
Miniature types (cat. sheet EP 1501) consist of a small bead in a gas-filled glass tube with two connecting wires; they are also available in an evacuated tube for maximum sensitivity, in a thermometer-type tube and a special tube for vacuum measurements. Owing to their low inertia, miniature NTC r...tors are very sensitive to rapid changes in temperature.
..ard values: 1000—3500 Ω and 100,000—350,000 Ω (± 20%) at 20 °C, rating 40 mW at an ambient temperature of 20 °C.
F.. special purposes these bead-type NTC's are supplied with a separate heater (cat. sheet EP 1502).
Rod types (cat. sheets EP 1503 and 1504) are available as follows.
Standard values: 2000, 4000, 7000, 17,500, 35,000 and 80,000 Ω (±25, 20 or 10%) at 20 °C,
rating 1—4 W at an ambient temperature of 20 °C.
..mber of suggestions on the application are given in cat. sheet EP 1590.

Voltage dependent resistors (VDR)

.. disc-shaped ceramic resistors do not respond to Ohm's law; their voltage-current relation is given by $E = CI^{\beta}$, where C ranges from 100 up t. ..000 and β lies between 0.17 and 0.25; any increase of voltage instantaneously causes a considerable decrease in resistance.
In addition to their quenching contact sparks in switches and relays, VDR's are being more and more used in electronic circuits for voltage stabilization (e.g. linearization in T.V. time bases), surge suppression and automatic volume control
S...dard types are rated for 0.25—3 W (list with complete data available on application).

RESISTORS AND POTENTIOMETERS FOR RADIO AND TELEVISION

Type	Cat. sheet	Resistance	Tol.	Rating at 70 °C ambient temp.	Temperature coefficient	Noise potential	Remarks
Low-power wire-wound resistors with wire-terminals	EP 1011	5.6—18,000 Ω	±10%	1.5, 3, 5 W	Max. 0.05 or 0.14%/10 °C		High stability and absence of noise
Insulated cracked carbon resistors	EP 1104	10 Ω—10 MΩ	+10, 5%	0.25, 0.5, 1, 1.5, 3 W	Max. —0.1 to —0.2%/°C	Max. 5 μV/V	The reliable, long-life carbon resistors
Midget carbon resistors	EP 1109	100 Ω—10 MΩ	±10%	0.05 W	Max. —0.1 to —0.25%/°C		Very suitable for miniaturized equipment
Carbon potentiometers 26Ø	EP 1302	1000 Ω—2 MΩ	±20%	0.10, 0.15 W			Low track noise Available with switch and/or tap
NTC resistors	EP 1510	1300—180,000 Ω at 20 °C	±25%	2—5 W at 20 °C ambient temp.	—3 to —4.5 %/°C at 20 °C		Widely used for safeguarding purposes

TUBE SOCKETS

If more than one type of socket is available for a given base, the choice depends on the application of the tube.

Tube base		Cat sheet	Type number of socket	Number of contacts	Material
A		EP 3413/2	40404	4	Synthetic resin
Diheptal	(B14A)	EP 3412	5914/20	14	Synthetic resin
Duodecal	(B12A)	EP 3412	5912/01	7	Resin-bonded paper
		EP 3412	5912/20	12	Synthetic resin
		EP 3412	5912/22	7	Synthetic resin
Edison-E14		EP 3413/5	88168/01	Screen + centre contact	Synthetic resin
-E27		EP 3413/5	40418		Synthetic resin
-E40		EP 3413/5	65 909 BG/01		Ceramic
El		EP 3412	5915/00	9	Resin-bonded paper
Giant	(B5F)	EP 3413/3	40211/01	5	Ceramic
Jumbo	(B4F)	EP 3413/2	40408	4	Ceramic
Loctal	(B8G)	EP 3411/2	5902/02	8	Synthetic resin
		EP 3411/2	40213	8	Ceramic
		EP 3413/4	40210/02	8	Ceramic
	(B9G)	EP 3411/2	5906/20	9	Synthetic resin
		EP 3411/2	40212	9	Ceramic
Magnal	(B11A)	EP 3412	5911/20	11	Synthetic resin
Medium	(G)	EP 3413/2	40218/03	4	Ceramic
	(N)	EP 3413/3	40219	5	Ceramic
Miniature	(B7G)	EP 3410/1	5909/01	7	Resin-bonded paper
		EP 3410/1	5909/36	7	Ceramic
		EP 3410/1	5909/35	7	Ceramic
Screen	H = 34.9 mm	EP 3410/1	56900		Nickel-plated brass
can	= 44.5	EP 3410/1	56901		Nickel-plated brass
	= 57.2	EP 3410/1	56902		Nickel-plated brass
Noval	(B9A)	EP 3410/3	5908/01	9	Resin-bonded paper
		EP 3410/3	5908/34	8	Ceramic
		EP 3410/3	5908/36	9	Ceramic
		EP 3410/3	5908/35	9	Ceramic
Screen	H = 38.1 mm	EP 3410/3	56907		Nickel-plated brass
can	= 49.2	EP 3410/3	56908		Nickel-plated brass
	= 60.3	EP 3410/3	56909		Nickel-plated brass
	= 71.4	EP 3410/3	56910		Nickel-plated brass
O		EP 3413/3	40465	5	Synthetic resin
Octal		EP 3411/1	5903/12	8	Synthetic resin
		EP 3413/4	5900/02	8	Synthetic resin
Rimlock	(B8A)	EP 3410/2	5904/01	8	Resin-bonded paper
		EP 3410/2	5904/36	8	Ceramic
Septar	(B7A)	EP 3413/4	40202	7	Ceramic
Special		EP 3413/1	40407	2	Resin-bonded paper
		EP 3413/1	1285	2	Ceramic
	(B3A)	EP 3413/1	40406	3	Synthetic resin
		EP 3413/1	1287	3	Resin-bonded paper
		EP 3413/1	40209	3	Resin-bonded fabric
Subminiature	(B8D)	EP 3410/1	5907/22	8	Synthetic resin
Super giant		EP 3413/3	40216	5	Ceramic
Super jumbo	(B4D)	EP 3413/2	40403	4	Ceramic
		EP 3412	5900/20	5	Synthetic resin
W		EP 3413/2	40221	4	Resin-bonded paper

Telephone pilot lamp holders (cat. sheet EP 3401)

Permissible wattage: 2 W.
Red, white, green or blue window.

Midget pilot lamp holders (cat. sheet EP 3402)

Suited to tubular lamps 6913N, 8008N, 8009N and 12913N with base B[illegible].
Three designs with red, white, green or blue window.

Holders for incandescent pilot lamps (cat. sheet EP 3403/1)

Suited to switchboard lamps 24 V/5 W or tubular lamps 125 V/15 W and 220 V/15 W, all lamps with base B15.
Red, white or green window.

Holders for neon pilot lamps (cat. sheet EP 3403/2)

Suited to neon pilot lamps 9512W: 125 V/2—3 mA and 220 V/2—3 mA, with base B15.
With ornamental flange or colourless window.

Holders for screw bases E14 (cat. sheet EP 3404)

Peak voltage: 500 V; max. current: 6 A.
Suitable for either surface-mounting or flush-mounting.

Fuse-carriers for semi-enclosed fuses (cat. sheet EP 5502)

Suited to fuses of 2—25 A; peak voltage: 500 V.
Available with synthetic resin fuse holder and ornamental flange.

Fuse-carriers for glass cartridge fuses (cat. sheet EP 5504)

Suited to cartridges 5Ø×20 mm, or having a diameter between 5 mm and $\frac{1}{4}''$, and a length of $\frac{3}{4}''$ (20 mm), 1″ (25 mm) or $1\frac{1}{4}''$.
Peak voltage: 750 V; max. current: 6 A.

COMPONENTS FOR MOUNTING AND CONTROL

Single-pole plugs and sockets (cat. sheet EP 4001(2))

Peak voltage: 500 V; max. current: 0.12—0.5 A D.C., 0.65—3 A A.C.
Contact resistance: max. 7.5 mΩ.

Interconnecting plugs (cat. sheet EP 4006)

2 to 5 solid pins, either interconnected in pairs or not.
Peak voltage: 500 V; max. current: 10 A.

Screened plugs and sockets (cat. sheet EP 4002)

Two sizes, three-pole or six-pole.
Peak voltage: 500 V.
Max. current: 6 or 15 A.
Breaking power: 0.25 or 1 kW.
Contact resistance: max. 3 mΩ.

Connecting combinations (cat. sheet EP 4007)

8-, 12-, 16- and 20-pole standard combinations.
Peak voltage: 500—1000 V.
Max. current: 15 A per contact.
Breaking power: 1.5 kW per contact.
Contact resistance: max. 3 mΩ.

Synthetic resin lead-ins (cat. sheet EP 4101)

Single or double soldering tag at each side.
Peak voltage: 1000 V.
Max. current: 10 A.
Insulation resistance: appr. 500,000 MΩ.

Glass lead-ins (cat. sheet EP 4102(2)

13 different standard types.
Peak voltage: up to 4500 V.
Max. current: 2—10 A.
Insulation resistance: min. 10.000-100,000 MΩ.

Terminals (cat. sheet EP 4103)

Insulated and non-insulated, low or high types, either in A.F. or H.F. synthetic resin or ceramic material.
Peak voltage: 500 V (H.T. type: 3500 V).
Max. current: 20 A.

Mounting brackets (cat. sheet EP 4202)

38 types in 3 lengths for max. 4, 6 and 8 soldering tags respectively.
Peak voltage: 500 V between adjacent tags.
Max. current: 10 A per tag.

Connecting blocks (cat. sheet EP 4203)

2, 3, 4, 6 or 8 contact strips.
Peak voltage: 500—1000 V between adjacent strips.
Max. current: 15 A per strip.

Midget connecting blocks (cat. sheet EP 4205)

2—12 contact strips.
Peak voltage: 500—1000 V between adjacent strips.
Max. current: 25 A per strip.

Control knobs (cat. sheet EP 8401)

Large range of round knobs (14—100 mm Ø), wing-shaped and arrow-shaped knobs, available with flange and arrow mark or arrow point, all with clamp attachment.

Vernier control knob (cat. sheet EP 8402(2))

Double knob with reduction drive 1 : 9 for shafts 6 mm Ø.

SWITCHES

Apparatus switches (cat. sheet EP 5001)

Single, double or triple with key-knob or round shaft and with soldering terminals.
Breaking power: 250 V/6 A A.C. (power factor min. 0.60).
Contact resistance: 6—10 mΩ.

Heavy-current tapping switches (cat. sheet EP 5002)

Single, double or triple with 2—12 positions.
Breaking power: D.C. — 100 W (max. 500 V, max. 15 A);
A.C. — 3.8 kVA (power factor 0.8—1),
1.8 kVA (power factor smaller than 0.8).
Contact resistance: 2—4 mΩ.

Tapping switches for measuring purposes (cat. sheet EP 5004)

Single, double or triple, 1- or 2-pole with 3—24 positions and detention per 15° or 30°.
Permissible voltage: 24 V between adjacent contacts.
Max. current at rest: 4 A.
Max. current to be ruptured: 2 A A.C. (power factor min. 0.60).
Contact resistance: 2—4 mΩ.

Disc built-up switches (cat. sheet EP 5005)

49 standard types of 1- to 6-pole on/off, change-over and various special switches, either for surface-mounting (with or without cover) or flush mounting.
Peak voltage: 500 V.
Max. current: 10 A (power factor 0.8—1),
7.5 A (power factor smaller than 0.8).
Breaking power: 2.5 kVA (power factor 0.8—1),
2 kVA (power factor smaller than 0.8).
Contact resistance: 2—4 mΩ.

Key switches (cat. sheet EP 5402)

54 standard combinations of continuous and discontinuous double-throw contacts.
Peak voltage: 500 V between contacts.
Max. current: 1 A A.C. or 0.5 A D.C.
Contact resistance: max. 5 mΩ.

QUARTZ CRYSTAL UNITS

Standard quartz crystal units for frequency stabilization are provided with metal holders which are hermetically sealed with glass-to-metal terminals in order to prevent any shifting from the rated frequency and any activity drop due to the entrance of moisture, dust and suchlike. The resonators are distinguished by a high accuracy, remarkable stability and small temperature dependency.

Crystal units are supplied for frequencies between some 50 kc/s and 75 Mc/s according to any reasonable specification. If differing or more stringent requirements are not prescribed, the following specification is preferred.

Nominal frequency:	defined for an effective parallel capacitance of 30 pF at a nominal operating temperature of 20±5 °C.
Frequency tolerance:	±0.01%, being the frequency drift over the relevant temperature range added to the tolerance on the nominal frequency.
Temperature range:	—20 to +70 °C.
Activity:	according to the nominal frequency, defined either as equivalent parallel resistance, effective series resistance or grid current in a standard oscillator.

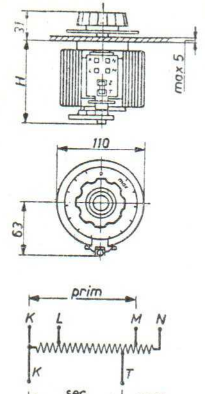
Since the activity and frequency of crystal resonators depend on the oscillator circuit to which they are connected, it is recommended when ordering crystal units, or making enquiries, to give full details of the conditions in which they will have to operate.

VARIABLE TRANSFORMERS

for 220 V A.C. 50-60 c/s

(cat. sheet EP 0406)

Output rating	Secondary voltage	Secondary current	No-load losses	Panel mounting				Bench mounting			
				Type number	Fig.	*H* mm	Weight kg	Type number	Fig.	*H* mm	Weight kg
VA	V	A	W								
260		max. 1	max. 5.5	84527	1	100	3	84526	2	150	3.8
520	appr.	.. 2	.. 7.5	84531	1	120	4	84530	2	170	4.9
1040	0-260	.. 4	.. 16	84535	3	148	9	84534	4	206	10.3
2080		.. 8	.. 28	84537	3	210	12.7	84536	4	282	14



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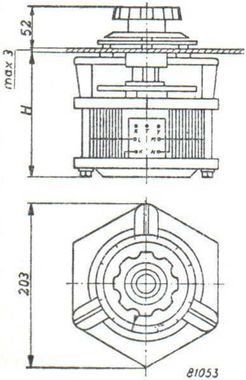

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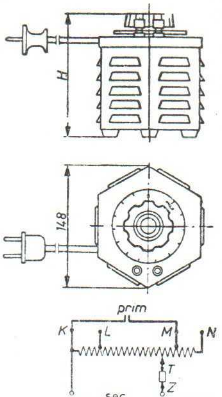

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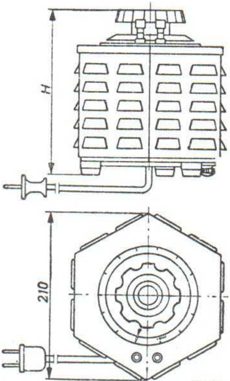

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MATERIALS

FERROXCUBE

FERROXCUBE is the name given to the ceramic soft magnetic core material produced by the Philips factories. Owing to its excellent properties, this material more and more supersedes metallic core materials in high frequency applications. Thanks to the high electrical resistivity the eddy current losses in the material are extremely low, even at high frequencies, so the troublesome process of laminating the core can be avoided. Hence ferroxcube is supplied as ready shaped piece parts the forms of which have been adapted to the required magnetic circuit.

Application

Ferroxcube is used as a core material in an abundancy of applications in radio-, television- and telecommunication technique and in various other branches of the electronic domain. A few examples are:

Radio and television:	Rod aerials I.F. band pass filters R.F. transformers Permeability tuning Variable inductors Line-output transformers Deflection units Linearity correctors Amplitude adjustors Antenna coils
Telecommunication:	Loading coils Filter coils H.F. chokes Wideband transformers Telecommunication transformers Power transformers Pulse transformers Delay lines
Other uses.	Tape recorder heads Computer elements Magnetostrictive applications Noise suppressors Microwave modulator High frequency heating Frequency modulation Ignition coils.

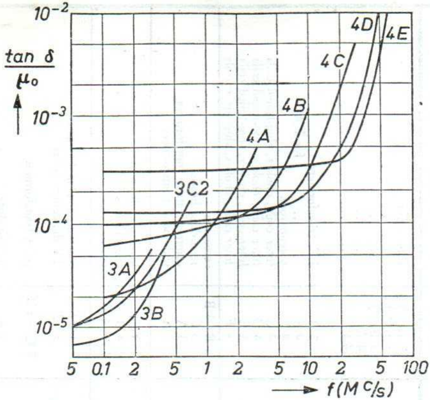
Grades of ferroxcube

Ferroxcube is made in several grades, which should be used according to the application.
Table I gives the various grades with their main properties; table II will help in selecting the right grade for some typical applications

TABLE 1

Grade of ferroxcube	3A	3B	3B1	3B2	3B3	3B4	3C2	3D2	4A	4B	4C	4D	4E	4F	6
Initial permeability μ_o at 20° C	1400 ±15%	900 ±20%	900 ±20%	900 ±20%	900 ±20%	900 ±20%	1100 ±20%	750 ±20%	700 ±20%	250 ±20%	125 ±20%	50 ±20%	15 ±20%	for frequencies up to 100 Mc/s (data on request)	square loop material (see p. 279)
Maximum permeability							≈2000	≈1600		≈750					
Loss factor tan δ/μ_o	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.	see diag.		
Flux density in gauss, ballistically measured at a field intensity (in oersted) of	10	10	10	10	10	10	10	10	10	20	30	60	80		
at 20° C approx.	3000	3400	3400	3400	3400	3400	3300	3600	2900	3300	2800	2500	1900		
at 100° C approx.	1000	2300	2300	2300	2300	2300	2200	2800	1800	2700	2500	2300	1800		
Saturation value (at H = 2000 Oe and T = 20° C)	3250	4500	4500	4500	4500	4500	4650	5100	3600	4200	4100	3650	2300		
Hysteresis factor $q_{2\,(24-100)}$			<12	<12	<12	<5.5									
Temperature factor $\Delta\mu/\mu_o^2\Delta T$ (between 20 and 50° C)	max. 4.5×10^{-6}	max. 3×10^{-6}	max. 3×10^{-6}	max. 2×10^{-6}	max. 2×10^{-6}	max. 4×10^{-6}	max. 4.5×10^{-6}	max. 4.5×10^{-6}	max. 6×10^{-6}	max. 8×10^{-6}	max. 12×10^{-6}	max. 15×10^{-6}	max. 15×10^{-6}		
Curiepoint (°C)	min. 100	min. 150	min. 150	min. 150	min. 150	min. 150	min. 150	min. 210	min. 125	min. 250	min. 350	min. 400	min. 500		
Specific D.C. resistance at 20° C (ohm cm)	min. 20	min. 20	min. 20	min. 60	min. 100	min. 20	min. 80	min. 80	min. 10^5	min. 10^5	min. 10^5	min. 10^5	min. 10^5		
Linear expansion coefficient	approximately 10^{-5}/°C.														
Specific weight (g/cm³)	4.7—4.9	4.7—4.9	4.7—4.9	4.7—4.9	4.7—4.9	4.7—4.9	4.7—4.9	4.7—4.9	4.6—5.0	4.4—4.8	4.2—4.6	4—4.4	3.5—4.0		

For further particulars see catalogue sheet EP 9201.


10^-2
tan δ / μo
10^-3
10^-4
10^-5
4D
4E
4C
4B
4A
3C2
3A
3B
5 0.1 2 5 1 2 5 10 2 5 100
f (Mc/s)

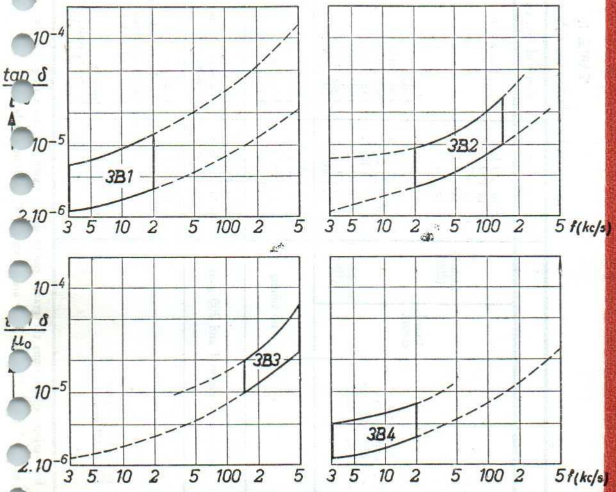

10^-4
10^-5
2.10^-6
3B1
3B2
3 5 10 2 5 100 2 5
3 5 10 2 5 100 2 5 f(kc/s)
10^-4
μo
10^-5
2.10^-6
3B3
3B4
3 5 10 2 5 100 2 5
3 5 10 2 5 100 2 5 f(kc/s)

TABLE II

Suggestions for selecting the right grade of ferroxcube *)

			frequency region	shape of fxc. parts	grade of fxc.	Example of application
no power application Low induction (B < 1 gauss)	tuned circuit	high Q (300)	up to 20 kc/s	pot cores	3 B1 **)	filter coils
			up to 150 ,,	,,	3 B2 **)	,, ,,
			up to 500 ,,	,,	3 B3 **)	,, ,,
			up to 1 Mc/s	,,	4 A	,, ,,
			up to 2 ,,	,,	4 B	,, ,,
		medium Q (100)	450 kc/s	rods	3 B	I.F. transformers
			10 Mc/s	rods, tubes	4 E	,, for F.M.
			500-2000 kc/s	rods, tubes	4 B	antennarods
			up to 5 Mc/s	rods, tubes	4 C	filter coils, chokes, slug-tuned coils
			up to 10 ,,	rods, tubes	4 D	filter coils, chokes, slug-tuned coils
			up to 20 ,,	rods, tubes	4 E	filter coils, chokes, slug-tuned coils
			up to 100 ,,	rods, tubes	4 F	filter coils, chokes, slug-tuned coils
	no tuning		above 1 Mc/s	beads	3 B—4 B	screening
			up to 100 kc/s	hooks	3 C	recording heads
			0.3—3.5 kc/s	E-cores	3 A	communication transformers
			0.1—10 Mc/s	E-cores	3 A	wide-band transformers
inductions between 1 and 200 gauss			0.3—3.4 kc/s	pot cores	3 B4	loading coils
			up to 100 kc/s	E-cores, U-cores	4 B	transductors
			above 100 kc/s	toroids, rods	4 A—4 B	chokes
power applications (B > 200 gauss)			up to 100 kc/s	U-cores	3 C2	line output transformers
				castellated yoke rings	3 C2	TV deflection yokes
				split yoke rings		
			pulses from 0.1 μsec and longer	rods and plates	3 C2—4 B	pulse transformers
			up to 1 Mc/s	toroids	3 A	increductors
				U-cores, rods, slugs	3 C2—3 D2	ignition coils
				rods, tubes, plates	3 C2—3 D2	general high induction application

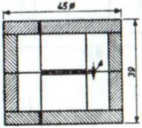
*) For various applications the grades can be used outside the given frequency ranges.

[illegible]) gra[illegible] 3 B[illegible] 3 B[illegible] d 3[illegible] are [illegible]ecte[illegible] ualit[illegible] from [illegible]ade [illegible]

Shapes available

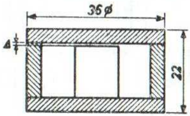
Ferroxcube is made in the shape of pot cores, E-, I- and U-cores, rings and in an ample choice of rods and tubes.

Pot cores	Δ (mm)	further particulars in catalogue sheet No	coilformer
D 60/42 — 14.9 — 3B4	1.2		
— 15.1 —	0.8		88492 (2 sections)
— 15.2 —	0.6		
— 15.3 —	0.4		
D 45/39 — 13.20 — 3B4	0.6	EP 0001	88484 (2 sections)
— 13.35 —	0.3		88485 (1 section)
— 13.50 —	0		
D 36/25 — 8.1 — 3B4	0.6		88493 (2 sections)
— 8.2 —	0.3		
— 8.3 —	0.2		
D 36/22 — 9.35 — 3B1	0.65	EP 0002(2)	88481 (1 section)
— 9.50 —	0.50		
— 9.65 —	0.35		
— 9.80 —	0.20		
— 10.00 —	0		



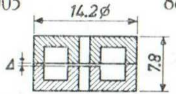
D 45/39

D 36/22 — 9.00 — 3B2	1.0			
— 10.00 —	0			
D 36/22 — 8.00 — 3B3	2.00			
— 10.00 —	0			
D 25/16 — 9.75 — 3B1	0.25		EP 0003(3)	88494 (3 sections)
— 9.85 —	0.15			88488 (1 section)
— 10.00 —	0			
D 25/16 — 9.15 — 3B2	0.85			
— 9.55 —	0.45			
— 10.00 —	0			
D 25/16 — 8.20 — 3B3	1.80			
— 10.00 —	0			
D 25/12 — 5.85 — 3B1	0.15		EP 0003(3)	88489 (1 section)
— 6.00 —	0			
D 25/12 — 5.40 — 3B2	0.60			
— 5.65 —	0.35			
— 6.00 —	0			



D 36/22

Pot cores	Δ (mm)	further particulars in catalogue sheet No.	coilformer
D 25/12 — 4.75 — 3B3	1.25		
— 6.00	0		
D 18/12 — 03 — 3B	0.3	EP 0004	
05 —	0.5		
10 —	1.0		
D 14/8 — 02 — 3B	0.2	EP 0005	88470 (1 section)
— 03 —	0.3		
— 04 —	0.4		
— 00 —	0		

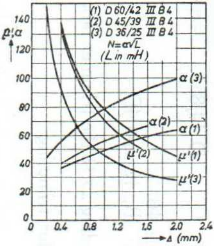


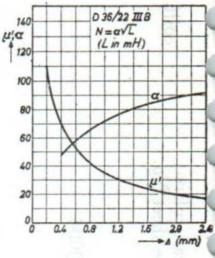
D 14/8

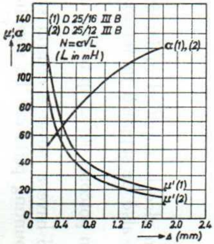
Pot cores 25/16 and 25/12 can also be supplied in ferroxcube 4B.
Pot cores 18/12 and 14/8 can also be supplied in ferroxcube 4B, 4C and 4D.

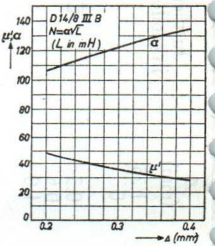
For adjusting the inductance in potcores 60/42 up to and including 25/16 the trimmer tape according to EP 0021 may be used.
The pot cores 18/12 and 14/8 have a movable central slug for trimming.
For all types of pot cores mounting parts can be supplied.

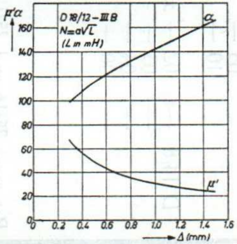
The values of μ' and α for the various pot cores as a function of the airgap are given below.











E-cores (see catalogue sheet EP 0041)

Type number	Fig.	Main dimensions (mm) l	h	d	Coilformer for two E's	Winding space (mm)	Number of turns for 1 henry
56 907 44/3A	1	13	7	3	—	—	2280
56 907 10/3A	1	29	10.5	11	—	—	680
56 907 12/3A	2	34	10	12	NK 241 78	7×7	705
56 907 30/3A	3	40	24	15	NG 330 00	31.8×5.5	745
56 907 36/3A	1	41	22	9	NK 246 05	29.1×7.2	900
					NK 246 07 (2 sect.)	(14+14) × 7.2	900
					NK 246 06 (2 pairs of E's)	29.1×7.2	640
					NK 246 14 (2 pairs of E's, 2 sections)	(14+14) × 7.2	640
56 907 13/3A	1	41	22	12	NK 246 18	29.1×7.2	780
56 907 18/3A	1	52	30	12	—	—	825

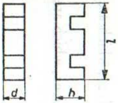


Fig. 1

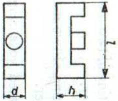


Fig. 2

E-cores according to "DIN" standards can be made on order.

Corresponding I-cores:

Type number	Fig.	Dimensions l	h	d	For use with E-core no.
56 750 17/3A	4	13	4	3	56 907 44/3A
56 740 09/3A	4	41	9	6	56 907 36/3A
56 010 33/3A	4	41	12	6	56 907 13/3A
56 740 10/3A	4	52	12	8	56 907 18/3A

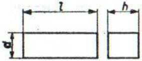


Fig. 4

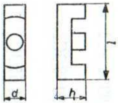


Fig. 3

For all E-cores mounting parts can be supplied.

Ferroxcube rings for TV deflection

Type number	Fig.	
56 590 38/3C2	1	consisting of two matched halves, which are supplied together.
56 590 39/3C2	2	consisting of two matched halves, which are supplied together.
56 590 55/3C2	3	castellated yoke ring.
56 924 24/3C2	4	four parts are needed for one ring.
56 924 18/3C2	5	four parts are needed for one ring.

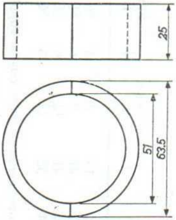


Fig. 1

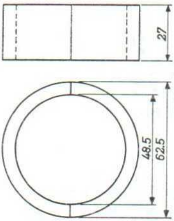


Fig. 2

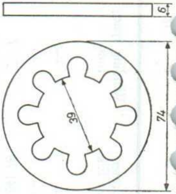


Fig. 3

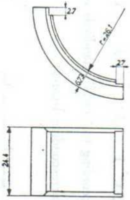


Fig. 4

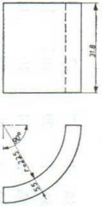


Fig. 5

U-cores (see catalogue sheet EP 0053)

Type number	Fig.	Main dimensions (mm) l	h	d
56 907 38/3C2	1	51	26	9
56 907 40/3C2	2	57	26	9
56 907 17/3C2	3	60	27	14
56 907 26/3C2	3	60	33	14
56 907 55/3C2	1	60	33	14
56 907 24/3C2	3	72	33	14

Corresponding I-core

56 750 16/3C2 for use with 56 907 17/3C2 or 56 907 26/3C2

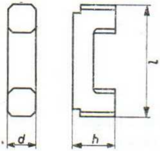


Fig. 1

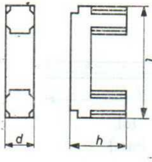


Fig. 2

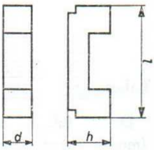


Fig. 3

Ferroxcube cores for magnetophone heads

Two standard types are made according to fig. 4

Type number	Dimension A
56 907 27/3B	1.5 mm
56 907 33/3B	3.5 mm

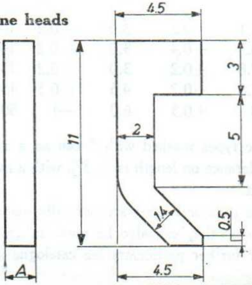


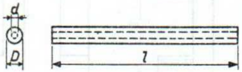
Fig. 4

Ferroxcube rods and tubes (see catalogue sheet EP 0051)

Rods

D (mm)	tol. (mm)	preferred length (mm)
0.9	—0.1	8*
1.65	±0.1	9*—11.3*—14—19*—28*—33*—40—50
2.2	±0.1	10—15—22—33—47
3.4	±0.1	10—15—22—33—47—68
5.25	±0.15	10—15—22—33—47—68
6.5	±0.2	40—60—90—140
7.8	±0.2	90*—140*—160—178*—203*
9.5	±0.3	100*—140*—160*—178*—203*
15.2	+1.5 —0.5	178—241

Tubes



D (mm)	tol. (mm)	d (mm)	tol. (mm)	preferred length (mm)
2.5	+0.2	1.2	+0.2	10—15—22—33—47
3.55	±0.15	1.8	±0.1	10—13.5*—22—33—47
4.1	+0.2	2.0	+0.2	7*—10—15—18—21*—25*—30—35*—40*—45—50*—55
5.1	+0.2	3.0	+0.2	10—15—22—33—47—68—100
6.5	+0.4	3.0	+0.2	10—15—22—33—47—68—100
7.8	±0.2	3.0	+0.2	15—22—33—47—68—100
7.8	±0.2	4.5	±0.3	15—22—33—47—68—100
10	+0.5	6.0	—1	50*—98*—140*—180*

The types marked with * can as a rule be supplied at very short notice. Tolerance on length is ± 3% with a minimum of ± 0.2 mm. Camber is 1 per cent.

The rods and tubes are normally manufactured in grades 3B and 4B, but on request they can also be made in grades 4C, 4D and 4E.

For further particulars see catalogue sheet EP 0051.

Ferroxcube antenna rods and tubes are made in the following sizes:

Antenna rods

type number	diameter (mm)	tolerance (mm)	length (mm)	tolerance (mm)
56 681 55/4 B	6.35	± 0.2	165	± 3.5
56 681 27/4 B	6.35	± 0.2	178	± 5
56 681 60/4 B	7.8	± 0.2	140	± 2
56 681 61/4 B	7.8	± 0.2	203	± 2
56 681 25/4 B	9.5	± 0.3	100	± 3
56 681 31/4 B	9.5	± 0.3	160	± 4
56 681 62/4 B	9.5	± 0.3	203	± 2
56 681 75/4 B	9.7	± 0.3	130	± 2
56 681 22/4 B	9.7	± 0.3	140	± 5
56 681 63/4 B	9.7	± 0.3	170	± 2
56 681 24/4 B	9.7	± 0.3	175	± 5
56 681 64/4 A	9.7	± 0.3	190	± 2
56 681 23/4 B	9.7	± 0.3	203	± 6

Antenna tubes

Type number	outer diam (mm)	tol. (mm)	inner diam (mm)	tol. (mm)	length (mm)	tol. (mm)
56 261 10/4 B	10	+ 0.5	6	— 1	98	± 4
56 261 40/4 B	10	+ 0.5	6	— 1	140	± 3
56 261 36/4 B	10	+ 0.5	6	— 1	180	+ 1

Antenna plate

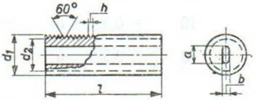
An antenna plate can be supplied having the following dimensions:

Length	106 ± 2	mm
Width	37.5 ± 1.2	mm
Thickness	2.5 ± 0.15	mm

Ferroxcube screw cores (see catalogue sheet EP 0052)

Screw cores are made from ferroxcube 3B and have a full length internal slit for operating.

Type number	h (mm)	l (mm)	d_1 (mm)	d_2 (mm)	a (mm)	b (mm)
88 922	0.5	12±0.2	3.75±0.02	3.28±0.1	1.7+0.3	0.7+0.2
88 921	0.75	12±0.2	3.62±0.02	2.92±0.12	1.7+0.3	0.7+0.2
88 923	0.5	12±0.2	4.75±0.02	4.28±0.1	2.0+0.5	0.8+0.2
88 924	0.75	12±0.2	4.62±0.02	3.92±0.12	2.0+0.5	0.8+0.2
88 915	0.5	12±0.2	5.9 —0.02	5.5 —0.12	3.0+0.5	1.2+0.2
88 910	0.75	13±0.2	5.5 ±0.02	4.9 —0.2	2.5+0.5	1.2+0.2
88 928	1.0	12±0.2	5.89±0.05	4.59—0.1	3.0+0.5	1.2+0.2
88 920	1.0	25±0.2	5.89±0.05	4.59—0.1	3.0+0.5	1.2+0.2
88 913	1.0	12±0.2	6.5 —0.1	5.7 —0.3	3.0+0.5	1.2+0.2
88 925	1.25	16±0.3	7.37±0.02	6.22±0.17	3.0+0.5	1.2+0.2
88 919	consists of screw core 88915 complete with coilformer for chassis mounting.					



Ferroxcube 6

A special grade of ferroxcube, developed for use in computing machines, magnetic memories, magnetic amplifiers and switching circuits.

Maximum induction	B_{max}	=	appr. 1400 gauss
obtained at	H_{max}	=	appr. 1.4 oersted
	$\frac{B_r}{H_{max}}$	=	min. 0.9
Coercivity	H_c	=	appr. 1 oersted
Resistivity	ϱ	=	appr. 10^6 ohm cm.
Squareness ratio	a	=	$\frac{B_{-\frac{1}{2}H max}}{B_{H max}}$ = min. 0.7

Four types of rings are available of the following dimensions:

Type no.	outer diam. (mm)	inner diam. (mm)	height (mm)
56 591 38/6	2.03±0.1	1.27±0.1	0.64±0.1
56 591 39/6	2.54±0.1	1.78±0.1	0.76±0.1
56 591 40/6	3.80±0.1	2.20±0.1	1.50±0.1
56 591 41/6	9.53±0.3	4.75±0.2	3.18±0.2

FERROXDURE

Ferroxdure is the name given to a class of permanent magnet materials which in recent years were developed by the Philips Laboratories. In Great Britain and U.S.A. the name "Magnadur" has been adopted.
The outstanding properties of this material are:

Very high electrical resistivity
Very high coercive force.

The first property opens the possibility of using the magnets in high frequency fields, e.g. for biassing ferromagnetic circuits, without introducing eddy current losses.
The second property makes it possible to use very short magnets or magnet systems with a wide airgap or even without any yoke at all; the high coercivity prevents the magnets from being demagnetized.
Ferroxdure is made in three grades: ferroxdure I, II and III.
Ferroxdure I is isotropic, which means that the magnetic properties are the same in each direction Ferroxdure II and III are anisotropic and show their high quality in one preferred direction only.

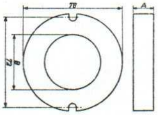
Properties of Ferroxdure	Ferroxdure I	Ferroxdure II	Ferroxdure III
Remanence B_r (gauss)	1800—2200	3200—3600	2800—3200
Coercive force H_c (oersted)	1400—1600	1200—1400	1800—2200
$(BH)_{max}$	appr. 0.8×10^6	$2—2.3\times10^6$	$2—2.3\times10^6$
Recoil permeability	appr. 1.25	appr. 1.25	appr. 1.25
Resistivity (ohm cm)	10^6	10^6	10^6
Curie point (°C)	appr. 450	appr. 450	appr. 450
Specific gravity	appr. 4.7	4.8—4.9	appr. 4.8

Applications

Ferroxdure magnets can be used in most cases where up to now metallic magnets have been used, especially when very short magnets are required or systems with a large airgap. Furthermore they can be used in high frequency fields without giving eddy current trouble. A few applications are:

- T.V. focusing magnets
- Loudspeaker magnets
- Telephone magnets
- Biassing magnets in
  - pulse transformers
  - relays
  - inductance coils
- Bicycle dynamo's
- Oilfilters
- De-ironing systems
- Chucks
- Magneto-mechanical couplings
- Toys

Ferroxdure being a ceramic material, all shapes are formed by extrusion or pressing in dies. Commercial shapes are blocks, slugs, discs, rings, rods and tubes.
Television focusing rings made of Ferroxdure I are available in seven different types



Type no.	Dimension A (mm)	Dimension B (mm)	Slots	Tube types and range	
56 590 61/FD 1	12.0	41.5	no	12—14";	10—14 kV
56 590 68/FD 1	12.0	44.0	no }	12—14";	10—14 kV
56 590 62/FD 1	12.0	44.0	yes }		
56 590 79/FD 1	13.0	44.0	no	14—17";	14 kV
56 590 75/FD 1	13.5	44.0	(two clearance holes for fitting)	14—21";	14—19 kV
56 590 57/FD 1	14.0	44.0	no	14—21";	14—19 kV
56 590 54/FD 1	14.0	44.0	yes	14—21";	14—19 kV

ELECTRONIC TUBE HANDBOOK

The standard data book on Philips Electronic tubes and semiconductor devices. Contains over 2,000 loose-leaf data sheets with complete information on all Philips Electronic tubes. Three volumes, 4-prong, gold imprinted binders. Available on a subscription basis. Descriptive folder on request.

HANDBOOK NEWS

At irregular intervals, Handbook News will be sent together with the supplementary sheets in order to enable quick reference to be made to recently developed improvements in tube design, new publications, etc.

ELECTRONIC APPLICATIONS

Bulletin issued on a limited scale to interested parties, containing a digest of articles on the application of electronic tubes and semiconductor devices.

APPLICATION BULLETINS

TELEVISION

*Television Picture Tubes.
— Nr 5096 —.
Full data and curves of the direct-view picture tubes MW 36-44 — MW 43-64 and the MW 53-20, with application descriptions of circuits in which these tubes can be used.

*R.F. double triode PCC 84 for cascode amplifiers in tuners for T.V.-receivers. — Nr 4584 —.
Gives ample tube characteristics and data of practical circuits.

*The 21″ Picture Tube MW 53-80 with 90° deflection A.T.V. receiver with simplified tuner and self-oscillating line time-base.

AM, AM/FM BROADCAST RECEIVERS AND AUDIO AMPLIFIERS

*Battery Receiving Tubes.
— Nr 4556 —.
Contains comprehensive descriptions, data and curves of miniature battery receiving tubes and tuning indicators. Extensive descriptions are included of a five-tube ABC receiver, a four tube 90 V and a four tube 67.5 V all dry-battery receiver.

*Tubes for A.F. Amplifying Equipment — Nr 4606 —.
Full technical data of A.F. amplifying tubes are given together with various circuit descriptions.

INDUSTRY

*Thyratrons — Nr 4589 —.
Complete technical information on inert gas-filled types and mercury vapour thyratrons, including many examples of their applications.

*Industrial Rectifying Tubes — Nr 3720 —.
Detailed technical data on rectifying tubes for power distribution, battery chargers, welding etc. including design calculations, practical examples and selection chart.

*Phototubes in Industry — Nr 3701 —.
Phototube theory, extensive data and curves of 9 phototube types, numerous application circuits for light-operated devices and light-measurements, illustrative multi-colour printings and alphabetic register of applications.

IN PREPARATION

Special Quality Tubes for the Industry.
Ignitrons.
Industrial tubes for electronic motor control.

SEMI-CONDUCTOR DEVICES

*Germanium Diodes for T.V.

X-RAY

*Loose-leaf catalogue, containing full information on the complete range of X-Ray tubes and valves. (text in English—French—German and Spanish).

COMPUTERS

*Voltage Reference and Stabilising Tubes.
Theory and complete technical data on stabilisers, voltage reference tubes, rare-gas cartridges and trigger tubes. Applications of these tubes are illustrated either by design calculations or circuits.
*EIT for Measuring Equipment

FOLDERS AND BOOKLETS

TELEVISION, AM-AM/FM BROADCAST RECEIVERS AND AUDIO AMPLIFIERS

*Hi-Fi — Nr 4812 —.
Booklet, giving a description of a 4 + 1 Tube Hi-Fi amplifier with complete data, photographs of amplifier included.
*Cross Index of Electronic Tube Type Numbers — Nr 5136 —.
Reference booklet for equivalent type numbers.

A survey of ordinary receiving and transmitting tubes, which can also be used for A.F., is included.

*D 96 series—25 mA Battery Tubes.
— Nr 4595 —.
Full data and characteristics of the complete range of the miniature 25 mA battery tubes. Application descriptions of economic receivers are included.

*12 Watt Power Pentode EL 84.
— Nr 4585 —.
Data and characteristics of the tube EL 84. Description of a Hi-Fi amplifier with two tubes EL 84 in push-pull.

*A Low-cost additional Radio Receiver. — Nr 4488 —.
Description of a 3 plus 1 tube additional radio receiver with Ferroxcube rod aerial.

*Tuning Indicators DM 70 and DM 71.
— Nr 4597 —.
Data, characteristics and extensive application notes on the tuning indicators DM 70—DM 71 for battery, AC/DC and AC sets.

IN PREPARATION
Tubes for AM/FM Receivers.
A condensed issue of previous publications on this subject, extended with new tubes and circuits.
Receiving tubes for T.V.
T.V. Picture tube MW 53-80.

COMMUNICATION

*V.H.F. Power Triodes — Nr 3400 —.
Technical data and description of V.H.F. power triodes TB 2.5/300 and TB 3/750 for diathermy, industrial and communication equipment. Examples of applications are included.

*V.H.F. Transmitting Tetrodes — Nr 3407 —.
Technical information and operating conditions of the tetrodes QB 3/300 and QB 3.5/750. Descriptions of a diathermy and a H.F. power amplifier are included.

*Very High-Power Transmitting Tubes — Nr 3984 —.
Extensive data and descriptions of a 100 kW air-cooled (TBL 12/100) and a 100 kW water-cooled (TBW 12/100) transmitting tube including circuits and practical applications.

IN PREPARATION
U.H.F. tubes for Communication and Measuring Equipment — Nr 3309 —.
Technical information on noval and disc-seal tubes for the U.H.F. field as well as descriptions of practical applications.

*25 mA Battery Tubes — Nr 4938 —.
Folder with abridged data and characteristic curves on the D96 miniature battery tubes.

*Tubes for AM/FM Receivers-Nr 4961 —.
Folder containing technical information on the range of receiving tubes for AM/FM.

COMMUNICATION

*List of Philips Preferred Transmitting Tubes — Nr 5032 —.
Quick reference for equipment designers in the selection of tubes for new equipment design as well as for replacement purposes, with rectifiers to match by function.

*High Voltage Rectifying Tubes for Use with Transmitting Tubes — Nr 4635 —.
Folder containing abridged data on high-voltage, gas filled rectifying tubes. (revised edition)

*Transmitting and Rectifying Tubes for Mobile Equipment — Nr 4636 —.
Folder with technical information on the Philips range of transmitting tubes for mobile equipment.

*U.H.F. Tubes for Communication and measuring equipment — Nr 5133 —.
Folder giving technical information on receiving and oscillator tubes for the U.H.F. field.

*U.H.F. Disc-seal Tube—EC55 — Nr 4924 —.
Folder on the disc-seal tube EC55, giving description, data and enlarged cut-away drawing.

*Special Quality Tubes — Nr 5095 —.
Folder with technical data of the preferred range of special quality and long-life tubes (second edition).

TUBES FOR RADAR EQUIPMENT

Of a series of folders on the tubes for radar-equipment the following have appeared:

*Magnetron — 4J50 — Nr 4625 —
*Magnetron — 55029 — 55030 — 55031 and 55032 — Nr 4625 A
*Magnetron — 725A — Nr 4627 —
*Hydrogen thyratron 6268/4C35 — Nr 4621 —
*Magnetrons 2J49 — 2J50 — Nr 5191 —
*Magnetrons 2J42 — JP9-7A — Nr 5192 —
*Hydrogen thyratrons 3C45 — Nr 5202 —
*Hydrogen thyratron 6279/5C22 — Nr 4622 —

*Magnetron — 55100 — Nr 4629 —

*Halfwave rectifying tube — 8020 — Nr 4630 —

IN PREPARATION

Magnetron 5J26
Magnetron 4J52

INDUSTRY

*New Tools for Industry — Nr 5104 —.
Booklet dealing with electronic applications in industry, their possibilities and various aspects (non-technical).

*Electronic Tubes for H.F. Heating in Industry — Nr 4633 —.
Descriptive folder of the transmitting- and rectifying tubes for H.F. heating, including abridged technical data.

*Ignitrons — Nr 4618 —.
Data and description of Ignitron tubes.

*Selenium-Rectifiers for Industrial Applications — Nr 4615 —.
Folder giving data and basic circuits for selenium rectifiers for industrial applications.

*Thyratrons — Nr 4619 —.
Folder on the Philips Thyratron range, containing data and characteristic curves.

*Thyratron PL 255 for motor control — Nr 4581 —.
Description and abridged data on the thyratron PL 255.

*Thyratron PL 5727 — Nr 4911 —
Data and curves on the thyratron PL 5727 for relay and servo-control.

*Heavy-Duty Tubes — Nr 4547 —.
Broadsheet containing data, application information on thyratrons, ignitrons and rectifying tubes.

*Single-anode Rectifying Tubes — Nr 5112 —.
Data on the tungar types 1163 and 1164.

*Rectifying Tubes for Industry — Nr 5134 —.
Data on preferred and replacement types of industrial rectifying tubes.

MEASURING EQUIPMENT

*Cathode-Ray Tubes for Measuring Equipment — Nr 4599 —
Booklet, describing manufacturing, screen-characteristics, data and curves of the cathode-ray tubes for measuring equipment

*High-vacuum Thermo-Couples — Nr 4918 —.
Descriptive folder on operation, data and characteristic curves of the high-vacuum thermo-couples.

SEMI-CONDUCTOR DEVICES

*Junction Transistors OC 70—OC 71 for Hearing Aids — Nr 4941 —.
Booklet giving extensive data on the junction transistors, OC 70—OC 71; a description of a hearing aid is included.

*All-glass Germanium Diodes OA 70—OA 73 — Nr 4942 —.
Folder giving data and extensive characteristic curves.

*Transistors — Nr 4800 —.
Booklet giving a popular description of the history, development and operation of both point-contact and junction transistors.

Germanium Diodes — Nr 4773 —.
Folder on the Philips range of glass-fernico germanium diodes with data and curves.

IN PREPARATION

All-Glass Germanium Diodes.
Junction Transistors for low-frequency Amplification.

X-RAY

*Philips X-ray tubes — Nr 4568 —.
Booklet in which the Philips range of X-ray tubes, valves, shields, cables, receptacles and auxiliary equipment in described and full data are given. This booklet is printed in English—French—German and Spanish.

*The X-ray Image Intensifying Tube — Nr 5044 —.
Booklet describing the new X-ray image intensifier, its development, operation, possible application, optical systems; full technical data are also given.

MISCELLANEOUS

COMPUTERS AND COUNTING EQUIPMENT

*EIT—Decade Counter Tube — Nr 4548 —.
Descriptive folder on the EIT decade counter tube with data and application suggestions.

*Voltage Reference and Stabilising Tubes — Nr 4579 —.
Folder with data and characteristic curves of the preferred range of voltage reference and stabilising tubes.

*Phototubes — Nr 3997 —.
Folder containing data and characteristic curves of the preferred range of Philips phototubes. A survey of phototube applications is also included.

*Surge Arresters — Nr 4917 —.

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PREFERRED TYPE LIST —

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World Map for Amateur Transmitting Purposes.
Relationships in the Electronic Tube family (revised edition).
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MATRONICS

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