

Tube Number Systems

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European system after 1934 (pro-electron)

See also: [Type Designation Code](#) from "Preferred Types of Electron Tubes 1967".

1st letter	heater indication
0	tubes without filament
A	4 V AC parallel connection
B	180 mA DC
C	200 mA AC/DC series or parallel connection
D	<= 1.4 V DC dry-battery, parallel connection
E	6.3 V AC or carbattery, parallel connection
F	13 V carbattery
G	5V AC parallel connection
H	early: 4V DC battery. later: 150mA AC/DC series connection
I	20V AC/DC parallel connection
K	2 V battery
O	150 mA AC/DC series connection
P	300 mA AC/DC series connection
U	100 mA AC/DC series connection
V	50mA AC/DC series connection
X	600 mA AC/DC series connection
Y	450 mA AC/DC series connection

2nd+next letters	tube systems
A	single detection diode
B	double detection diode
C	small-signal triode
D	power triode
E	small-signal tetrode (or 2nd emission tube EE1)
F	small-signal pentode

H	hexode or heptode
K	octode
L	power pentode or power tetrode
M	indicator tube
N	thyatron
Q	enneode
W	single gasfilled rectifier diode
X	double gasfilled rectifier diode
Y	single vacuum rectifier diode
Z	double vacuum rectifier diode

digits	socket & order
x	P (some are V) (except U-series (e.g. UBL1), those are octal)
1x	Y8A
2x	W8A, Loctal (except D-series (e.g. DL21), those are octal)
3x	K8A, A08, octal
4x	A8A, B8A, Rimlock
5x	T9A, B9G, Enne-al and C2R and some special bases
6x	Subminiature
7x	Subminor8p
8x, 18x, 8xx	B9A, noval
9x, 19x, 9xx	B7G, miniature-7p (Exception: The ECC99 is a poorly chosen tube type number, as it comes with a noval base.)
2xx, 2xxx	decal
5xx	B9D, magnoval

Examples	Description
CBL1	output pentode with dual detection diode, heater 200mA, P base
EABC80	triple signal diode with triode, heater 6.3V, noval base
ECC83	dual triode, heater 6.3V, noval base
GZ34	dual vacuum rectifier, heater 5V, octal base
PFL200	pentode and power pentode, heater 300mA, decal base
UCH21	triode and heptode, heater 100mA, base loctal

Philips system before 1934

1st letter	heater current
A	0.06 to 0.10 A
B	0.10 to 0.20 A
C	0.20 to 0.40 A
D	0.40 to 0.70 A

E	0.70 to 1.25 A
F	> 1.25 A

2nd digit or 2nd+3rd digits	heater voltage
x	heater voltage < 10 V
xx	heater voltage >= 10V

last 2 digits	description
xx	amplification factor for triodes
41, 51 etc	tetrode with spacecharge grid (2nd grid is control grid)
42, 52 etc	tetrode with screen grid (1st grid is control grid)
43, 53 etc	power pentode
44, 54 etc	triode with diode or tetrode with diode
45, 55 etc	hf tetrode with variable gain
46, 56 etc	hf pentode
47, 57 etc	hf pentode with variable gain
48, 58 etc	hexode frequency changer
49, 59 etc	hexode with variable gain

Suffix letter	Description
H	?
N	? New, later version
S	? Series connection allowed
T	?

Examples	Bases usually: A or O
E499	triode, If=1A , Vf=4V, gain=99
F443N	power pentode, If=2A, Vf=4V
B2046	hf pentode, If=0.18A, Vf=20V

MAZDA NUMBERING SYSTEM Signal valves

First number indicates heater or filament rating	
1	1.4V (parallel or series)
6	6.3V (parallel or series)
10	0.1A (series)
20	0.2A (series)
30	0.3A (series)
Following letter or letter sequence indicates class of valve	
C	Frequency changer with special oscillator section
D	Signal diode(s)

F	Voltage amplifier tetrode or pentode
FD	Voltage amplifier tetrode or pentode with diode(s)
FL	Voltage amplifier tetrode or pentode with voltage amplifier triode
K	Small gas triode or tetrode
L	Voltage amplifier triode or double triode including oscillator triode
LD	Voltage amplifier triode with diode(s)
M	Tuning indicator
P	Power amplifier valve, tetrode or pentode
PL	Power amplifier valve, tetrode or pentode with voltage amplifier triode
Final number distinguishes between different valves in the same class	

MAZDA NUMBERING SYSTEM Power rectifier valves

Letters indicates heater or filament rating	
U	High vacuum half-wave
UU	High vacuum full-wave
Final number distinguishes between different valves in the same class	

RUSSIAN NUMBERING SYSTEM

The regulation GOST 5461-59 applies to tubes manufactured from 1959 and semiconductors manufactured from 1959 to 1963. Every symbol consists of four elements. If an element is absent, a dash should be written at its place.

Note: There are exceptions. Not all Russian tubes are numbered according this system.

First element	
ГК	Generator (transmitting) tubes up to 25 MHz
ГУ	UKF generator (transmitting) tubes 25-600 MHz
ГС	Centimeter range generation (transmitting) tubes
ГМ	Modulator tubes
В	High power rectifiers
СГ	Voltage stabilizers
СТ	Current stabilizers
Т	Thyratrons
ГГ	Gas-discharge rectifiers
ГР	Mercury gas-discharge rectifiers
Φ, ΦУ	Photocells and photomultipliers
Approximate (usually full volts) heater voltage	Receiving tubes
Screen diameter in cm	Picture tubes
Д	Semiconductor diodes
И	Transistors

Second element	
Д	Diodes
Х	Double diodes
С	Triodes
Т	Tetrodes
П	Power pentodes and tetrodes
К	Remote cut-off pentodes
Ж	Sharp cut-off pentodes
В	Secondary emission pentodes
А	Mixing tubes with two signal grids
Б	Pentodes with one or two diodes
Г	Triodes with one or more diodes
Е	Tuning indicators
И	Triodes with hexode, heptode or octode
Н	Double triodes
Р	Double tetrodes and pentodes
Ф	Triode - pentodes
Ц	Rectifiers
Type sequence number	Gas-discharge tubes, power rectifiers
Г	Gas thyratrons
Р	Mercury thyratrons
Х	Cold cathode thyratrons
ЛО	Oscillograph tubes with electrostatic deflection
ЛМ	Oscillograph tubes with electromagnetic deflection
ЛК	TV picture tubes
Type sequence number	Semiconductors

Third element	
Receiving, picture, generator and modulator tubes voltage and current stabilizers photocells and photomultipliers cold cathode thyratrons	Type sequence number
Semiconductors	Subtype, group (letter)

Fourth element	
none	Metal
С	Glass
Ж	HF glass, side leads
К	Ceramic

II	Miniature glass 19 and 22.5 mm	Receiving tubes; voltage and current stabilizers
Г	Subminiature > 10 mm	
Б	Subminiature 10mm	
Р	Subminiature 4 mm	
А	Subminiature 6 mm	
Л	lock-in-key	
Д	Disc leads	
А	Water cooled	Generator (transmitting) and modulator tubes
Б	Air cooled	
letter	Luminophor color code	Picture tubes
X/Y	X = average current in A Y = reverse voltage amplitude in kV	Thyratrons (non cold cathode), Gas-discharge, power rectifiers

After symbol dash and postfix of one or more letters may be added:

Б	high reliability tube (military)
Е	long life tube (military)
И	designed for impulse operation
К	vibration resistant

Current Regulators

[A]^Б[V1-V2] [A] is the current (in amperes) and [V1-V2] is voltage range

Brimar type designation code for Receiving Valves

First Number	Indicates the Construction
1	Half Wave Rectifiers
2	Diodes. Single
3	Triodes, Output
4	Triodes, High-mu
5	Tetrodes, Straight
6	Tetrodes, Vari-mu
7	Pentodes, Power and Video
8	Pentodes, R.F. Straight
9	Pentodes, R.F. Vari-mu
10	Diodes, Double
11	Triodes with Double Diode
12	Pentodes, A.F. with Double Diode
13	Triodes Double, High-mu
14	Triodes Double, Class B Output
15	Heptodes

16	Triodes Output, D.C. Coupled
17	Pentodes R.F. with Double Diode
18	Pentodes with Triode
19	
20	Hexode/Heptode with Triode

Letter	Indicates the heater rating
A	3.6 to 4.4V Indirectly Heated
B	2V Directly Heated
C	Directly Heated other than 2 or 4V
D	All other heater ratings Indirectly Heated other than 4V

Number	Serial number
Serial Numbers are allocated in chronological order as new valve types are introduced	

TESLA NUMBERING SYSTEM

leading digits	heater indication
	Approximate (usually full volts) heater voltage

middle letters	tube systems (a subset of European system)
A	single detection diode
B	double detection diode
C	small-signal triode
F	small-signal pentode
H	hexode or heptode
L	power pentode or power tetrode
M	indicator tube
Y	single vacuum rectifier diode
Z	double vacuum rectifier diode

trailing digits	socket and order
1x	octal K8A, A08
2x	loctal W8A
3x	heptal B7G
4x	noval B9A
5x	special; mostly, 9 out of 10 pins 1.25mm on a circle diameter 25mm
6x	submagal B11A (no actual tube in this system known)
7x	duodecal B12A (no actual tube in this system known)
8x	diheptal B14A (no actual tube in this system known)

9x	free wires
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Examples	Description
35Y31	Single rectifier, heptal (7pin miniature) socket; 35V/150mA series heater; otherwise, European UY1N in heptal format
4L20	HF power pentode; filament 2x2.4V / 325mA, Soviet 4П11Л; German RL4,2P6 in octal format
6CC42	VHF double triode; 6.3V/350mA heater, noval; equivalent to 2C51
6F24	Telecom pentode, 6.3V/450mA heater, octal; <i>not</i> similar to later Mazda's 6F24
1M90	Subminiature indicator tube, 1.4V/25 mA filament, European DM70

leading 2 digits	screen specification
	Approximate screen diameter or diagonal, in centimeters

3rd digit	type order

middle letters	focusing and deflection
QP	magnetic focusing, magnetic deflection (early TV tubes)
QQ	electrostatic focusig, magnetic deflection (later TV tubes)
QR	electrostatic focusing and deflection (oscilloscope tubes)

trailing digits	screen color and persistence

Examples	Description
7QR20	Oscilloscope tube, 7cm diameter, green fluorescence, middle persistence
430QP44	TV tube, 43cm diagonal, magnetic focusing and deflection, white fluorescence, pentode system, 90 degrees deflection angle
430QQ44	TV tube, 43cm diagonal, electrostatic focusing, magnetic deflection, white fluorescence, tetrode system, 110 degrees deflection angle
431QQ44	Identical to 430QQ44, except with metal-backed screen

1st letter	tube category
R	HF tube
Z	modulator tube
U	gas-filled power rectifier

2nd letter	tube systems
	see receiving tubes

digits	power level
	Anode dissipation in watts or kilowatts

trailing letters	cooling system (optional 1st letter), tube order
X	air cooling
Y	water cooling

Examples	Description
RA0007B	Ballast diode controlled by filament current; max anode current 0.7mA
RD1,5XA	Air-cooled power triode up to 30MHz, 1.5kW anode dissipation
RE40AK	KT88 by Tesla Vršovive (in production)

TYPE DESIGNATION CODE FOR RADIO AND TELEVISION RECEIVING TUBES

This type designation code relates to tubes designed for use primarily in reproducing and recording equipment for domestic applications such as: radio and television receivers, record players, tape recorders and audio amplifiers, home cinema projectors, hearing aids, and similar equipment.

The type designation consists of:

TWO OR MORE LETTERS FOLLOWED BY A SERIAL NUMBER

Example and explanation:

<div style="text-align: center; margin-bottom: 5px;">PL 500</div>		
<p>D ≤ 1.4 V; series or parallel supply</p> <p>E 6.3 V; series or parallel supply</p> <p>G miscellaneous; parallel supply</p> <p>H 150 mA; series supply</p> <p>L 450 mA; series supply</p> <p>P 300 mA; series supply</p> <p>U 100 mA; series supply</p> <p>X 600 mA; series supply</p> <p>The use of letters A (4 V), B (180 mA), C (200 mA), F (12.6 V), K (2 V), V (50 mA) and Y (450 mA) has been discontinued.</p>	<p>A diode (excluding rectifiers)</p> <p>B double diode with common cathode (excluding rectifiers)</p> <p>C triode (excluding power output triodes)</p> <p>D power output triode</p> <p>E tetrode (excluding power output tetrodes)</p> <p>F pentode (excluding power output pentodes)</p> <p>L power output tetrode or power output pentode</p> <p>H hexode or heptode (of the hexode type)</p> <p>K octode or heptode (of the octode type)</p> <p>M tuning indicator</p> <p>Y half-wave rectifier</p> <p>Z full-wave rectifier</p>	<p>The serial number consists of three figures the first figure indicating the type of base¹⁾:</p> <p>1 miscellaneous base types</p> <p>2 miniature 10-pin base</p> <p>3 octal base</p> <p>5 magnoval base</p> <p>8 noval base</p> <p>9 miniature 7-pin base</p> <p>The last figure of tetrodes and pentodes (excluding power output tubes) indicates the type of characteristic, as follows:</p> <p>even figure: sharp cutoff characteristic</p> <p>odd figure: variable-μ characteristic</p>

¹⁾ The use of remaining figures for other base types and the use of serial numbers of one and two figures has been discontinued.

TYPE DESIGNATION CODE FOR PROFESSIONAL RECEIVING-TYPE TUBES

This type designation code relates to professional receiving-type vacuum tubes designed for use primarily in communication equipment, data processing equipment or in other industrial applications.

The type designation consists of:

TWO OR MORE LETTERS FOLLOWED BY A SERIAL NUMBER

Example and explanation:

ECC2000		
First letter indicates the heater voltage	Second and subsequent letters indicate the construction and/or application of the tube. (If there is more than one electrode system these letters are placed in alphabetical order.)	Serial number
E 6.3 V; parallel or series supply	A diode C triode (excluding power output triodes) D power output triode E tetrodes (excluding power output tetrodes) F pentode (excluding power output pentodes) L power output tetrode or power output pentode H heptode M tuning indicator	The serial number consists of four figures, the first figure indicating the type of base ¹⁾ : 1 miscellaneous 2 miniature 10-pin base 3 octal base 5 magnoval base 8 noval base 9 miniature 7-pin base

¹⁾ Serial numbers for prototypes always end in zero, those for variants in one of the figures 1 to 9. The other first figures will be used for new base types as required.

TYPE DESIGNATION CODE FOR CATHODE-RAY TUBES

This type designation code relates to cathode-ray tubes for all applications such as: television and radar display tubes, oscilloscope tubes, monitor tubes and view finders.

The type designation consists of:

ONE LETTER FOLLOWED BY TWO GROUPS OF FIGURES JOINED BY A HYPHEN, AND ONE OF TWO LETTERS

Example and explanation:

D10-11GH

A59-11W



First letter indicates the application and or construction of tube.	First figure or group of figures indicates the screen dimensions.	Second figure or group of figures.	Final letters indicate the screen properties.
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A TV display tube for domestic applications	For rectangular screen the screen diagonal in cm.	Serial number	The first letter denotes the colour of the fluorescence (or phosphorescence in the case long or very long persistence screens) according to the regions of the Kelly Chart of color designations for lights, where applicable: A Reddish-purple, purple, bluish-purple B Purplish-blue, blue, greenish-blue D Blue-green G Bluish-green, yellowish-green K Yellow-green L Orange, orange-pink R Reddish-orange, red, pink, purplish-pink, purplish-red, red-purple Y Greenish-yellow, yellowish-orange W indicates the "standard white" television display tube phosphor X indicates tri-colour screens.
D Oscilloscope tube, siggle trace	For circular screens the screen diameter in cm.	The second letter is a serial letter to denote other specific differences in screen properties.	Word description of persistence. (Time to decay to 10 % of initial light output less than
E Oscilloscope tube, multiple trace			1 u sec. very short 1 msec. to medium
F Radar display tube, direct view			1 u sec. to short 100 msec.
L Display storage tube			10 u sec. 100 msec. long
M TV display tube for professional applications, direct view			10 u sec. to medium to 1 sec.
P Display tube for professional applications, projection			1000 u sec. short more than very long
Q Flying spot scanner			1 sec.

GROUPS OF LETTERS ALLOCATED TO EXISTING PHOSPHORS

Designation		EIA number	Colour		Persistence (10 %)
New	Old		Fluorescence	Phosphorescence	
BA	C	P11	purplish blue		very short
BC	V		purplish blue		
BD	A		blue		very short
BE	B		blue	blue	medium short
BF	U		blue		medium short
GB	M	P32	purplish blue	yellowish green	long
GE	K	P24	green	green	short
GH	H	P31	green	green	medium short
GJ	G	P1	yellowish green	yellowish green	medium
GK	G ¹⁾		yellowish green	yellowish green	medium
GL	N	P2	yellowish green	yellowish green	medium short
GM	P	P7	purplish blue	yellowish green	long
GN	J		blue	green	2)
GP			bluish green/green	green	medium short
LA	D		orange	orange	medium
LB	E		orange	orange	long
LC	F		orange	orange	very long
LD	L	P33	orange	orange	very long
RA			reddish orange		medium
YA	Y		yellowish orange	yellowish orange	medium
W	W		white for TV display tubes		
X	X		three-colour for TV display tubes		

¹⁾ Used for colour TV.

²⁾ Depends on external stimulation.

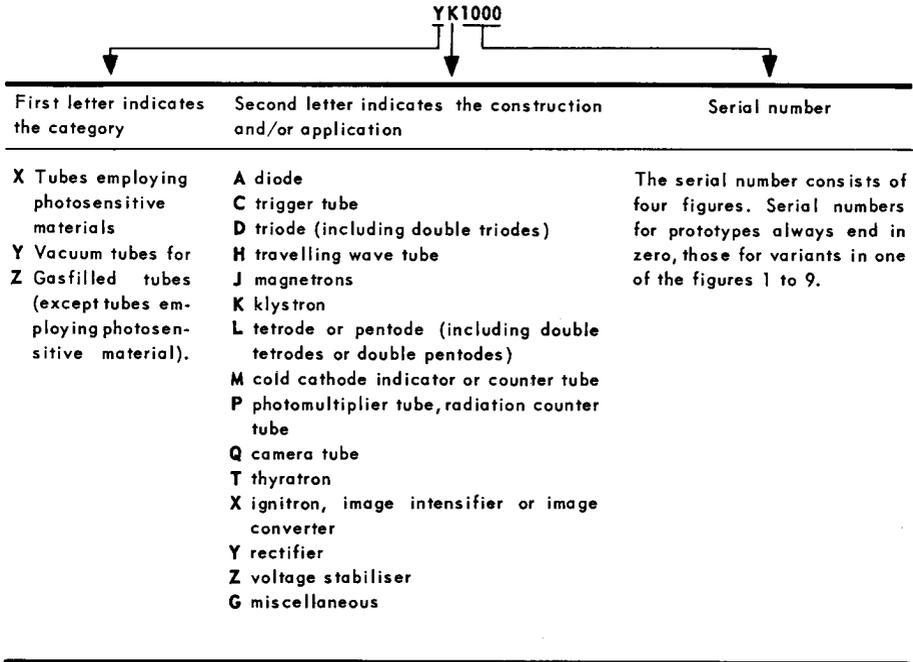
TYPE DESIGNATION CODE FOR PROFESSIONAL TUBES

This type designation code relates to tubes designed for use primarily in radio or television transmitting equipment, in navigation or communication equipment or in other industrial applications.

The type designation consists of:

TWO LETTERS FOLLOWED BY A SERIAL NUMBER

Example and explanation:



CATHODE-RAY TUBES (Old system)

The type number consists of two capital letters followed by two sets of figures (e.g. DG13-2, MW31-16).

- 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

- A - Electrostatic focusing and electromagnetic deflection.
- D - Electrostatic focusing and electrostatic deflection in two directions.
- M - Electromagnetic focusing and electromagnetic deflection.

Second letter

Indicates the phosphor screen properties.

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 (Old system)

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. TAL12/10, DCG4/1000G).

- 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. QQC04/15).

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
- H - Helix or other integral cooler
- 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
- GS - Super jumbo 4p-base
- N - Medium 5p-base
- P - P-base

PHOTOTUBES AND PHOTOMULTIPLIERS (old system)

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
- Third letter: letter P only for photomultipliers.

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

First figure

- 2 - Octal 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)
- U - Caesium-antimony cathode with quartz window
- T - Tialkali cathode.

Second letter

- G - Gasfilled
- V - High vacuum

VOLTAGE STABILIZERS (old system)

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, 150C1K).

- 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