

ELECTRON TUBES

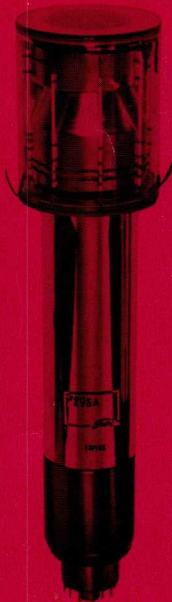
Cathode-ray tubes



Photo tubes



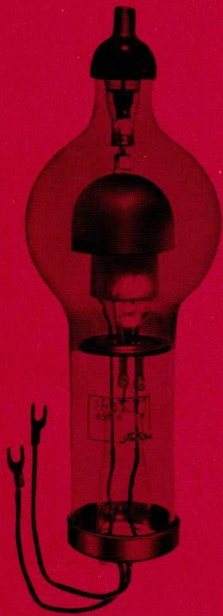
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Discharge tubes



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EXPLANATION OF ABBREVIATIONS

1. Cathode

FW —Pure tungsten filament
FT —Thorium tungsten filament
FO —Direct heating oxide coated filament
HO —Indirect heating oxide coated filament

2. Use

CT —Class C telegraph (suitable also as oscillator)
CP —Class C plate-modulated telephone
CS —Class C grid No. 3 modulat telephoned
AB₁ —Class AB₁ audio frequency amplification
AB₂ —Class AB₂ audio frequency amplification
B —Class B audio frequency amplification
BSSB —Class B SSB telephone
BTV —Class B television
CW —Continuous wave oscillation or amplification
PW —Pulse oscillation

3. Maximum rating and typical operation

Max. frequency, max. rating and typical operation are for respective uses. Typical operation of Class AB₁, AB₂, and B shows the value of two tubes.

Egm —Audio frequency peak voltage between grids.
Z_p —Effective load resistance (between anodes)

4. Cooling system

N —Natural air cooling
V —Forced ventilation
R —Forced air cooling
QR —Air volume
SP —Static pressure
W —Water cooling
QW —Water volume
S —Vapor cooling
C —Conduction cooling

EXPLANATION OF TERMS

Maximum frequency for full input

This shows the frequency usable at full input and serves as a standard of the frequency characteristic of transmitting tube. If the maximum input is lowered, tube can be used at higher frequency then rated. In this case reduction of plate input is accomplished by reduction the anode voltage.

Maximum anode rating, Maximum rating

The maximum anode rating shows only those items directly related to the anode while the maximum rating shows other principal items.

All maximum ratings are absolute and must not be exceeded regardless of operating conditions.

Typical operation

Typical operation shows a general example of operation for every principal use.

(Transmitting tube)

Typical operation without "note" shows the value at maximum frequency for the full input.

Plate output is the power supplied by the tube to the circuit (anode input—anode dissipation). Therefore, the difference of plate output and circuit loss is the effective power usable for the actual load.

(Rectifying discharge tube)

DC output voltage to the filter is computed according

to the rectifying system designated in "Rectifier System" column.

If another rectifying system is used, this value changes accordingly.

(Microwave tube)

The output is the value of the matched load and the condition is a typical example. The designed range of adjustment is shown in the test standard.

Maximum peak inverse voltage

This is the instant aneous value of maximum inverse voltage applicable to a given tube without any danger, below the regular temperature and surge current. If the inverse voltage exceeds this value, there is danger of inverse arc.

Maximum peak forward voltage

This is the maximum instant aneous value of positive voltage applicable to the anode within normal temperature, limits without making the grid inoperative.

In contrast to the peak inverse voltage excessive peak forward voltage does not inflict permanent damage, but trouble may occur as a result of the inoperative grid.

Maximum average time of anode current

The maximum average anode current, when flowing in rapid recurrence, can be measured for regulation with a DC ammeter. When this is not done, the average current must

5. Name of base

(I) D 16 S -1 (example)

— Difference in dimension and structure necessary for use which can not be distinguished in items 1, 2, and 3.

S : Standard

P : With side pin

K : With key or guide

L : Pin lengths differing from standard

Q : With key, guide or side pin

— Diameter of pin configuration or cap is shown in mm.

— Number of pin is shown alphabetically

Letters	A	B	C	D	E	F	G	H	J
Number of pin	1	2	3	4	5	6	7	8	9

(II) E7-1—7-pin mT tube (JEDEC number)

6. Name of terminal

T 8 - 2 (example)

— Difference in dimension and shape which can not be distinguished in items 1 and 2

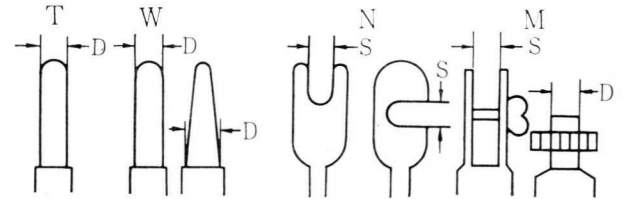
— In case of rod, its diameter; for other, cases, diameter essential to inserting

T : Base fixed to tubes

N : Nipples attached to lead wire

W : Base attached to lead wire

M : Other



be otherwise regulated for the specified time or the tube may burn out.

This specified time is called the Maximum Average Time of Anode Current, and the average current should be calculated within this time.

Maximum commutation factor

The ratio of decreasing current, just prior to the occurrence of commutation, is shown in Amp/ μ sec, and the increasing ratio of inverse voltage just after the commutation in Volt/ μ sec. The product of the two, VA/ μ sec², is designated the commutation factor.

The heat cathode grid control discharge tube filled with xenon gas, argon gas or hydrogen gas should be provided with a buffer circuit to slow down the rising ratio of initial inverse voltage and to keep the commutation factor below the maximum value, thus protecting against gas clean-up.

Maximum control power

This is the maximum value of the product of effective values of circuit voltage and control current of ignitron.

In the case of small power consumption ratios, even with a small average current, any drop in internal voltage is accompanied by a generation of heat and the pressure of the mercury vapor falls instantaneously below the minimum safety limit. Therefore under conditions of small power consumption since the maximum permissible current is inversely proportionate to circuit voltage, a minimum safety limit for this voltage must be provided for.

Cooling

(Air cooled tubes)

The anode seal section and glass section should be cooled not to exceed the temperature of then 170°C and 250°C respectively.

If care is taken in ventilation, this is usually sufficient with natural circulation. However, if adjacent tubes are located too close, or there is insufficient ventilation, a suitable cooling device is required.

Tubes marked "forced ventilation" should be cooled as specified.

(Forced air cooled tubes)

The air flow is forced upward from the bottom of the tube, and uniform cooling should be attained by adhering to the designated air volume. The air volume can be regulated by the pressure at the radiator inlet. However, if the outlet for the cooled air is directed by a air duct, the air volume should be determined guided by the of pressures drop in the radiator.

(Water cooled tubes)

The anode is cooled with a designated volume of water. The temperature of the inlet water must not exceed 60°C. Temperature rise of the cooling water is kept below 10°C.

(Vapor cooled tubes)

The tube is fixed in the boiler, in which the anode is cooled by evaporation of water.

The vapor cooling systems and their standard elements such as are boilers and condensers are specified and provided by the TOSHIBA respectively for each tubes.

TRANSMITTING TUBES

RECTIFIER TUBES

Type	Cathode			Dimensions		Base number		Tube voltage drop (V) (Max. plate current (mA))
	Classification	Voltage (V)	Current (A)	Length (mm)	Dia. (mm)	Cap	Base	
1 K 22	HO	2.5	1.75	112	38	A 9 S	D16S	200 (45)
1 K 24	FT	5.0♦ 2.5+	3.0	118	38	A 9 S	D16P	250 (160)
K-252	FT	5.0	3.25	170	60	A14S	D16P	130 (60)
1 K 29	HO	2.5	4.75	130	38	A 9 S	D16P	130 (110)
3 K 76A□	FT	5.0 5.4++	14.0 15.0++	191	57	(9.52φ)	D25S C	200 (450)

△ For Full wave rectification ○ Value of each unit

TRIODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)	Use
	Classification	Voltage (V)	Current (A)	Length Max. (mm)	Max. Dia. (mm)					
2 C 43	HO	6.3	0.9	68.2 Max	33.3 Max	H17Y (H17S)	8.0 (0.022)	50	1.7	□ CT
2 T 12 P	HO	10.0	1.5	105	43	A 9 S H17S	5.0 (0.03)	28	8.0	⊕ CT
2 T 24	FT	6.3	3.0	106	35	D16S	2.0 (0.025)	23	1.5	CT CP B
2 T 27 A	FT	6.3	3.0	120	40	A 9 S D16P	2.0 (0.025)	23	1.5	CT
2T72	HO	6.3	0.9	33.7	13.46	—	23.0 (0.06)	75	2.6	CT■
2T72R	HO	6.3	0.9	35.5	24	—	23.0 (0.06)	75	2.6	CT■
3 T 35	FT	5.0	4.0	140	45	D16P	2.85 (0.1)	39	1.8	CT CP B
UV-211 A	FT	10.0	3.25	170	52	D25L	3.8 (0.075)	12	15.0	CT B
2 C 39 A	HO	6.3	1.0	66	32	—	22.0 (0.07)	100	1.95	○ CT
4 T 10 R	HO	6.0	0.98	68.6 Max	32.1	—	25.0 (0.07)	100	2.05	○ CT
4 T 83 R	HO	6.3	1.3	68.4	34	—	35 (0.07)	90	2.2	○ CT
4 T 85 P	HO	6.3	4.8	175	93	A 9 S E32S	13 (0.3)	34	6.2	⊕ CT

♦ Typical operation is for pulse oscillation, with output at peak value. Other columns are at average value (duty factor 0.01).

▲▲ Effective output ○ In typical operation, the upper figures are for 500 Mc, lower for 2500 Mc.

▲ Output of exciter stage



1K22



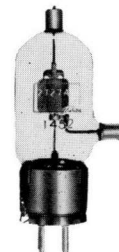
1K24



1K29



2T12P



2T27A

TRANSMITTING TUBES

Maximum plate ratings						U.S.A. equivalent	Type
Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Plate Dissipation (W)	Frequency (Mc)	Static capacity between plate and cathode (pF)		
12.5	0.06	0.0075	—	—	—	2X2A	1 K 22
7.5	0.1	0.0075	—	—	—		3B24W
20.0	0.3	0.06	—	—	—	—	
20.0*	0.15*	0.03*	—	—	—		3B29
30.0	0.2	0.06	—	—	—	576A	
16.0	0.25	0.065	—	—	—		
2.5	2.5	0.5	160	—	—		
2.5**	12.0**	0.03**					

● At choke input □ Suitable for Shunt diode ++ Value when used as shunt diode + One side of filament used
 ◆ Equipped with neutral point terminal (Don't use 2.5 V in parallel)

Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
	Voltage (kV)	Input (W)	Dissipation (W)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
3370	0.5 (3.5)	— (—)	12 (12)	0.47 (3.0)	R _g =1 kΩ (R _g =100Ω)	0.038 (—)	— (—)	— (—)	9 (0.75)	N	2C43	2 C 43
30	1.5	70	20	1.0	—100	0.012	4	—	800	N	—	2 T 12 P
60	2.0	100	25	1.5	—170	0.065	20	6	75	N	3C24	2 T 24
60	1.6	70	17	1.2	—180	0.05	17	5	46			
—	2.0	80	25	1.2	—40	0.02/0.1	18	2	Z _p =24200Ω 75			
100	2.0	125	40	1.5	—150	0.08	20	5	85	N	—	2 T 27 A
1500	0.75	—	40	0.7	—15	0.07	20	3▲	23▲▲	C	—	2T72
1900	0.75	—	40	0.7	—15	0.07	20	3▲	23▲▲	R Q=0.1 m ³ /min	—	2T 72 R
100	2.0	200	50	1.5	—120	0.12	40	9	135	N	(35TG)	3 T 35
100	1.6	140	34	1.2	—120	0.1	40	9	90			
—	2.0	160	50	1.5	—30	0.04/0.16	50	5	Z _p =19200Ω 150			
10	1.25	180	75	1.0	—150	0.13	20	5	90	N	(211)	UV-211 A
—	1.25	150	75	1.0	—77	0.02/0.28	20	3	Z _p =7600Ω 180			
2500	1.0	125	100	0.8 0.9	—45 —22	0.08 0.09	32 27	▲6 —	▲▲27 ▲▲12	★R QR=0.4 m ³ /min	2C39A	2 C 39 A
2500	1.0	125	100	0.9 0.9	—22 —22	0.09 0.09	30 25	▲6 —	▲▲40 ▲▲15	★R QR=0.35 m ³ /min	3CX100A5	4 T 10 R
2500	1.0	—	130	0.9 0.9	—20 —20	0.14 0.14	35 40	▲8 —	▲▲55 25	★R QR=0.4 m ³ /min	—	4 T 83 R
20	2.5	—	150	2	—135	0.023	5	—	3000	N	—	4 T 85 P

□ Typical operation shows value of 2 tubes for the oscillating frequency of 350 Mc, and () shows the average value at pulse width of 1 μs and recurrence frequency of 1000 c/s for plate pulse oscillation. ★ Inlet air temperature for forced air cooling should be below 40°C



2T72



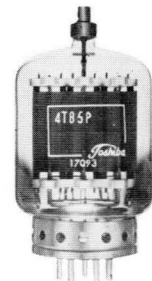
2T72R



2C39A



4T83R

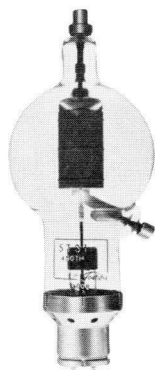


4T85P

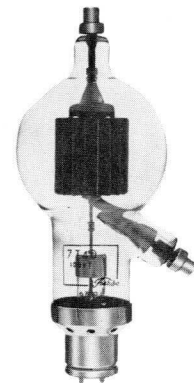
TRANSMITTING TUBES

Type	Cathode			Dimensions		Base number or terminal	Mutual Conductance (m μ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)	Use
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)					
5T20	FT	5.0	10.5	250	96	A9S D25L	1.7 (0.1)	14	3.0	CT CP B
5T21	FT	5.0	10.5	250	96	A9S D25L	3.5 (0.1)	36	2.6	CT CP B
5T34	FT	5.0 10.0	25.0 12.5	190	89	A9S D27S	16.7 (1.0)	12	8.6	CT CP B
5T35	FT	5.0 10.0	25.0 12.5	190	89	A9S D27S	16.7 (1.0)	20	10.2	CT CP B
5T30	FT	7.5	12.0	310	127	A14S D25L	3.5 (0.15)	18	4.5	CT CP
5T31	FT	7.5	12.0	310	127	A14S D25L	4.4 (0.15)	38	5.0	CT CP B
7T40	FT	7.5	16.0	310	127	A14S D25P	7.0 (0.3)	35	5.0	CT CP B
7T40A	FT	7.5	16.0	315	140	A14S D25P	7.0 (0.3)	35	5.0	CT CP B
7T31	FT	7.5	16.0	350	140	D25P	6.0 (0.3)	18	5.0	CT *CT
7T45	FT	7.5	24.0	420	175	A14S D53S	4.0 (0.3)	15	6.0	CT CP

● Typical operation when grid grounded.



5T31

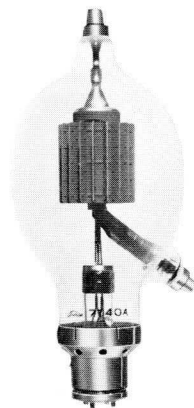


7T40

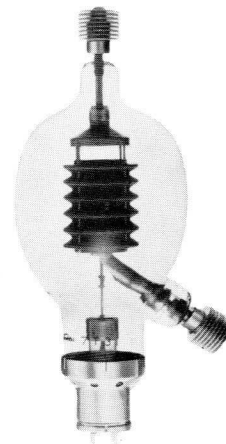
TRANSMITTING TUBES

Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
	Voltage (kV)	Input (W)	Dissipation (W)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
40 40 —	4.0 3.2 4.0	1000 660 850	250 165 250	3.5 3.0 3.0	-450 -550 -200	0.26 0.2 0.06/0.35	35 30 8	26 25 2.5	700 460 $Z_p=16400\Omega$ 620	N	250 TL	5 T 20
40 40 —	4.0 3.2 4.0	1000 660 800	250 165 250	3.5 3.0 3.0	-255 -250 -70	0.26 0.2 0.06/0.36	55 55 25	25 23 3.8	700 460 $Z_p=16000\Omega$ 630	N	250 TH	5 T 21
40 40 —	3.0 2.5 2.5	1200 800 1000	300 200 300	3.0 2.0 2.5	-400 -500 -230	0.37 0.37 0.16/0.6	80 90 25	40 60 6.5	850 570 $Z_p=8000\Omega$ 900	N	304 TL	5 T 34
40 40 —	3.0 2.5 3.0	1200 800 1000	300 200 300	3.0 2.0 2.5	-300 -350 -120	0.37 0.37 0.16/0.6	120 130 30	45 55 4.8	850 570 $Z_p=8400\Omega$ 900	N	304 TH	5 T 35
40 40	6.0 4.5	1800 1200	450 300	5.0 4.0	-500 -550	0.35 0.27	45 50	30 37	1350 920	N or V	450 TL	5 T 30
40 40 —	6.0 4.5 5.0	1800 1200 1500	450 300 450	5.0 4.0 4.0	-350 -450 -120	0.35 0.27 0.08/0.5	60 75 30	32 47 7	1350 920 $Z_p=16400\Omega$ 1200	N or V	450 TH	5 T 31
50 50 —	7.5 6.0 7.5	4000 2600 3000	1000 660 1000	6.0 5.0 6.0	-400 -450 -160	0.6 0.45 0.15/0.83	80 110 40	55 75 12	2700 1800 $Z_p=14800\Omega$ 3100	V	1000T	7 T 40
50 50 —	7.5 6.0 7.5	4000 2600 3000	1000 660 1000	6.0 5.0 2.0	-400 -450 -160	0.6 0.45 0.15/0.83	80 110 40	55 75 12	2700 1800 $Z_p=14800\Omega$ 3100	V	—	7 T 40 A
50 50	7.5 7.5	4000 6000	1000 1500	6.0 6.5	-500 -550	0.6 0.65	60 65	45 50	2800 3250	V	—	7 T 31
40 40	7.5 6.0	6000 4000	1500 1000	6.0 5.0	-700 -1100	0.85 0.6	90 100	105 150	3800 2350	V	(1500T)	7 T 45

○ Radiator has a hole for thermometer. ★ Inlet air temperature for forced air cooling should be below 40°C.
 † Typical operation is for pulse oscillation, with output at peak value. Other columns are at average value (duty factor 0.01).



7T40A



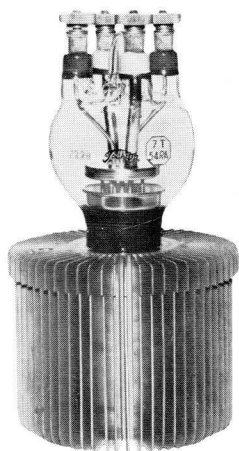
7T31

TRANSMITTING TUBES

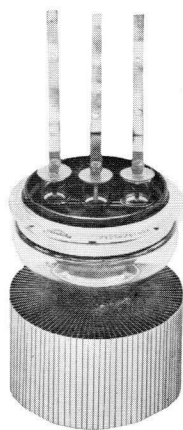
TRIODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current (A))	Amplification	Static capacity between plate and grid (pF)	Use
	Classification	Voltage (V)	Current (A)	Length Max. (mm)	Max. Dia. (mm)					
7T54RA	FT	12.0	25.0	240	126	M6	5.0 (0.4)	25	12.5	CT CP B
7T25R	◆FT	12.6	29.0	181 Max	117.5	—	11 (0.5)	29	18	CT CP B
7T58R	FT	5.0	80.0	240	204	T9	7.5 (0.5)	20	14	CT CP B
8T58	FT	5.0	80.0	235	90	T9	7.5 (0.5)	20	13	CT CP B
8T11R	FT	22.0	60.0	410	276	T9	6.5 (0.6)	25	19	CT CP B
8T20RA	FT	12.0	40.0	330	204	T9	11.0 (1.0)	21	20	CT CP B
8T30R	FT	12.0	40.0	385	204	T9	9.0 (1.0)	50	18	CT CP B
8T33R	FT	7.5	60.0	360	204	T9	18.0 (1.0)	40	27	CT CP B
8T11	FT	12.0	40.0	387	105 Max	T9-1 T9-2	6.5 (0.6)	25	18	CT CP B
8T20A	FT	12.0	40.0	325	120 Max	T9	11.0 (1.0)	21	19	CT CP B
8T30	FT	12.0	40.0	380	115	T9	9.0 (1.0)	50	18	CT CP B

◆ Equipped with FCT. △ Filaments and grid seals are cooled by forced air.



7T25R



7T54RA



7T58R

TRANSMITTING TUBES

Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
	Voltage (kV)	Input (kW)	Dissipation (kW)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
40 40 —	8.0 6.0 7.0	6.0 4.0 6.0	2.5 1.7 2.5	7.0 6.0 7.0	-800 -850 -220	0.85 0.6 0.3/1.4	110 100 80	140 130 40	4300 2700 Z _p =10000Ω 6000	R QR=8m ³ /min SP=36mm a. q ○	—	7 T 54 RA
30 30 —	6.2 5.0 6.2	8.7 5.0 8.7	4.0 2.7 4.0	6.0 4.7 4.7	-510 -400 -170	1.3 0.96 0.2/2.7	280 280 370	210 170 146	6000 3700 Z _p =3550Ω 8000	QR= 8.5m ³ /min SP=74mm a. q	5762A	7 T 25 R
30 30 —	8.0 6.0 8.0	15.0 8.4 12.0	4.0 2.6 4.0	7.0 6.0 7.0	-800 -900 -340	1.6 1.2 0.2/2.4	200 200 130	250 260 80	8000 5500 Z _p =5600Ω 10000	R QR=13m ³ /min SP=15mm a. q ○	—	7 T 58 R
30 30 —	8.0 6.0 8.0	16.0 8.5 12.0	5.0 3.3 5.0	7.0 6.0 7.0	-800 -900 -340	1.8 1.2 0.2/2.4	220 200 130	280 260 80	9000 5500 Z _p =5600Ω 10000	W QW=10l/min △	—	8 T 58
30 30 —	12.0 10.0 12.0	17.0 10.0 12.0	6.0 4.0 6.0	10.0 9.0 9.0	-1100 -1200 -300	1.6 1.0 0.5/2.4	160 140 55	300 230 35	11500 7000 Z _p =7200Ω 12500	R QR=20m ³ /min SP=17mm a. q ○	—	8 T 11 R
30 30 —	12.0 10.0 12.0	22.0 16.0 20.0	6.0 4.0 6.0	10.0 9.0 10.0	-1100 -1200 -430	2.0 1.3 0.5/3.6	190 200 55	290 300 35	15500 9000 Z _p =8000Ω 16000	R QR=16m ³ /min SP=20mm a. q ○	—	8 T 20 RA
30 30 —	12.0 10.0 12.0	18.0 14.0 10.0	6.0 4.0 6.0	10.0 9.0 9.0	-800 -1000 -110	1.45 0.85 0.4/1.8	230 220 130	300 310 50	10000 5500 Z _p =9000Ω 9000	R QR=20m ³ /min SP=16mm a. q ○	—	8 T 30 R
30 30 —	10.0 7.5 10.0	22.5 15.0 18.0	6.0 4.0 6.0	9.0 5.0 8.0	-500 -400 -200	2.2 1.55 0.2/3.3	280 330 180	220 220 75	15000 6000 Z _p =5200Ω 18000	R QR=20m ³ /min SP=16mm a. q ○	—	8 T 33 R
30 30 —	12.0 10.0 12.0	22.0 10.0 20.0	10.0 6.6 10.0	10.0 9.0 11.0	-1050 -1200 -370	1.8 1.0 0.5/3.4	240 200 120	355 320 95	13500 7000 Z _p =6600Ω 23000	W QW=20l/min △	—	8 T 11
30 30 —	12.0 10.0 12.0	27.0 18.0 25.0	10.0 6.6 10.0	11.0 9.0 11.0	-1100 -1200 -480	2.2 1.3 0.5/4.0	200 200 65	310 300 48	18000 9000 Z _p =5600Ω 270000	W QW=20l/min △	—	8 T 20 A
30 30 —	14.0 10.0 12.0	22.0 14.0 20.0	10.0 6.5 10.0	12.0 9.0 11.0	-1000 -1000 -145	1.7 0.85 0.5/3.0	250 220 150	400 310 85	14000 5500 Z _p =7200Ω 20000	W QW=20l/min △	—	8 T 30

○ Radiator has a hole for thermometer

★ Inlet air temperature for forced cooling should be below 40°C.



8T33R



5T20A

TRANSMITTING TUBES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current) (A)	Amplification	Static capacity between plate and grid (pF)	Use
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)					
8T33	FT	7.5	60.0	355	120	T 9	18.0 (1.0)	40	26	CT CP B
8T34R	FT	7.5	120.0	330	180	—	25.0 (2.0)	26	23.5	●CT ±●BTV
8T36R	FT	7.5	60.0	360	204	T 9	18.0 (1.0)	40	27	CT CP B
8T50	FT	8.0	225.0	380	210	T14	16.0 (2.0)	20	35	CT CP B
8T71R	FT	11.0	285.0	625	349	T17	30.0 (2.0)	39	52	CT CP B
8T72A	FT	8.0	180.0	460	150	T14	16.0 (2.0)	20	32	CT CP B
8T61	FT	8.0	280.0	450	150	T14	30.0 (2.0)	20	41	CT CP B
8T54	FT	9.0	240.0	443	175	—	45.0 (4.0)	30	35	●CT ±●BTV
9T71	FT	11.0	285.0	610	234	T17	30.0 (2.0)	39	53	CT CP B
9T38	FT	18	315	700	250	—	80 (5.0)	40	97	CT CP B
9T64	FT	12	320	610	240 Max	T-13	55 (5.0)	30	80	CT CP B
9T82	FT	16.5	325	590 Max	203	—	65.0 (5.0)	30	85	CT CP B

△ Filaments and grid seal are cooled by forced air.

△△ Electrode seals and glass parts are cooled by forced air.



8T71R



8T33



8T72A



8T61



8T54

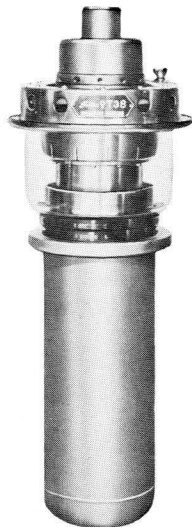
TRANSMITTING TUBES

Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
	Voltage (kV)	Input (kW)	Dissipation (kW)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (W)			
30 30 —	10.0 7.5 10.0	27 15 25	10 6.6 10	9 5 8	-500 -400 -200	2.5 1.55 0.2/4.0	300 330 240	250 220 100	17000 6000 Z _p =4400Ω 22000	W QW=20l/min △	—	8 T 33
130 130	7.0 7.0	20 24	10 10	6 6	-330 -200	3.0 3.8	330 300	1700 1750	13000 12500	R QR=12m ³ /min SP=70mm a. q	—	8 T 34 R
30 30 —	10.0 7.5 10.0	27 15 25	10 6.6 10	9 6 8	-500 -530 -200	2.5 1.8 0.2/4.0	300 330 240	250 270 100	17000 8500 Z _p =4400Ω 22000	R QR=20m ³ /min SP=60mm a. q	—	8 T 36 R
25 25 —	14.0 11.0 14.0	70 42 55	25 17 25	12 10 12	-1000 -1200 -550	5.0 3.6 1.2/8.0	550 600 360	900 1050 320	42000 28000 Z _p =3000Ω 60000	W QW=45l/min △△	—	8 T 50
10 10 —	15.0 12.5 15.0	100 55 75	25 17 25	13 12 12	-1200 -1200 -300	6.0 4.0 0.6/9.0	800 800 300	1400 1300 200	58000 38000 Z _p =2700Ω 68000	R QR=65m ³ /min SP=50mm a. q △	5671	8 T 71 R
25 25 —	14.0 11.0 14.0	60 36 50	25 17 25	12.5 10 12	-1200 -1200 -570	4.5 3.0 0.7/8.0	450 500 300	800 850 270	40000 23000 Z _p =3000Ω 60000	W QW=45l/min △	—	8 T 72 A
30 30 —	12.0 9.5 12.0	100 60 80	35 23 35	10 8 11.5	-1000 -800 -700	8.0 5.0 0.2/8.0	950 750 250	1400 860 210	58000 30000 Z _p =3000Ω 60000	W QW=65l/min △	—	8 T 61
130 130	10.0 10.0	60 80	45 45	9 9	-450 -300	6.5 8.8	500 1300	4500 6800	40000 57500	W QW=90l/min △△	—	8 T 54
20 20 —	17.0 12.5 15.0	150 60 90	50 33 50	15 12 12	-1200 -1200 -300	8.0 4.5 0.6/10.0	800 900 400	1450 1500 235	88000 43000 Z _p =2400Ω 75000	W QW=75l/min △	5770	9 T 71
2 2 —	15.0 12.5 15.0	300 180 300	120 75 120	14 12 14	-900 -700 -330	18 14 18	2500 2000 1700	3400 2070 1200	190000 130000 165000	W QW=200l/min △△ △△	—	9 T 38
15 15 —	15 12	200 105	75 50	14 12	-900 -1200	13 8	2000 1900	2800 3000	140000 Z _p =77000	W QW=130l/min △	—	9 T 64
30 30 —	16.0 14.0 16.0	300 185 280	120 80 120	15 14 15	-1350 -1230 -450	18.3 10.7 6.0/35.0	3300 2350	7200 3900 2000	215000 118000 Z _p =873Ω 330000	W QW=230l/min △	5682	9 T 82

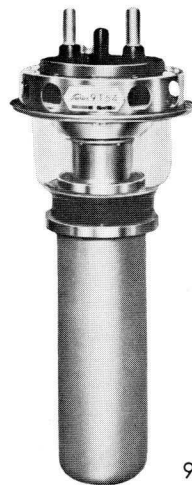
● Typical operation with grid grounded † Typical operation shows values when synchronizing signal is of 8 Mc bandwidth.
★ Inlet air temperature for forced cooling should be below 40°C.



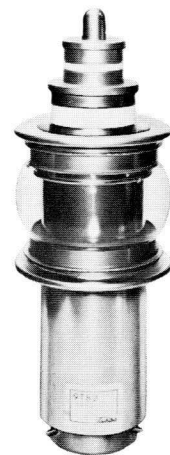
9T71



9T38



9T64

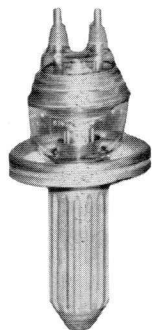


9T82

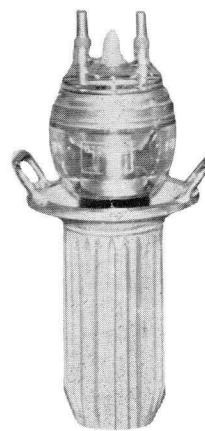
TRANSMITTING TUBES

VAPOR COOLED TRIODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current A)	Amplification	Static capacity between plate and grid (pF)	Use
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)					
8T39 (8T13)	FT	7.5	60	355	160	T 9-1	18.0 (1.0)	40	26	CT
8T27	FT	8.0	180	475	200	T14-2	16.0 (2.0)	20	32	CT
9T46	FT	12.0	320	616	310	T17-1	55.0 (5.0)	30	80	CT
9T16	FT	8.0	280	465	200	T14-3	30.0 (2.0)	20	41	CT
9T17	FT	11.0	285	636	240	T17-1	30.0 (2.0)	39	53	CT
9T83	FT	18.0	315	700	380	—	80.0 (5.0)	40	100	CT



8T39



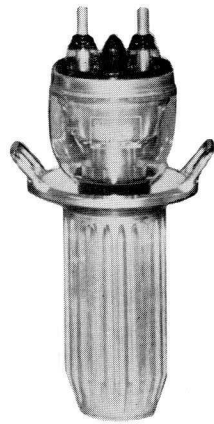
8T27

TETRODES

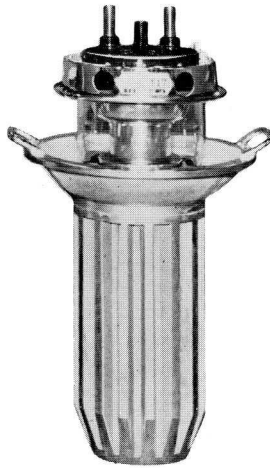
Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current mA)	Grid-No. 2 amplification	Inner static capacity			Use	Max. frequency for full input (Mc)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No. 1 & plate (pF)	Input (pF)	Output (pF)		
3F65	FT	6.0	3.5	106	60 Max	A 9 S G25Y	4.0 (0.125)	6.0	0.08	7.2	2.3	CT CP AB ₂	150 150 —
4F16R	HO	6.3	2.1	47.9	31.8	—	12.0 (0.115)	18.0	0.065	33.0	4.4	CT *CP	1215 1215
4F84R	HO	26.5	0.52	47.9	31.8	—	12.0 (0.115)	18.0	0.065	33.0	4.4	CT *CP	1215 1215
4F21	FT	5.0	6.5	138	73 Max	A 9 S E32S	2.45 (0.05)	6.2	0.05	10.8	3.1	CT CP AB ₂	120 120 —
4F15R	HO	6.0	2.6	59	41.3	H17S A-1	12 (0.25)	5.0	0.06 Max	15	4.6	CT *BTV	500 500
4F20R	HO	26.5	0.56	59	41.3	H17S A-1	12 (0.25)	5.0	0.06 Max	15	4.6	CT *BTV	500 500
5F15R	HO	6.0	2.6	62.7	41.3	H17S A-1	12 (0.2)	5.0	0.03	16.0	4.4	CT CP	150 500 150
5F16R	HO	26.5	0.58	62.7	41.3	H17S A-1	12 (0.2)	5.0	0.03	16.0	4.4	CT CP	150 500 150

TRANSMITTING TUBES

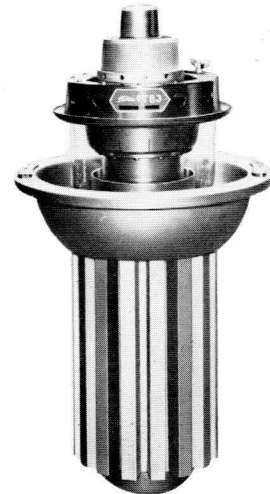
Max. frequency for full input (Mc)	Max. plate ratings			Typical operation						★ Cooling system	U.S.A. equivalent	Type
	Voltage (kV)	Input (kW)	Dissipation (kW)	Plate voltage (kV)	Grid voltage (V)	Plate current (A)	Grid current (mA)	Exciting power (W)	Plate output (kW)			
30	10.0	27.0	15.0	9.0	- 500	2.5	300	250	17.0	S	—	8 T 39 (8 T 13)
25	14.0	60.0	35.0	12.0	- 300	4.5	450	800	40.0	S	—	8 T 27
15	15.0	200.0	75.0	14.0	- 900	13.0	2.0	2800	140.0	S	—	9 T 46
30	12.0	100.0	50.0	10.0	-1000	8.0	950	1400	88.0	S	—	9 T 16
20	17.0	150.0	75.0	15.0	-1200	8.0	800	1450	58.0	S	—	9 T 17
2	15.0	300.0	150.0	15.0	-1000	20.0	2500	3600	220.0	S	—	9 T 83



9T16



9T17



9T83

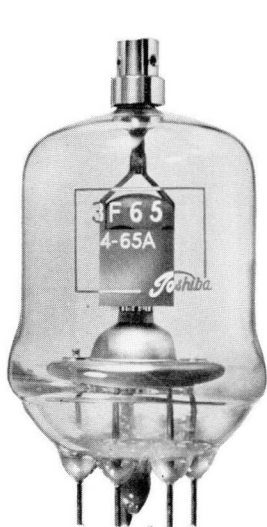
Max. ratings					Typical operation							★ Cooling system	U.S.A. equivalent	Type
Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (A)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
3.0 2.5	400 400	260 180	65 45	10 10	2.5 2.0	250 200	-100 -100	0.09 0.08	10 20	1.2 3.0	170 120 Z _p =15200Ω 180	N or V	4-65A	3 F 65
3.0	600	200	65	10	1.5	250	- 30	0.06/0.20	15	0.8				
1.8 0.8	300 300	180 120	115 75	4.5 3	0.9 0.7	300 250	- 22 - 50	0.17 0.13	1 10	▲ 5 ▲ 3	▲▲ 40 ▲▲ 45	R QR=0.48m ³ /min	6816	4 F 16 R
1.8 0.8	300 300	180 120	115 75	4.5 3	0.9 0.7	300 250	- 22 - 50	0.17 0.13	1 10	▲ 5 ▲ 3	▲▲ 40 ▲▲ 45	R QR=0.48m ³ /min	6884	4 F 84 R
3.5 2.5 3.0	400 400 600	450 300 400	125 85 125	20 20 20	3.0 3.0 2.5	350 350 350	-180 -250 - 85	0.15 0.14 0.04/0.22	30 30 7	3.3 4.2 0.6	350 220 Z _p =24000Ω 320	N or V	4-125A/4D21	4 F 21
1.25 1.25	300 400	250 400	150 150	12 12	1.0 1.0	250 300	-110 - 65	0.20 0.33	7 45	▲25 8	▲▲120 200	R QR=0.16m ³ /min SP=6.6mm a. q △	4X150A	4 F 15 R
1.25 1.25	300 400	250 400	150 150	12 12	1.0 1.0	250 300	-110 - 65	0.20 0.33	7 45	▲25 8	▲▲120 200	R QR=0.16m ³ /min SP=6.6mm a. q △	4X150D	4 F 20 R
2.0 1.25 1.6	300 300 300	500 250 250	250 250 165	12 12 12	2.0 1.25 1.6	250 250 250	- 90 -115 -150	0.25 0.2 0.2	19 10 18	3.9 ▲30 3.6	▲▲390 140 250	R QR=0.16m ³ /min SP=15mm a. q △	7034/4X150A	5 F 15 R
2.0 1.25 1.6	300 300 300	500 250 250	250 250 165	12 12 12	2.0 1.25 1.6	250 250 250	- 90 -119 -150	0.25 0.2 0.2	19 10 18	2.9 ▲30 3.6	▲▲390 140 250	R QR=0.16m ³ /min SP=15mm a. q △	7035/4X150D	5 F 16 R

TRANSMITTING TUBES

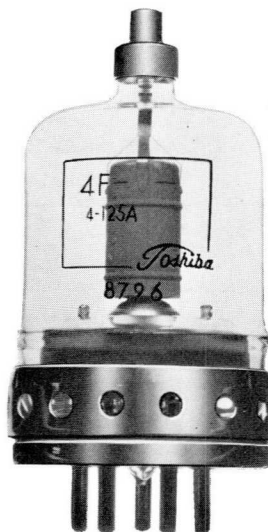
TETRODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current (A))	Grid-No. 2 amplification	Inner static capacity			Use	Max. frequency for full input (Mc)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No. 1 & plate (pF)	Input (pF)	Output (pF)		
5 F 20 RA	HO	6.0	2.6	60.8	41.3	H17S A-1	12 (0.2)	5.2	0.03	15.1	4.4	CT CP	500 500
7609	HO	26.5	0.57	62.7	41.3	H17S A-1	12 (0.2)	5.0	0.03	15.5	4.5	CT CT CP	150 500 150
5 F 22	FT	5.0	14.0	156	89	A 9 S E32S	4.0 (0.1)	5.3	0.12	12.7	4.5	CT CP B	75 75 —
5 F 22 A	FT	5.0	14.0	145	89	A 9 S E32S-3	4.0 (0.1)	5.3	0.12	12.7	4.5	CT CP BSSB	75 75 75
5 F 35 RA	HO	6.0	3.75	78.6	50	H17S A-1	15.0 (0.35)	5.0	0.05	25	6.5	CT BTV	250 250
5 F 23	FT	5.0	14.0	156	89	A 9 S E32S	4.0 (0.1)	5.3	0.12	12.5	4.7	CT CP BSSB AB ₂	75 75 75 —
5 F 23 A	FT	5.0	14.0	145	89	A 9 S E32S	4.0 (0.1)	5.3	0.12	12.5	4.7	CT CP BSSB AB ₂	75 75 75 —
5 F 60 R	HO	6.0	5.5	61 Max	60	—	—	15	0.15 Max	41	10.5	CT	1215
4 F 16	HO	6.3	2.1	47.8	27.8	—	12.0 (0.115)	18.0	0.065	33.0	4.4	CT Δ CP \square	1215 1215
4 F 84		26.5	0.52										
4 F 64		6.0	2.8										
4 F 64 R	HO	6.0	2.8	65	36.2	—	30.0 (0.25)	16.5	0.09	29.5	4.0	CT BTV*	500 500
4 F 64 R	HO	6.0	2.8	62	41.3	—	30.0 (0.25)	16.5	0.09	29.5	4.0	CT BTV*	500 500

★ Inlet air temperature forced cooling should be below 40°C. ▲ Including circuit loss. ▲▲ Effective output. △ Cooling socket is used.



3F65



4F21



4F16R



5F15R

TRANSMITTING TUBES

Max. ratings					Typical operation							★ Cooling system	U.S.A. equivalent	Type
Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (A)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
2.0	300	500	250	12	2.0	250	- 90	0.25	3	▲18	▲▲250	R QR=0.11m ³ /min SP=1.5mm a. q △	4CX250B	5F 20 RA
1.5	300	300	165	8	1.5	250	-100	0.20	31	0.7	235			
2.0	300	500	250	12	2.0	250	- 90	0.25	19	2.9	▲390	R QR=0.16m ³ /min SP=7.6mm a. q △	7609	7609
1.25	300	250	250	12	1.25	250	-115	0.2	10	▲30	▲▲140			
1.6	300	250	165	12	1.6	250	-150	0.2	18	3.6	290			
4.0	600	1000	250	35	3.5	500	-200	0.26	50	3.5	700	V QR=0.16m ³ /min SP=7mm a. q △	4-250A/5D22	5F 22
3.2	500	660	165	30	2.5	400	-200	0.21	50	3.5	400	Z _p =14600Ω		
4.0	600	800	250	35	3.0	500	-105	0.06/0.42	18	1	780			
4.0	600	1000	250	35	3.5	500	-200	0.26	50	3.5	700	V QR=0.14m ³ /min SP=2mm a. q △	6156	5F 22 A
3.2	500	660	165	30	2.5	400	-200	0.21	50	3.5	400	Z _p =14600Ω		
4.0	600	800	250	35	3.0	500	-150	0.21	9	0.5	780			
1.5	300	700	350	15	1.25	250	- 60	0.45	25	▲15	340	R QR=0.2m ³ /min SP=2.0mm a. q △	—	5F 35 RA
1.5	300	700	350	15	1.25	250	- 40	0.46	20	▲10	330			
4.5	600	1400	400	35	4.0	500	-230	0.31	55	5	950	V QR=0.4m ³ /min SP=53mm a. q △	4-400A	5F 23
3.2	600	850	270	30	3.0	500	-230	0.27	50	4.5	610			
4.0	600	1000	400	35	3.5	500	- 90	0.26	11	0.6	540	Z _p =13600Ω		
4.0	600	1000	400	35	3.5	500	- 90	0.12/0.52	22	1.2	1100			
4.5	600	1400	400	35	4.0	500	-230	0.31	55	5	950	V QR=0.4m ³ /min SP=8mm a. q △	—	5F 23 A
3.2	600	850	270	30	3.0	500	-230	0.27	50	4.5	610	Z _p =13600Ω		
4.0	600	1000	400	35	3.5	500	- 90	0.26	11	0.6	540			
4.0	600	1000	400	35	3.5	500	- 90	0.12/0.52	22	1.2	1100			
2.0	600	1000	450	12	2.0	400	- 50	0.5	4	21	▲▲550	R QR=0.25m ³ /min SP=5mm a. q △	—	5F 60 R
1.0	300	180	115	4.5	0.9	300	- 22	0.17	1	5▲	40▲▲	C	7844	4F 16
0.8	300	120	75	3	0.7	250	- 50	0.13	10	3▲	45▲▲	C	7843	4F 84
2.0	400	—	100	12	1.3	250	- 40	0.18	20	10▲	150	C	—	4F 64
2.0	400	—	100	12	1.3	250	- 14	0.16	35	4▲	100			
2.0	400	500	180	12	1.5	300	- 40	0.22	7	10▲	200	R QR=0.16m ³ /min SP=7mm a. q △	—	4F 64 R
2.0	400	400	180	12	1.5	300	- 18	0.25	5	8.5▲	200			

● Typical operation when grid grounded.

* Typical operation shows values when synchronizing signal is 5 Mc, bandwidth below Frequency 216 Mc.



5F20RA



5F35RA

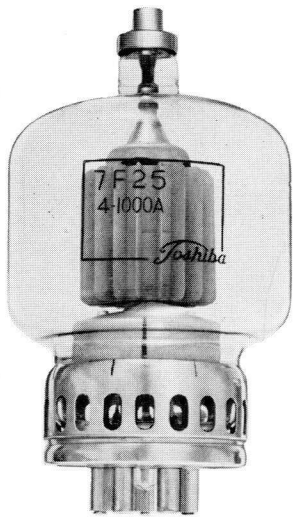


5F60R

TRANSMITTING TUBES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current (A))	Grid-No. 2 amplification	Internal static capacity			Use	Max. frequency for full input (Mc)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No. 1 & plate (pF)	Input (pF)	Output (pF)		
6F50R	FT	5.0	13.5	115	65	T8-1	5.2 (0.2)	6.2	0.05	12.8	5.6	CT	120
6F62R	FT	4.0	35.0	141	74	—	20.0 (0.7)	8.3	0.25 Max	43.5	10.0	CT ⊕ BTV	250 250
6F70R	HO	6.3	7.5	59.4	52.3	—	25.0 (0.24)	13.0	0.09 Max	67.0	5.5	● CT ※● CP	1215 1215
7F25	FT	7.5	21.0	235	127	A14S E38SA	10.0 (0.3)	7.0	0.24	27.2	7.6	CT CP BSSB AB ₂	110 110 110 —
7F37R	FT	4.0	35.0	125	74	—	15.0 (0.4)	8.3	0.25 Max	36	9.0	× CT □ AB ₁ SSB	130 30
7F60RA	FT	4.0	58.0	178	122	—	20.0 (0.6)	7.0	0.65	72	16.0	× CT CP ⊕ BTV	250 250 250
7F13R	HO	5.5	17.5	82	94	—	45.0 (0.6)	17.0	0.17	97.0	16.0	■ CT ■ CP	1215 1215
7F31R	FT	6.0	48.0	215	105	—	22.0 (2.0)	10.0	0.3	68	15.5	CT □ CP ⊕ BTV	220 220 220
8F66RA	FT	5.0	177.0	285	152	T11-1	20.0 (1.0)	10.0	0.6 Max	104	23.0	CT □ CP ⊕ BTV	220 220 220

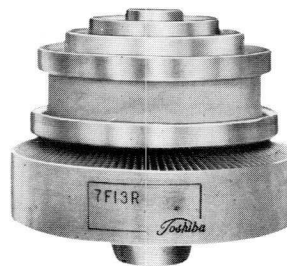
★ Inlet air temperature forced coolig should be below 40°C. ▲ Including circuit loss. ▲▲ Effective output. △ Cooling socket is used.



7F25



6F70R



7F13R



7F37R

TRANSMITTING TUBES

Max. ratings					Typical operation							★ Cooling system	U.S.A. equivalent	Type
Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate loss Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (A)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
4.0	500	1200	500	30	3.0	500	150	0.3	35	▲ 15	600	R QR=1 m ³ /min SP=36 mm a.q.	4X500A	6 F 50 R
3.0	600	1500	700	50	2.5	500	-157	0.55	25	▲ 80	900	R QR=1 m ³ /min SP=15 mm a.q.	—	6 F 62 R
3.0	600	1500	460	50	1.9	500	-70	0.67	⊕10	▲ 13	650			
2.5	1200	1200	700	25	2.5	400	-50	0.5	6	▲ 80	▲▲450	R QR=1 m ³ /min SP=17 mm a.q.	7650	6 F 70 R
2.0	1200	1000	460	17	2.5	400	-36	0.5	8	▲ 35	▲▲600			
6.0	1000	4000	1000	75	5.5	500	-200	0.6	90	15	2500	V QR=1.25 m ³ /min SP=70 mm a.q.	4-1000A	7 F 25
5.0	1000	2700	670	75	4.5	500	-200	0.55	120	15	1950			
6.0	1000	3200	1000	75	5.0	500	-65	0.5	50	3	1500	Z _p =10400Ω		
6.0	1000	3200	1000	75	5.0	500	-65	0.18/1.0	100	6	3100	Δ		
4.0	600	2500	1000	50	3.0	500	-150	6.0	45	▲ 15	1250	R QR=1.7 m ³ /min SP=35 mm a.q.	—	7 F 37 R
5.0	800	3500	1000	50	5.0	800	-100	0.06/0.56	35	—	1800			
4.0	700		2000	60	4	500	-180	0.9	60	▲ 180	2300	R QR=3.5 m ³ /min SP=50 mm a.q.	—	7 F 60 RA
3.0	700		2000	60	2.5	500	-90	1.0	50	▲ 80	1400			
2.5	1000	2500	1500	50	2.5	500	-30	1.0	20	▲ 175	1350	R QR=1.2 m ³ /min SP=15 mm a.q.	7213	7 F 13 R
2.0	1000	1700	1000	35	2.0	500	-30	0.83	15	▲ 55	800			
4.0	1000	5000	2500	120	4.0	800	-200	1.2	85	▲ 150	3200	R QR=4 m ³ /min SP=60 mm a.q.	—	7 F 31 R
3.2	800	3300	1650	120	3.0	500	-200	1.0	110	▲ 75	2050			
4.0	1000	6000	2500	120	3.8	800	-80	1.47	⊕95	▲ 250	3500			
7.5	2000	20000	12000	400	7.0	1200	-310	2.75	300	▲ 750	12000	R QR=15.6 m ³ /min SP=168 mm a.q.	6166A/7007	8 F 66 RA
5.5	2000	10000	8000	270	4.8	800	-300	1.8	160	▲ 125	6000			
7.5	2000	24000	12000	400	5.8	1200	-130	3.45	⊕200	▲ 800	12000			

□ Example is for below 30 Mc.

⊕ Example shows values when synchronizing signal is of 6 Mc. bandwidth.

⊖ Example shows values when synchronizing signal is of 8.5 Mc bandwidth.

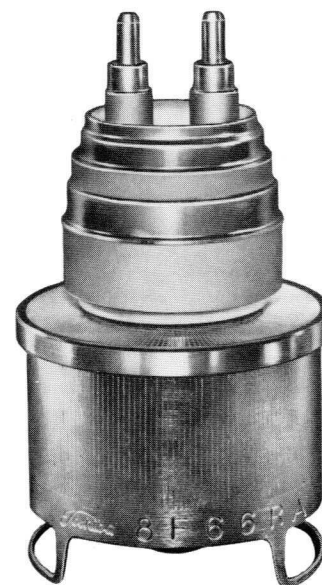
● Typical operation with grid grounded.



6F62R



7F60RA



8F66RA

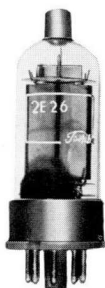
TRANSMITTING TUBES

BEAM POWER TUBES

Type	Cathode			Dimensions		Base number of terminal	Mutual conductance (m μ) Plate current (mA)	Grid-No. 2 amplification	Inner static capacity			Use	Max. frequency for full input (Mc)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between grid-No. 1 & plate (pF)	Input (pF)	Output (pF)		
6360◇	HO	6.3 12.6	0.82 0.41	78.0 Max.	22.2 Max.	(E9-1)	3.3(30)+	7.5+	0.1+ Max	6.2+	2.6+	CT	200
6939◇	HO	6.3 12.6	0.6 0.3	67.0 Max	22.2 Max	(E9-1)	10.5(25)+	31.0+	0.15+	6.4+	1.6+	CT	500
2E24	FO	6.3	0.65	89	34 Max	A 9S H17S	3.2(16)	7.5	0.11 Max	8.5	6.5	CT CP AB ₂	125 125 —
2E26	HO	6.3	0.8	89	34 Max	A 9S H17S	3.5(20)	6.5	0.2 Max	12.5	7	CT CP AB ₂	125 125 —
2B46P□	HO	6.3	1.25	94	43	A 9S H17S	7.0(100)	4.5	0.22 Max	13.5	8.5	○ Pulse Modulator	—
2B32◇	HO	6.3 12.6	1.6 0.8	81	60 Max	G25S	3.5(30)+	6.5+	0.07+ Max	8+	3.8+	CT CP	200 200
2B33	HO	6.3	0.9	128	43.2 Max	A 9S E19S	6.0	7.5	0.2 Max	12	7	CT CP AB ₂	60 60 —
2B29P◇□	HO	6.3 12.6	2.25 1.125	105	60 Max	G25S	8.5(60)+	9.0+	0.12+ Max	14.5+	7+	○○ Pulse Modulator	—
2B52◇	HO	6.3 12.6	1.3 0.65	80	47	G25S	2.5(20)+	8.0+	0.05+	6.5+	2.6+	CT CP	300 300
2B46■	HO	6.3	1.25	94	4	A 9S H17S	7.0(100)	4.5	0.22 Max	13.5	8.5	CT CP BSSB AB ₂	60 60 60 —
UY-807	HO	6.3	0.9	142	50	A 9S H19S	6.0	8.0	0.2 Max	12	7	CT CP AB ₂	60 60 —
2B29◇	HO	6.3 12.6	2.25 1.125	105	57	G25S	8.5(60)+	9.0+	0.12+ Max	14.5+	7+	CT CP	200 200
2B94◇	HO	6.3 12.6	1.8 0.9	105	47	G25S	6.0(40)+	8.2+	0.08+	10.5+	3.2+	CT CP AB ₂	250 250 —
4B13	FT	10.0	5.0	185	65	A14S G25PA	3.75(50)	8.5	0.16	16	13	CT CP AB ₁	30 30 —
4B38	HO	6.3	4.8	175	90	A 9S E32S	20.0(300)	6	1.5	45	20	AB ₁	—
4B85■	HO	6.3	4.8	175	90	A 9S E32S	20.0(300)	4.8	1.5	48	20	AB ₁	—

◇ Twin beam tube. □ Maximum ratings and typical operation may be custom-adjusted to client's requirements within limitations
○ Maximum ratings shows values at duty factor 0.001~1.0 (Max average time 10 msec.)

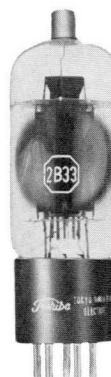
2E26



2B46P



2B33



2B29P



TRANSMITTING TUBES

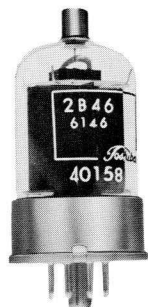
Max. ratings					Typical operation							★ Cooling system	U.S.A. equivalent	Type
Plate voltage (kV)	Grid-No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
0.3	200	2× 11.25	2×5	2×1	0.3	175	-40	2× 37.5	2.3	2× 0.05	14.5	N or V	—	6360◇
0.25	200	6	3	1.5×2	0.18	180	-20	55	2.5	1.2	5.8	N or V	—	6939◇
0.5 0.4	200 200	30 20	10 6.7	2.5 1.7	0.5 0.4	190 180	-45 -45	65 50	10.5 8	0.2 0.15	20 13.5 Z _p =7000Ω	N	2E24	2 E 24
0.5	200	30	10	2.5	0.4	125	-15	18/150	26	0.43	42			
0.5 0.4	200 200	30 20	10 6.7	2.5 1.7	0.5 0.4	185 160	-40 -50	60 50	11 7.5	0.15 0.15	20 13.5 Z _p =6200Ω	N	2E26	2 E 26
0.4	200	30	10	2.5	0.4	125	-15	20/150	32	0.3	42			
3.5	500	80	10	1.75								N	6293	2 E 46 P◇
0.75 0.6	250 250	36 22	15 10	5.0 3.4	0.75 0.6	200 200	-65 -65	48 36	15 16	0.19 0.18	26 17	N	832-A	2 B 32
0.6 0.475	300 300	60 40	25 16.5	3.5 2.5	0.6 0.475	250 250	-45 -85	100 83	8 8	0.3 0.4	40 28 Z _p =6900Ω	N	(5933)	2 B 33
0.6	300	60	25	3.5	0.6	300	-32	48/200	0.7/18	0.1	80			
5.0	850	85	15	3								N	3E29	2 B 29 P◇
0.6 0.5	250 250	60 40	20 13.3	3.0 3.0	0.6 0.5	180 180	-60 -70	100 80	5 8	2.0▲ 3.5▲	43 30	N	6252	2 B 52◇
0.6 0.48 0.6	250 250 250	67.5 45 62.5	20 13.3 20	3.0 2.0 3.0	0.6 0.475 0.6	150 135 165	-58 -77 -45	112 94 100	9 6.4 8	0.2 0.3 0.1	52 34 45 Z _p =6800Ω	N	6146	2 B 46■
0.6	250	62.5	20	3.0	0.6	165	-44	22/207	17	0.2	90			
0.6 0.475	300 300	60 40	25 16.5	3.5 2.5	0.6 0.475	250 250	-45 -85	100 83	8 8	0.3 0.4	40 28 Z _p =6900Ω	N	807	UY-807
0.6	300	60	25	3.5	0.6	300	-32	48/200	0.7/18	0.1	80			
0.75 0.6	225 225	120 90	40 28	7.0 4.7	0.6 0.5	200 200	-55 -70	190 160	18 20	0.65 0.75	82 60	N or V	829-B	2 B 29◇
0.6 0.45	250 250	120 72	40 27	7.0 4.5	0.6 0.45	250 250	-80 -100	200 150	16 16	4.0▲ 6.0	85 50 Z _p =8000Ω	N or V	5894	2 B 94◇
0.6	250	120	40	7.0	0.6	250	-25	50/200	26	0.2	80			
2.25 1.6	450 350	400 240	100 65	20.0 20.0	2.0 1.5	400 300	-120 -160	190 135	35 25	2.0 1.8	290 155 Z _p =1600Ω	N	813	4 B 13
2.5	800	360	100	20.0	2.25	750	-95	45/288	40	—	450			
1.25	400	450	150	15.0	1.0	300	-50	80/720	70	—	Z _p =2800Ω	N or V	—	4 B 38
1.25	300	450	150	15.0	1.0	200	-45	120/800	45	—	Z _p =2840Ω	N or V	—	4 B 85■
											560			

▲ Including circuit losses.

■ Special 2B46 and 4B85 performed stability aging are suitable for TV modulator.

+ Shows value of each unit.

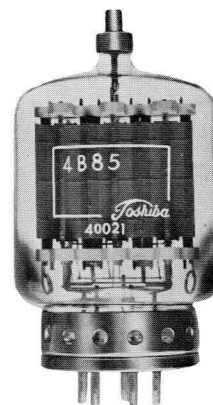
○○ Maximum ratings show values at the duty factor 0.0001~1.0 (max., average time 1.2 msec.)



2B46



4B13



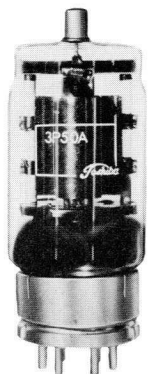
4B85

TRANSMITTING TUBES

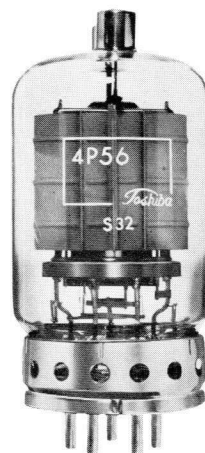
PENTODES

Type	Cathode			Dimensions		Base number or terminal	Mutual conductance (m μ) (Plate current (mA))	Grid-No. 2 amplification	Inner static capacity			Use	Max. frequency for full input (Mc)
	Classification	Voltage (V)	Current (A)	Length (mm)	Max. Dia. (mm)				Between Grid-No. 1 & plate (pF)	Input (pF)	Output (pF)		
3P50	HO	12.0	1.25	135	50	A9S D25QB	4.0(50)	5.0	0.06	20	10	CT CS BSSB AB ₁	30 30 30 —
3P50A	HO	10.0	1.5	135	50	A9S F25P	4.0(50)	5.0	0.06	20	10	CT CS AB ₁	30 30 —
4P55	HO	6.3	2.6	160	75	A14S E32S	6.5(100)	5.5	0.4	25	21	CT BSSB AB ₁	25 25 —
4P56	HO	12.0	1.6	160	75	A14S E32S	6.5(100)	5.5	0.4	25	21	CT BSSB AB ₁	25 25 —
4P60	FT	10.0	3.25	160	65	A14S E38K	2.6(60)	6.0	0.07	11	13	CT CS AB ₁	40 40 —
5P70	FT	◆ 12.0	10.0	225	120	A20S F65S	6.0(200)	4.5	0.1	26	21	CT CS AB ₁	30 30 —
6P80	FT	◆ 12.0	20.0	310	160	A20S F84SA	6.0(200)	7.0	0.12	31	23	CT	30
6P80A	FT	◆ 12.0	20.0	310	160	A30S F85S	6.0(200)	7.0	0.12	31	23	CT CS	30 30

◆ Equipped with FCT (2-phase heating possible).



3P50A



4P56

TRANSMITTING TUBES

Max. ratings					Typical operation								Cooling system	U.S.A equivalent	Type
Plate voltage (kV)	Grid No. 2 voltage (V)	Plate input (W)	Plate Dissipation (W)	Grid-No. 2 Dissipation (W)	Plate voltage (kV)	Grid-No. 3 voltage (V)	Grid-No. 2 voltage (V)	Grid-No. 1 voltage (V)	Plate current (mA)	Grid-No. 2 current (mA)	Exciting power (W)	Plate output (W)			
1.2	400	160	60	8	1.0	0	300	-120	150	20	0.7	105	N	—	3 P 50
1.2	400	85	60	8	1.0	-75	600 V to 15 k Ω	-120	80	23	1.1	28			
1.2	400	160	60	8	1.0	0	300	-50	120	8	0.15	65			
1.2	400	160	60	8	1.0	0	300	-50	40/190	6	—	Z _p =6600 Ω 75			
1.2	400	160	60	8	1.0	0	300	-120	150	20	0.7	105	N	—	3 P 50 A
1.2	400	85	60	8	1.0	-75	600 V to 15 k Ω	-120	80	23	1.1	28			
1.2	400	160	60	8	1.0	0	300	-50	40/190	6	—	Z _p =6600 Ω 75			
1.5	400	300	120	15	1.25	50	300	-120	200	20	0.3	180	N	—	4 P 55
1.5	400	300	120	15	1.25	0	300	-60	200	18	0.1	150			
1.5	400	300	120	15	1.25	0	300	-60	20/280	20	—	Z _p =8800 Ω 220			
1.5	400	300	120	15	1.25	50	300	-120	200	20	0.3	180	N	—	4 P 56
1.5	400	300	120	15	1.25	0	300	-60	200	18	0.1	150			
1.5	400	300	120	15	1.25	0	300	-60	20/280	20	—	Z _p =8800 Ω 220			
2.0	500	350	125	25	2.0	0	500	-200	160	25	1.1	230	N	—	4 P 60
2.0	500	200	125	25	2.0	-145	1000 V to 20 k Ω	-200	85	34	2	60			
2.0	900	350	125	25	2.0	0	500	-80	40/150	3	—	Z _p =17000 Ω 115			
3.5	600	1500	420	80	3.0	0	500	-220	450	80	6	1000	N	—	5 P 70
3.5	600	750	420	80	3.0	-300	1000 V to 5.3 k Ω	-230	220	95	7.5	250			
3.5	800	1100	420	80	3.0	0	500	-100	60/420	3	—	Z _p =91200 Ω 500			
4.0	800	2000	600	100	3.5	0	600	-200	515	70	6.5	1350	N	—	6 P 80
4.0	800	2000	600	100	3.5	0	600	-200	515	90	6.5	1350	N	—	6 P 80 A
4.0	800	1000	600	100	3.5	-230	600 Plate voltage 27 k Ω	-200	260	110	8	350			



5P70



6P80

DISCHARGE TUBES

RECTIFIER TUBES

Mercury-vapor Filled

Type	Dimension		Cap	Base	Filament				Maximum ratings					Typical operation***											U.S.A. equivalent
	Length (mm)	Max. Dia. (mm)			Recommended Socket	Classification*	Voltage (V)	Current (A)	Heating up time(sec) Min.	Tube voltage drop (approx.) (V)	Ambient temperature (°C)	Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Frequency	Plate peak inverse voltage (kV)	Voltage (kV)	Current (A)	Rectifier system						
			Single-phase half-wave (Fig. a)	Single-phase full-wave (Fig. b)															Single-phase full-wave (4 tubes) (Fig. c)	Three-phase half-wave (Fig. d)	Three-phase full-wave (Fig. e)	Four-phase half-wave (Fig. f)	Six-phase half-wave (Fig. g)		
1H16	116	38	A9S HV-3000	D16S-1 HV-1004	FO	2.5	2	30	15	20~60	7.5	0.5	0.125	150	7.5	Es Eo Io	5.32 2.39 0.125	2.65 2.39 0.25	4.78 4.78 0.25	3.06 3.58 0.375	3.06 7.15 0.375	2.65 3.38 0.5	2.65 3.59 0.75	816	
2H66	165	60	A14S HV-3001	D16P-1 HV-2012	FO	2.5	5	30	15	20~80 20~70 20~60	5 2 10	2 1 1	0.5 0.25 0.25	150	10	Es Eo Io	7.1 3.18 0.25	3.54 3.18 0.5	7.1 6.37 0.5	4.08 4.78 0.75	4.08 9.52 0.75	3.54 4.51 1.0	3.54 4.78 1.5	866A	
4H72	220	60	A14S HV-3001	D25P-1 —	FO	5	75	30	15	25~65 25~55	5 10	5 5	1.25 1.25	150	10	Es Eo Io	7.1 3.18 1.25	3.54 3.18 2.5	7.1 6.37 2.5	4.08 4.78 3.75	4.08 9.52 3.75	3.54 4.51 5.0	3.54 4.78 7.5	872A	
4H73	280	76	A14S HV-3001	D25PA-1 HV-2013	FO	5	10	30	15	25~60 25~50	10 15	7 6	1.75 1.5	150	15	Es Eo Io	10.6 4.78 1.5	5.3 4.78 3.0	10.6 9.55 3.0	6.12 4.08 4.5	6.12 14.3 6.6	5.3 6.76 6.0	5.3 7.18 9.0	673	
4H74	230	60	A14S HV-3001	D25P-2 —	FO	5	7.5	30	15	25~55	15	5	1.25	150	15	Es Eo Io	10.6 4.78 1.25	5.3 4.78 2.5	10.6 9.55 2.5	6.12 7.18 3.75	6.12 14.3 3.75	5.3 6.76 5.0	5.3 7.18 7.5	8008	
4H88A	220	60	A14S HV-3001	D25PA-1 HV-2013	FO	5	7.5	30	15	25~50	15	5	1.25	150	15	Es Eo Io	10.6 4.78 1.25	5.3 4.78 2.5	10.6 9.55 2.5	6.12 7.18 3.75	6.12 14.3 3.75	5.3 6.76 5.0	5.3 7.18 7.5	869-B	
5H69	330	127	A20S HV-3002	Flexible lead —	FO	5	19	60	15	30~60 30~50 30~40	10 15 20	10 10 10	2.5 2.5 2.5	150	20	Es Eo Io	14.2 6.37 2.5	7.07 6.37 5.0	14.2 12.7 5.0	8.16 9.57 7.5	8.16 19.0 7.5	7.07 9.01 10.0	7.07 9.57 15.0	869-B	
5H69A	370	127	A20S HV-3002	B35K-1 S-B35K	FO	5	19	60	15	30~60 30~50 30~40	10 15 20	10 10 10	2.5 2.5 2.5	150	20	Es Eo Io	14.2 6.37 2.5	7.07 6.37 5.0	14.2 12.7 5.0	8.16 9.57 7.5	8.16 19.0 7.5	7.07 9.01 10.0	7.07 9.57 15.0	869-B	
6H51	420	150	A20S HV-3002	Flexible lead —	FO	5	25	60	15	30~40	16	20	5	150	16	Es Eo Io	11.3 5.1 5.0	5.65 5.1 10.0	11.3 10.2 15.0	6.53 7.65 15.0	6.53 15.2 20.0	5.65 7.21 20.0	5.65 7.65 30.0	857-B	
7H57	500	180	A20S HV-3002	Flexible lead —	FO	5	30	60	15	25~60 30~40	10 20	40 40	10 10	150	20	Es Eo Io	14.2 6.37 10.0	7.07 6.37 20.0	14.2 12.7 30.0	8.16 9.57 30.0	8.16 19.0 30.0	7.07 9.01 60.0	7.07 9.57 60.0	857-B	
HX-968D	135	40	A9S HV-3000	D16P-1 HV-2012	FO	2.5	3	30	15	20~55	5	0.6	0.15	150	5	Es Eo Io	3.54 1.59 0.15	1.77 1.59 0.3	3.54 3.18 0.3	2.04 2.39 0.45	2.04 4.76 0.45	1.77 2.25 0.6	1.77 2.39 0.9	—	
HV-972A	265	100	A14S HV-3001	D25P-1 —	FO	5	10	30	15	30~40	18	3.2	0.8	150	18	Es Eo Io	12.8 5.73 0.8	6.36 5.73 1.6	12.8 11.5 2.4	7.35 8.62 2.4	7.35 17.1 2.4	6.36 8.11 3.2	6.36 8.62 4.8	—	

Xenon gas Filled

Type	Dimensions		Cap	Base	Filament				Maximum ratings					Typical operation***											U.S.A. equivalent
	Length (mm)	Max. Dia. (mm)			Recommended Socket	Classification*	Voltage (V)	Current (A)	Heating up time(sec) Min.	Tube voltage drop (approx.) (V)	Ambient temperature (°C)	Peak inverse voltage (kV)	Peak current (A)	Average current (A)	Frequency	Plate peak inverse voltage (kV)	Voltage (kV)	Current (A)	Rectifier system						
			Single-phase half-wave (Fig. a)	Single-phase full-wave (Fig. b)															Single-phase full-wave (4 tubes) (Fig. c)	Three-phase half-wave (Fig. d)	Three-phase full-wave (Fig. e)	Four-phase half-wave (Fig. f)	Six-phase half-wave (Fig. g)		
2H28	153	51	A14S HV-3001	D16P-1 HV-2012	FO	2.5	5	5	10	-55~+75 -55~+75	5 5	2 1	0.5 0.25	150	10	Es Eo Io	7.1 3.18 1.25	3.54 3.18 0.5	7.1 6.37 0.5	4.08 4.78 0.75	4.08 9.52 0.75	3.54 4.51 1.0	3.54 4.78 1.5	3B28	
4H22	Max 152	Max 42	—	D16P-1 HV-2012	FO	2.5	6.25	20	10	-55~+70	0.725	4	1**	250	0.725	Es Eo Io	— 0.256 0.23	— 1.0 1.0	— — —	— — —	— — —	— — —	— — —	3B22	
4H32	205	57	A14S HV-3001	D25P-1 —	FO	5	7.5	30	10	-55~+70	10	5	1.25	150	10	Es Eo Io	7.1 3.18 1.25	3.54 3.18 2.5	7.1 6.37 2.5	4.08 4.78 3.75	4.08 9.52 3.75	3.54 4.51 5.0	3.54 4.78 7.5	4B32	
1007	Max 66.8	Max 34	—	H17S-4 —	FO	0 1	1.2	5	20 12	-55~+70 -55~+70	0.08 0.08	0.36 0.36	0.03~ 0.12~ 0.12	150	1.08	Es Eo Io	— 0.382 0.35	— 0.12 0.12	— — —	— — —	— — —	— — —	— — —	1007	

* Fo=Filamentary type, Oxide coated

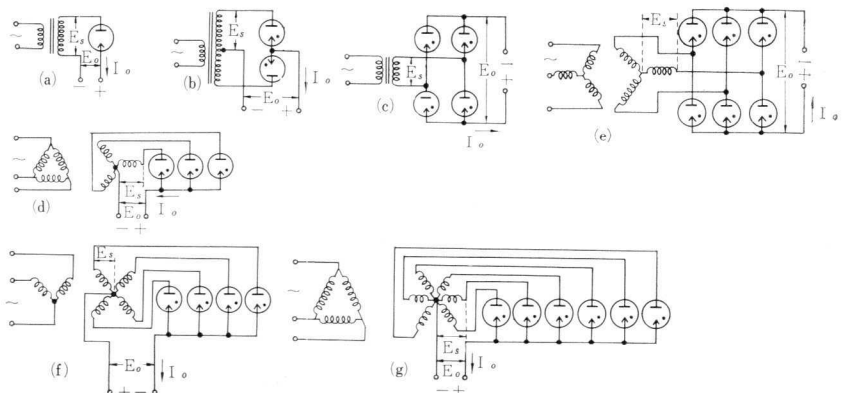
** Full Wave Output

*** Es=Trans. sec. voltage (R.M.S)

Eo=Peak DC output voltage

Io=Average DC output current

Condition assumed involve sine-wave supply; zero voltage drop in tubes; no losses in transformer and circuit; no back emf in load circuit; and no phase-back.

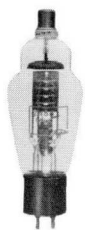


DISCHARGE TUBES

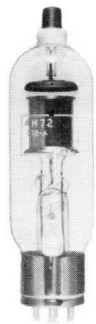
TUNGAR BULBS

Type	Remark	Dimensions		Cap	Base	Construction	Gas	Cathode				Tube Voltage drop (V)	Starting Voltage (V)	Maximum plate ratings		Mounting position	U.S.A. equivalent
		Overall Length Max. (mm)	Max. Dia. (mm)					Classification*	Voltage (V)	Current (A)	Heating up time (sec) Min.			Peak inverse Voltage (V)	Average current (A)		
TN-2	Battery charging DC Power	110	55	—	E26/25 Special	Half Wave	Ar	FT	1.8	11	3	8	13	300	2	any	—
TN-6	"	170	81	lead 1.5φ × 1 mm	E39/45	"	Ar	FT	2	15.5	3	8	13	300	6	"	(4B28) (4B26)
TN-10	"	185	90	A34S	E39/45	"	Ar	FT	2.1	17	3	8	13	300	10	"	—
TN-15	"	220	97	A38S	E39/45	"	Ar	FT	2.2	24.5	15	8	13	270	15	"	(5B21)
TH-6	"	190	81	A34S	E39/45	"	Hg	FO	2.1	13	300	9	15	700	6	Vertical	—
TH-10	"	220	97	A38S	E39/45	"	Hg	FO	2.2	15.5	300	10	15	700	10	"	—
TH-15	"	245	113	A43S	E39/45	"	Hg	FO	2.3	18.5	300	11	15	700	15	"	—
TH-15L	"	240	108	A38S	E39/45	"	Hg	FO	2.3	18.5	300	11	15	525	15	"	—
TS-5	"	140	56	A25S	E26/30 × 28	"	Ar+Hg	FT	2	12	3	6	5	70	5	"	(4B36)

* FO=Filamentary. Oxide coated; FT=Thorium-tungsten Filament.



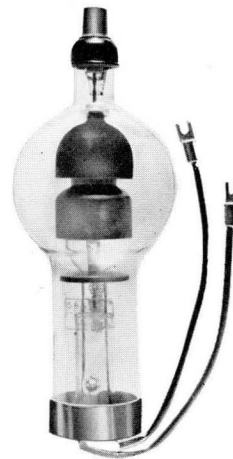
2H66



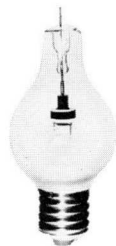
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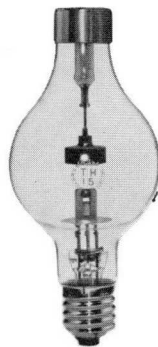
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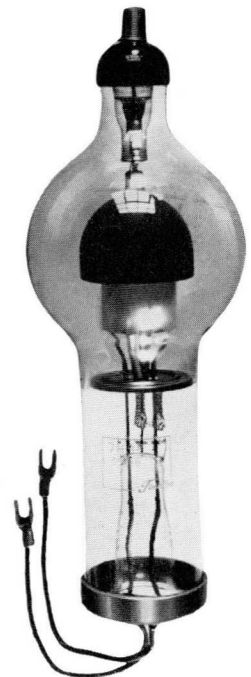
5H69



TN-6



TH-15



7H57

DISCHARGE TUBES

HOT CATHODE GRID CONTROLLED DISCHARGE TUBES

Mercury-Vapor Filled

Type	Applications	Dimensions		Cap	Base	Cathode					Max. plate ratings						Starting characteristics		Mounting Position	U.S.A. equivalent (similar)	
		Length Max. (mm)	Max. Dia. (mm)			Recommended Socket	Classification*	Voltage (V)	Current (A)	Heating up time (Sec) Min.	Tube Voltage drop (approx.) (V)	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Negative Controlled Grid Voltage	Peak current (A)	Average current (A)	Average time (Sec)			Plate Voltage (kV)
2G57A	Grid-controlled Rectifier	149	50	A14S	D16P-1	FO	2.5	5	5	15	30~60	5	2.5	-500	2	0.5	15	0.1	-2	Vertical	5557 FG-17
				HV-3001	HV-2012									1				-7			
2G66	"	180	40	A14S	D16P-1	FO	2.5	5	30	15	25~66	10	10	-500	1	0.25	30	3	-10	"	-
				HV-3001	HV-2012									10				-25			
4G63A	"	261	63	A14S	D25P-2	FO	5	10	60	15	25~55 25~50	15 25	15 25	-500/-10	10	1.8	20	3	-13	"	5563A
				HV-3001	HV-2001									6.4				1.6	20		
5G69	"	350	120	A20S	Flexible lead	FO	5	19	60	15	30~40	20	20	-1000	15	2.5	30	3	-15	"	-
				HV-3002	-									15				30	-37		
6G51	"	460	150	A20S	Flexible lead	FO	5	25	60	15	30~40	16	16	-1000	20	5	30	3	-4	"	-
				HV-3002	-									15				30	-18		
7G57	"	550	150	A20S	Flexible lead	FO	5	30	180	15	30~40	18	18	-1000	40	10	60	3	-4	"	-
				HV-3002	-									15				60	-18		

Inert gas and Mercury-Vapor Filled

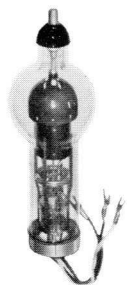
Type	Applications	Dimensions		Cap	Base	Cathode					Max. ratings						Starting characteristics		Mounting Position	U.S.A. equivalent (similar)	
		Length Max. (mm)	Max. Dia. (mm)			Recommended Socket	Classification*	Voltage (V)	Current (A)	Heating up time (Sec) Min.	Tube Voltage drop (approx.) (V)	Condensed mercury temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Negative Controlled Grid Voltage	Peak current (A)	Average current (A)	Average time (Sec)			Plate Voltage (kV)
4G23	Grid-controlled Rectifier	149	50	A14S	D16P-1	FO	2.5	7	15	10	-55~+80	1.25	1.25	-500	6	1.5	5	0.5	-3.8	Vertical	3C23
				HV-3001	HV-2012									1				-10			
4G93	"	160	50	A9S	H17S-3	FO	2.5	7	15	10	-55~+80	1.25	12.5	-500	6	1.5	5	0.5	-3.8	"	393A
				HV-3000	-									1				-10			
5G10	"	168	40	A14S	D32L-M1	FO	2.5	9	20	15	-40~+80	1.5	1.5	-500	30	2.5	5	1	-5	"	7518/710L
				HV-3001	HV-2014									1				-10			
5G11	"	154	40	A14S	D16P-4	FO	2.5	9	20	15	-40~+80	1.5	1.5	-500	30	2.5	5	1	-5	"	6011/710
				HV-3001	HV-2012									1				-10			
5G12	"	139	40	A14S	Flexible lead	FO	2.5	9	20	15	-40~+80	1.5	1.5	-500	30	2.5	5	1	-5	"	-
				HV-3001	-									1				-10			
6G57	"	245	63	A14S	D32L-M4	FO	2.5	21	60	12	-40~+80	1.5	1.5	-500	77	6.4	15	0.2	-2.8	"	7023/710L
				HV-3103	HV-2014									1.25				-5.5			
6G58	"	233	63	A14S	D25PA-1	FO	2.5	21	60	12	-40~+80	1.5	1.5	-500	77	6.4	15	0.2	-2.8	"	6858/760
				HV-3103	H-2013									1.25				-5.5			
6G59	"	215	63	A14S	Flexible lead	FO	2.5	21	60	12	-40~+80	1.5	1.5	-500	77	6.4	15	0.2	-2.8	"	6859/760 P
				HV-3103	-									1.25				-5.5			

* FO=Filamentary type Oxide coated.

** The upper is before conduction; the lower is during conduction.



7G57



6G51



5G69



4G63A



2G66



2G57A



6G58



5G11



4G23

DISCHARGE TUBES

Inert gas Filled

Type	Applications	Dimensions		Cap	Base	Gas	Cathode					Max. ratings							Control-characteristics		Mounting Position	U.S.A. equivalent	
		Length (mm)	Max. Dia. (mm)				Recommended Socket	Classification	Voltage (V)	Current (A)	Heating up time (Sec) Min	Tube Voltage drop (approx.) (V)	Ambient temperature (°C)	Peak inverse voltage (kV)	Peak forward voltage (kV)	Negative Control-Grid Voltage	Peak current (A)	Average current (A)	Average time (sec)	Commutation factor (VA/us ²)			Plate Voltage (kV)
1G84	Time axis Sweep oscillation relay	Max. 90	Max. 34	—	H17S-2	Ar	HO	6.3	0.6	30	16	-60~+85	0.3	0.3	-350 -15	0.3	0.075	30	—	0.11 0.25	-12.5 -26	any	(884)
3G15	Automatic	165	40	A14S HV-3001	D16P-1 HV-2012	Xe	FO	2.5	6	40	10	-55~+70	0.34	0.17	-50 -10	7.7	0.64	4.5	0.66	0.12 r.m.s.	Max -5.3	"	C 1 A
4G14	Motor speed control	Max. 108	Max. 40	—	D16P-4 HV-2012	Xe	FO	2.5	6.3	20	10	-60~+75	1.25	1	-100 -10	8	1	4.5	0.15	1	-4.5	"	6014/C1K
5G31	Welder	166	40	A14S HV-3001	A4-100 HV-2014	Xe	FO	2.5	9	30	10	-55~+75	1.25	0.75	-100 -10	30	2.5	4.5	0.66	0.75	-4.5	"	7216/C31L
5G32				A14S HV-3001	D16P-4 HV-2012										-100 -10								
5G33	Motor speed control	135	40	A14S HV-3001	Flexible lead —	Xe	FO	2.5	9	30	10	-55~+75	1.25	0.75	-100 -10	30	2.5	4.5	0.66	0.75	-4.5	"	—
5G84	Ignitor firing			A14S HV-3001	D16-P4 HV-2012										-100 -10								
6D4	Noise generation relay	Max. 54	Max. 19	—	E7-1	Ar	HO	6.3	0.25	30	10	-55~+90	0.35	0.35	-150 -15	0.11	0.025	30	—	0.125	-12.5	"	6D4
6G20	Welder	245	50	A14S HV-3001	A4-90 HV-2014	Xe	FO	2.5	20	60	10	-55~+75	1.25	0.75	-100 -10	77	6.4	6	0.66	0.75	-3.5	"	—
6G21				Motor speed control	A14S HV-3001										D25S C-1 HV-2013								
6G22	Ignitor firing	200	50	A14S HV-3001	Flexible lead —	Xe	FO	2.5	20	60	10	-55~+75	1.25	0.75	-100 -10	77	6.4	6	0.66	0.75	-3.5	"	—
6G45	Motor speed control			A14S HV-3001	D25 PA-1 HV-2013										-250 -10								
6G45A		Motor speed control	185	64	A14S HV-3001	Flexible lead —	Xe	FO	2.5	21	60	16	-55~+70	1.5	1.5	-250 -10	80	6.4	15	130	0.1 1	0 -7	"
6G85	Motor speed control				A14S HV-3001	D25S C-1 HV-2013										-100 -10							
884	relays	Max. 105	Max. 40	—	H17Y-1	Ar	HO	6.3	0.6	30	16	-60~+85	0.3	0.3	-350 -15	0.3	0.075	30	—	0.11 0.25	-12.5 -26	"	884

* Below 200 cycle Ib=3mAdc (max.)

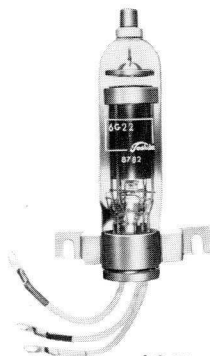
** The upper is before conduction. The lower is during conduction.

*** Commutation factor is the product of the rate of current decay in amperes-per-microsecond just prior to the end of commutation and the rate of inverse voltage rise in volts-per-microsecond just after the end of commutation.

■ Ho: Indirectly heated type Fo: Filamentary type



5G32



6G22



6G21



6G20

DISCHARGE TUBES

HOT CATHODE GRID CONTROLLED DISCHARGE TUBES (TETRODE)

Xenon gas Filled

Type	Applications	Dimensions		Base	Heater			Tube Voltage drop (approx.) (V)	Max. ratings							Starting characteristics		Mounting Position	U.S.A. equivalent (similar)
		Length (mm) Max.	Max. Dia. (mm) Max.		Vol-tage (V)	Cur-rent (A)	Heat-ing up time (sec)		Ambient tempera-ture (°C)	Peak inverse Voltage (kV)	Peak forward Voltage (kV)	Negative Controlled Grid Voltage (V)	Peak current (A)	Ave-rage (A)	Avera-ge time (sec)	Plate Vol-tage (kV)	Grid Vol-tage (V)		
1G50A	Grid-Controlled Rectifier	90	34	H17S-2	6.3	0.6	10	10	-75~+90	0.35 1.3	0.18 0.65	-250/-10 -250/-10	1 1	0.2 0.1	30 30	0.46 0.46	-3.7* -5.2**	"	2050A
2D21	"	54	19	E7-1	6.3	0.6	20	10	-75~+90	1.3	0.65	-100 -10	0.5	0.1	30	0.46	-5.2**	"	2D21
3G22	"	117	60	G25PA-1	6.3	2.6	30	10	-75~+90	1.3	0.65	-200 -10	6	0.75	30	0.5	-6.8***	"	3D22A
5696	"	44	19	E7-1	6.3	0.15	10	10	-75~+90	0.5	0.5	-100 -10	0.1	0.025	30	0.35	-3.1*	"	5696
5727	"	54	19	E7-1	6.3	0.6	20	10	-75~+90	0.5 1.3	0.1 0.65	-100/-10 -100/-10	10 0.5	0.01 0.1	30	0.46 0.46	-3.7* -5.2**	"	5727
6012	"	93	43	H17Y-2	6.3	2.6	30	10	-75~+90	1.3	0.65	-200 -10	5	0.5	30	0.46	-5.5*	"	6012

* Grid-No. 1 resistor=100 kΩ; Grid-No. 2 voltage=0 V. ** Grid-No. 1 resistor=10 MΩ; Grid-No. 2 voltage=0 V. *** Grid-No. 2 resistor=2 MΩ; Grid-No. 2 voltage=0 V.
 ※ The upper is peak, before anode conduction. The lower is average, during anode conduction.

Hydrogen Filled

Type	Dimension		Cap	Base	Cathode			Reservoir		Grid circuit		Cathode current		Anode Voltage		Operation factor *	Typical operation			
	Length (mm)	Max. Dia. (mm)			Vol-tage (V)	Cur-rent (A)	Heat-ing up time (sec) Min.	Vol-tage (V)	Cur-rent (A)	Peak Vol-tage (V)	Im-pe-dance (Ω)	Ave-rage (A)	Rate of rise (A/μs)	Supply (Vdc) Max.	Peak (kV) Min.		Anode Supply Vol-tage (kV)	Peak output power (MW)	Pulse width (μs)	Repetition rate (p.p.s.)
1G35P/4C35A	170	63	A14S	D25 PA-1	6.3	6.1	180	equal to cathode current	—	175 Min.	1500 Max.	0.1	1000	2.5	8	2×10 ⁹	4	0.31	0.5	2800
			HV-3001	HV-2013																
1G45P/3C45	122	38	A9S	D16S-2	6.3	2.25	120	—	—	175 Min.	1500 Max.	0.045	750	0.8	4	0.3×10 ⁹	1.5	0.045	0.5	2800
			HV-3001	HV-2012																
2G22P/5C22	216	63	A14S	D25 PA-1	6.3	10.6	300	equal to cathode current	—	200 Min.	500 Max.	0.2	1500	4.5	18	3.2×10 ⁹	8	1.28	1	800
			HV-3000	HV-2013																
3G49P/5949	305	82	A14S	E32S-1	6.3	18.5	900	3~5.5	2~5	550~1000	50~200	0.5	2500	5.0	27.5	6.25×10 ⁹	12.5 10	5.6 2	2 1	450 1200
			HV-3103	HV-2124																
4G48P/5948	400	127	A14S	Flexible lead	6.3	29	900	2.5~5.5	3~6	700~1000	50~200	1	5000	5.0	27.5	9×10 ⁹	12.5 7.5	12.0 3.5	2.5 1.25	360 1500
			HV-3103	—																
6130	127	38	A9S	D16S-2	6.3	2.25	120	—	—	175 Min.	1500 Max.	0.045	750	0.8	4	0.3×10 ⁹	4	0.31	0.5	2800
			HV-3000	HV-2012																
M2316	240	153	—	Flexible lead	6.3	30	900	3.5~5.5	8~10	1300~2500	10~25	4.0	10000	3.5	36	30×10 ⁹	16.5 15	33 15	2.5 5	465 250
			—	—																
5G64P/(1257)	240	216	—	Flexible lead	6.3	30	900	3.5~6.0	3~8	1300~2500	10~25	2.6	1000	3.5	33	16.5 15	33 15	2.5 1.3 5.0	2.5 1.3 5.0	310 1500 250
			—	—																

* Operation factor = Prr [pulse repetition rate (p.p.s)] × epy [peak forward anode voltage (V)] × ib [peak anode current (A)]



DISCHARGE TUBES

IGNITRONS

Type	Dimensions		Applications	Line Voltage (V)	Maximum ratings						Maximum Ignitor ratings					Minimum Ignitor ratings		
	Length (mm)	Max. Dia (mm)			Demand power (kVA)	Peak inverse or forward Voltage (V)	Peak current(A)		Average current (A)		Peak Voltage (V)		Current (A)			Peak Voltage (V)	Peak current (A)	Ignition time (μsec)
							Welder	Rectifier	Welder	Rectifier	Inverse	Forward	Peak current	Average current	Effective current			
5550	254	70	Single phase resistance welder service	250	150	—	810	—	4.86	—	5	900	100	1	10	200	30	100
				600	150	—	350	—	4.86	—								
5551A	343	67	"	250	200	—	1130	—	56	—	5	equal to anode Voltage	100	1	10	200	30	100
				600	200	—	466	—	56	—								
			250	600	—	3400	—	30.2	—	40								
			600	600	—	1410	—	30.2	—									
			—	—	500	—	700	—	5									
			—	—	1200	—	600	—	22.5									
—	—	1200	—	135	—	4												
—	—	1500	—	480	—	18												
5552A	368	105	Single phase resistance welder service	250	400	—	2260	—	140	—	5	"	100	1	10	200	30	100
				600	400	—	915	—	140	—								
			250	1200	—	6800	—	75.6	—									
600	1200	—	2830	—	75.6	—												
—	—	500	—	1600	—	100	—											
5553B	508	143	Single phase resistance welder service	250	800	—	4530	—	355	—	5	"	100	1	10	200	30	100
				600	800	—	1890	—	355	—								
5553B	508	143	Intermittent rectifier & frequency changer welder service	—	—	600	—	1140	—	190	5	"	100	1	10	200	30	100
				—	—	600	—	4000	—	54								
				—	—	1200	—	840	—	140								
				—	—	1200	—	3000	—	40								
				—	—	1500	—	672	—	112								
				—	—	1500	—	2400	—	32								
5822	368	105	Frequency changer welder service	—	—	1200	—	420	—	70	5	"	100	1	10	200	30	100
				—	—	1200	—	1500	—	20								
				—	—	1500	—	336	—	56								
				—	—	1500	—	1200	—	16								

THERMOSTAT (Terminal-Block Type)

Type	Use	Contact	Temperature (°C)		Contact Ratings
			Open	Close	
VD-101	Protective	normally closed	52	40	125 Vac.....3 Aac 250 Vac.....1.5 Aac 440 Vac.....0.75 Aac 660 Vac.....0.5 Aac
VD-102	Water control	normally open	30	35	



5553B



5552A



5551A

DISCHARGE TUBES

VOLTAGE STABILIZER TUBE

Type	Applications	Dimensions		Base number	Starting voltage (V)	Tube drop voltage (V)	Regulation (approx.) (V)	*Anode supply voltage Min. (V)	Anode current		Ambient temperature (°C)	U.S.A. equivalent	
		Length (mm) Max.	Max. Dia. (mm)						Max. (mA)	Min. (mA)			
OA2WA	Reliable tube	7	19	E 7-1	160	150	2 (5~30 mA)	165	30	5	-55 ~ +150**	OA2WA	
OB2WA		67	19	E 7-1	115	108	1.5(5~30 mA)	133	30	5	-55 ~ +150**	OB2WA	
VR75-GT	Voltage-Regulator	90	34	B 8-6	100	75	4 (5~40 mA)	105	40	5	-55 ~ +90	(OA3A)	
VR75-MT		67	19	E 7-1	105	75	3 (5~30 mA)	115	30	5	-55 ~ +90	OC2	
VR75-ST		108	39	B 6-3	100	75	4 (5~40 mA)	105	40	5	-55 ~ +90	OA3	
VR90-GT		90	34	B 8-6	115	90	4 (5~40 mA)	130	40	5	-55 ~ +90	(OB3A)	
VR90-MT		67	19	E 7-1	115	90	4 (5~30 mA)	130	30	5	-55 ~ +90	—	
VR90-ST		108	39	B 6-3	115	90	4 (5~40 mA)	130	40	5	-55 ~ +90	OB3	
VR105-GT		90	34	B 8-6	115	108	3 (5~40 mA)	133	40	5	-55 ~ +90	(OC3A)	
VR105-MT		67	19	E 7-1	115	108	3 (5~30 mA)	133	30	5	-55 ~ +90	OB2	
VR105-ST		108	39	B 6-3	115	108	3 (5~40 mA)	133	40	5	-55 ~ +90	OC3	
VR150-GT		90	34	B 8-6	160	150	4 (5~40 mA)	185	40	5	-55 ~ +90	(OD3A)	
VR150-MT		67	19	E 7-1	160	150	4 (5~30 mA)	180	30	5	-55 ~ +90	OA2	
VR150-ST		108	39	B 6-3	160	150	4 (5~40 mA)	185	40	5	-55 ~ +90	OD3	
991		Voltage-Regulator	40	16	BA15D/19	77	59	3(0.4~ 2 mA)	95	2	0.4	-55 ~ +90	991
85A2		Voltage-Regulator Voltage-Reference	54	19	E 7-1	105	85	3 (1~10 mA)	125	10	1	-55 ~ +90	85A2
5651	Voltage-Reference	54	19	E 7-1	105	87	2(1.5~3.5mA)	115	3.5	1.5	-55 ~ +90	5651	

* With normal room illumination (except for OA2WA, OB2WA)

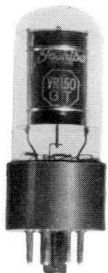
** +150°C is bulb temperature

COLD CATHODE TRIGGER TUBES

Type	Main application	Dimensions		Base number	Trigger starting voltage (V)	Trigger voltage drop (V)	Anode voltage drop (V)	Transfer Current (μA) Max.	Maximum ratings					U.S.A. equivalent
		Length (mm) Max.	Max. Dia. (mm)						Peak anode forward voltage (V)	Peak anode inverse voltage (V)	Peak cathode current (mA)	Average cathode current (mA)	Ambient temperature (°C)	
OA4-G	Relay Control	108	39	B 6-3	80	60	70	100 (Anode Voltage 140V)	225	225	100	25	-60 ~ +75	OA4-G
2040	Touch Switch	67	33	B 6-8	76	55	73	50 (Anode Voltage 100V)	180	180	50	18	-60 ~ +75	—
5823	Relay Control	54	19	E 7-1	80	61	62	400 (Anode Voltage 140V)	200	200	100	25	-60 ~ +75	5823



VR90-ST



VR150-GT



OA2WA



OB2WA



VR105-MT



VR150MT



5651



85A2



OA4-G



5823

DISCHARGE TUBES

GEIGER MULLER TUBES

Type	Use or Construction	Dimensions (mm)		Base or cap number	Quenching gas	Thickness (mg/cm ²)		Operation voltage (V)	Recommended resistance (MΩ)	Characteristics					Ambient temperature (°C)	Equivalent tube
		Overall length (Max.)	Diameter (Max.)			window	wall			Minimum plateau length (V)	Maximum plateau slope (%) (per 100V)	Maximum dead time (μs)	Maximum Background (c/m)			
GMH-X-1	For X ray analysis Mica window type	158	26	A6S (C 1-2)	Halogen	Mica 3.5	—	1200±300	1	50	20	300	60	-50 to 75	—	
GMH-X-2	For X ray analysis Twin mica window	188	31	C 1-1	Halogen	Mica 3.5	—	1200±300	1	70	20	300	60	-50 to 75	—	
M2319	For β and γ ray Mica window type	158	26	A 6 S (C 1-2)	Halogen	Mica 3.5	CrFe (1.3mm)	700±50	1	100	20	150	60	-55 to 75	Anton: 201H Amperex: 150N	
GM-B-5	For low energy β ray Mica window type	107	37	A4-9	Alcohol	Mica 1.9	—	1150±115	1	200	10	300	50	0 to 40	—	
GMH-B-2	For β ray Mica window type long life	83	33	(1.0 φ × 18mm)	Halogen	Mica 3.5	—	600±50	1	100	20	200	60	-50 to 75	—	
M2313	For β and γ ray Mica window type	55	17	(1.0 φ × 10mm)	Halogen	Mica 2~3	CrFe 250	450~650	2	200	2	150	20	-55 to 75	Amperex: 18504	
M2311B	γ-count or current ≤300 r/h β ray >0.5 Mev	38	7	(1.0 φ × 6mm)	Halogen	—	CrFe 90±10	500~600	10	100	15	50	5	-40 to 75	Philips: 18509 Mullard: MX 150	

DECADE COUNTER TUBES

Type	Construction	Dimensions		Base number	Counting speed (p.p.s)	Anode supply voltage (V)	Anode voltage drop (V)	Maximum anode current (mA)	Minimum anode current (mA)	Recommended circuit constant								British equivalent
		Length (mm)	Max. Dia. (mm)							Anode supply voltage (V)	Anode resistor (kΩ)	Cathode Load resistor (kΩ)	Cathode bias voltage (V)	Guide resistor (kΩ)	Guide capacitor (pF)	Guide bias voltage (V)		
DK20	Single-pulse operation Scale-of-ten	81±2	34	B 8-6	20,000	430~520	180	1.2	0.7	475 ±10%	330	10	0*	200	100	60~90	GC10D	
DK21	Double pulse operation Selector tube	95±3	38	Recommended socket HV-1523	4,000	400~550	180~200	0.55	0.25	475 ±10%	700	50	—	—	—	18**	(GS10C)	



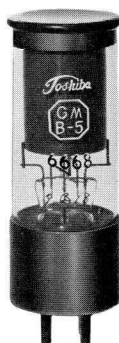
M2311B



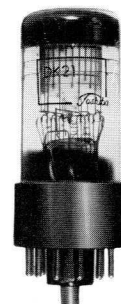
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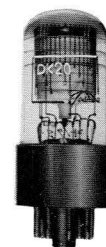
M2319



GM-B-5



DK21



DK20

MICROWAVE TUBES

KLYSTRON OSCILLATORS

CW Oscillators

Type	Frequency Range (Mc)	Heater		Base		Output Coupling	Typical Operation								Foreign Equivalent Tube
		Voltage (V)	current (A)	Cap	Bottom		Frequency (Mc)	Resonator		Reflector voltage (V)	Electronic tuning Range (Mc)	Modulation sensitivity (kc/V)**	Power Output (mW)	Cooling System	
								Voltage (V)	Current (mA)						
2V32⊙	2150~2300	6.3	0.8	A9S	Octal 8 pins	Type N coaxial	2225	900	90	-450	35	180	3500	R	—
2V10	2370~2590	6.3	0.44	A6S	B6-90	Probe	2480	300	25	-105	20	400	80	N	—
3V10	2540~2780	6.3	0.44	A6S	B6-90	Probe	2650	300	25	-140	20	400	80	N	—
3V30	2500~2700	6.3	0.8	A9S	Octal 8 pins	Type N coaxial	2600	750	75	-325	15	230	1000	R	—
3V31	2500~2700	6.3	0.8	A9S	Octal 8 pins	Type N coaxial	2600	750	75	-325	15	230	1000	C	—
726C	2700~2960	6.3	0.44	A6S	B6-90	Probe	2800	300	25	-105	30	1150	100	N	726C
4V32⊙	3630~4170	6.3	0.8	A9S	Octal 8 pins	WR229Δ	3900	900	90	-400	30	250	1500	R	—
6V301	5925~6225	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6075	750	72	-325	45	425	1000	N	VA-222F
6V431	5925~6225	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6075	750	72	-325	45	425	1000	R	SRC-43A VA-220F
6V32⊙	5925~6425	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6175	900	95	-260	60	550	1500	R	—
6V302	6125~6425	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6275	750	72	-325	45	425	1000	N	VA-222E
6V432	6125~6425	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6275	750	72	-325	45	425	1000	R	SRC-43B VA-220E
2K26	6250~7060	6.3	0.44	A6S	B6-90	Probe	6660	300	25	-90	50	1200	100	N	2K26
5976	6250~7425	6.3	0.44	A6S	B6-90	Probe	6750	300	25	-115	50	1200	110	N	5976
6V303	6325~6625	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6475	750	72	-325	45	425	1000	N	VA-222G
6V433	6325~6625	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6475	750	72	-325	45	425	1000	R	SRC-43C VA-220G
7V304	6575~6875	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6725	750	72	-325	45	425	1000	N	VA-222D
7V434	6575~6875	6.3	0.8	A9S	Octal 8 pins	UG-344/U	6725	750	72	-325	45	425	1000	R	SRC-43D VA-220D
7V305	6850~7150	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7000	750	72	-325	45	425	1000	N	VA-222C
7V435	6850~7150	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7000	750	72	-325	45	425	1000	R	SRC-43E VA-220C
7V306	7125~7455	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7290	750	72	-325	45	425	1000	N	VA-222B
7V436	7125~7455	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7290	750	72	-325	45	425	1000	R	SRC-43F VA-220B
7V40	7100~7800	6.3	0.44	A6S	B6-90	Probe	7500	300	25	-110	50	1200	80	N	—
8V307	7425~7755	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7590	750	72	-325	45	425	1000	N	VA-222A
8V437	7425~7755	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7590	750	72	-325	45	425	1000	R	SRC-43G VA-220A
8V308	7725~8055	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7890	750	72	-325	45	425	700	N	VA-222Z
8V438	7725~8055	6.3	0.8	A9S	Octal 8 pins	UG-344/U	7890	750	72	-325	45	425	700	R	VA-220Z
2K25	8500~9660	6.3	0.44	A6S	B6-92	Probe	9370	300	25	-155	50	3000	30	N	2K25 8460
9V10●	8500~10000	6.3	1.2	—	Viking connector VP 5/2 AA 1	UG-39/U	9000	300	23	-130	30	1700	30	N	BL-803
11V54	10450~11800	6.3	0.45	A6S	A3-1	UG-39/U	11100	300	27	-180	50	1300	70	N	V-53B
11V54A	10450~11800	6.3	0.45	A6S	A3-1	UG-39/U	11100	450	50	-260	70	1100	250	R	—
12V25	11600~12800	6.3	0.45	A6S	A3-1	WR75Δ	12200	300 450	27 50	-290 -260	40 55	1300 1150	50 250	N R	—

* Between half power points ● for high altitude use ⊙ for signal generator use Δ Connected to the stated waveguides with specified RF couplers

KLYSTRON AMPLIFIERS

CW Amplifier

Type	Frequency range (Mc)	Filament		Type of resonator	Input coupling	Output coupling	Typical operation									
		Voltage (V)	Current (A)				Frequency (Mc)	Accelerator Voltage (kV)	Cathode current (A)	Body current (mA)	Focusing Electrode voltage (V)	Collector voltage (kV)	Power gain (dB)	Power output (kW)	magnetic field (G) □	Cooling system
1V20*	460~690	7.5	34	external 4 cavities	Type N coaxial	WX-77DΔΔ	476 690	18.5 18.7	2.53 2.47	120 200	-250 -330	18.5 18.5	42	20.1 20.2	150	V.W
M4101A*	460~690	7.5	34	external 4 cavities	Type N coaxial	WX-77DΔΔ	476 690	18.5 18.7	2.53 2.47	120 200	-250 -330	18.5 18.5	42	20.1 20.2	150	V.W
6AV60	6370~6410	12	8	integral 4 cavities	UG-344/U	UG-343B/U	6390	—	1.4	60	-75	10	40	3	1400	V.W
M4627A⊙	6340~6440	11	7.0	integral 4 cavities	UG-344/U	UG-343B/U	6390	—	1.45	50	-40	10	30**	3	1800	V.W
M4627D	6370~6410	11	7.0	integral 4 cavities	UG-344/U	UG-343B/U	6390	—	1.75	50	-30	12	33	5.5	2100	V.W

ΔΔ Type of coaxial line □ To be used a Specified Electro-magnetic coil * Narrow-band amplifier
 ⊙ Connect to No.2 and No.3 cavities the specified matching loads ** At Broadband operation (1dB down at ±40 Mc)

MICROWAVE TUBES

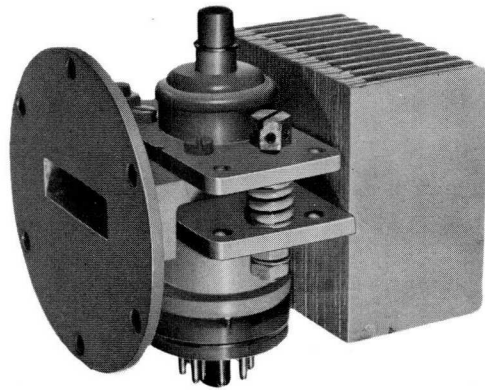
Pulsed Amplifier

Type	Frequency range (Mc)	Filament		Type of resonator	Input coupling	Output coupling	Typical operation									
		Voltage (V)	Current (A)				Frequency (Mc)	Pulse Accelerator voltage (kV)	Pulse cathode current (A)	Pulse collector voltage (kV)	Pulse Width (μ s)	Duty Factor	Power gain (dB)	Pulse power output (MW)	Magnetic field (G)	Cooling system
M4628	2600~2800	7.5	40	integral 4 cavities	UG-22B/U	UG-53/U	2885	160	128	160	5.5	0.0018	50	6.35	1200	W

□ To be used a Specified Electro-magnetic coil



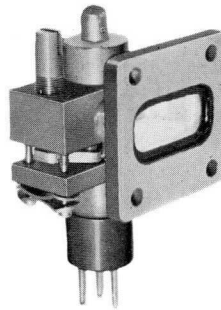
3V30



6V301 6V302 6V303
7V304 7V305 7V306
8V307 8V308



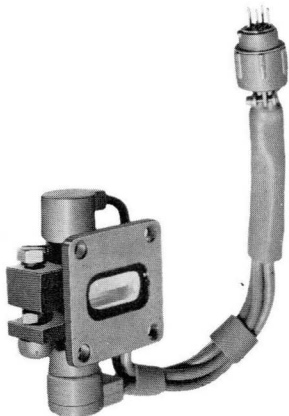
2V10 7V40 3V10
5V76 2K26 726C



11V54 11V54A
12V25



1V20



9V10



2V32



6AV60

MICROWAVE TUBES

TRAVELING WAVE TUBES

CW Amplifier

Type	Frequency range (Mc)	Heater		Base	Input and Output coupling	Typical operation											
		Voltage (V)	Current (A)			Frequency (Mc)	Focusing Electrode Voltage (V)	Accelerator Voltage (V)	Helix		Collector		Saturated power output (W)	Small Signal Gain (dB)	Noise Figure (dB)	Magnetic field (G)	Cooling system
									Voltage (V)	Current (mA)	Voltage (V)	Current (mA)					
1W50	400~ 900	6.3	8.5	Lead	Type N coaxial	750	-40	3150	3150	30	3300	750	400	32	-	Pkg	R
M4805	1700~ 2300	6.3	0.9	Lead	Type N coaxial	2000	-5	1400	2200	0.5	2200	65	20	37	-	Pkg	R
2W401	1700~ 2300	6.3	0.9	Octal 8 pins	Type N coaxial	2000	-5	1400	2050	0.5	2050	65	20	40	-	Pkg	R
3W402	2300~ 2900	6.3	0.9	Octal 8 pins	Type N coaxial	2600	-5	1400	2050	0.5	2050	65	18	38	-	Pkg	R
6861	2700~ 3500	5.0	0.65	Octal 8 pins	Type N coaxial	3100	0	20*	375	0.0005	400	0.15	0.001	25	6.5	525□	N
6W401	5850~ 6450	6.3	0.6	Octal 8 pins	WR 137△	6100	-5	2400	3100	0.1	3100	40	14	40	-	Pkg	R
7W402	6425~ 7125	6.3	0.6	Octal 8 pins	WR 137△	6800	-5	2400	3100	0.1	3100	40	16	40	-	Pkg	R
7W10	5800~ 7800	6.3	0.55	Octal 8 pins	WR 137△	6800	-5	50**	970	0.002	1020	0.5	0.01	25	11	Pkg	N
7W25	6400~ 7200	6.3	0.6	Octal 8 pins	WR 137△	6800	-5	1950	2700	0.1	2700	25	8	38	-	Pkg	R
8W403	7100~ 7900	6.3	0.6	Octal 8 pins	WR 137△	7500	-5	2400	3100	0.1	3100	40	12	40	-	Pkg	R
8W23	7300~ 7800	6.3	0.6	Octal 8 pins	WR 137△	7600	-5	1850	2500	0.1	2500	25	5	36	-	Pkg	R
11W18	10000~12000	6.3	0.55	Octal 8 pins	WR 90△	11000	-9	1000	2350	0.1	2450	8	1	32	-	Pkg	R
11W30	10000~12000	6.3	0.6	Octal 8 pins	WR 90△	11100	-10	1800	2810	0.2	2810	20	4	40	-	Pkg	R

□ To be used a Specified Electro-magnetic coil

△ Connect to the stated waveguides with specified R.F. couplers

* No. 2 Accelerator voltage: 40 V, No. 3 Accelerator voltage: 200 V

** No. 2 Accelerator voltage: 130 V, No. 3 Accelerator voltage: 250 V

Pulsed Amplifier

Type	Frequency range (Mc)	Heater		Base	Input and Output coupling	Typical operation											
		Voltage (V)	Current (A)			Frequency (Mc)	Focusing Electrode Voltage (V)	Pulse Helix		Pulse Collector		Pulse width (μs)	Duty factor	Saturated Pulse Power output (W)	Small signal Gain (dB)	Magnetic field (G)	Cooling method
								Voltage (V)	Current (mA)	Voltage (V)	Current (mA)						
3W80	2600~2900	6.3	2.0	B14-45	Type N coaxial	2750	-220	8000	200	8000	450	5	0.001	550	30	1300	R
3W80A	2600~2900	6.3	2.0	B14-45	Type N coaxial	2750	0	8200	250	8200	800	5	0.001	800	32	1300	R

□ To be used a Specified Electro-magnetic coil

CW MAGNETRONS

CW Oscillators

Type	Frequency (Mc)	Heater		Output coupling	Typical operation						Foreign equivalent tube
		Voltage (V)	Current (A)		Peak Anode Voltage (kV)	Average Anode current (mA)	Heater▲ Voltage (V)	Average Power output (W)	Magnetic field (G)	Cooling system	
2M21	2450	9.3	33	Probe	6.3	275	8	950	1400□	W	QK 707
2M40	2450	6.3	3.5	1/2" coaxial	1.6	100	6.3	80	Pkg	C	-
2M50	2450	5.3	3.2	Probe	1.8	200	4.5	200	Pkg	C	-
2M60	2450	9.0	75	Probe	6.0	900	7	2500	1000□	W, R	-
2M89	2450	5.0	16	Probe	7.0	300	5	1000	1800□	W	L-3189
7090	2450	5.3	3.2	1/2" coaxial	1.8	200	4.5	200	Pkg	C	7090

▲ The heater voltages shown are those suitable for conditions of typical operation. If used under other conditions, they should be adjusted according to the average Anode input power. To preheat before applying Anode voltage, supply normal heater voltage.

□ To be used a Specified Electro-magnetic coil.

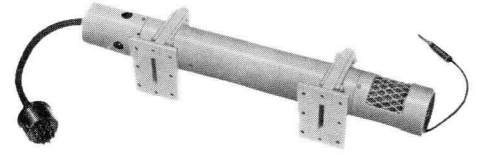
MICROWAVE TUBES



3W80 3W80A



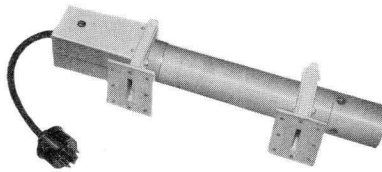
11W18



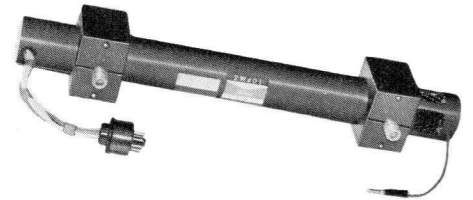
6W401 7W402 8W403



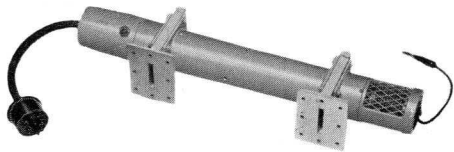
6861



7W10



2W401 3W402



7W25 8W23



1W50



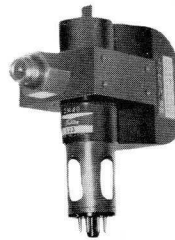
2M60



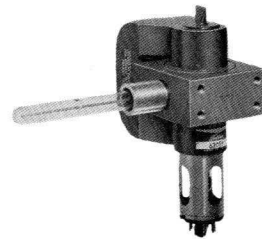
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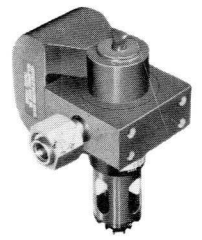
2M89



2M40



2M50



7090

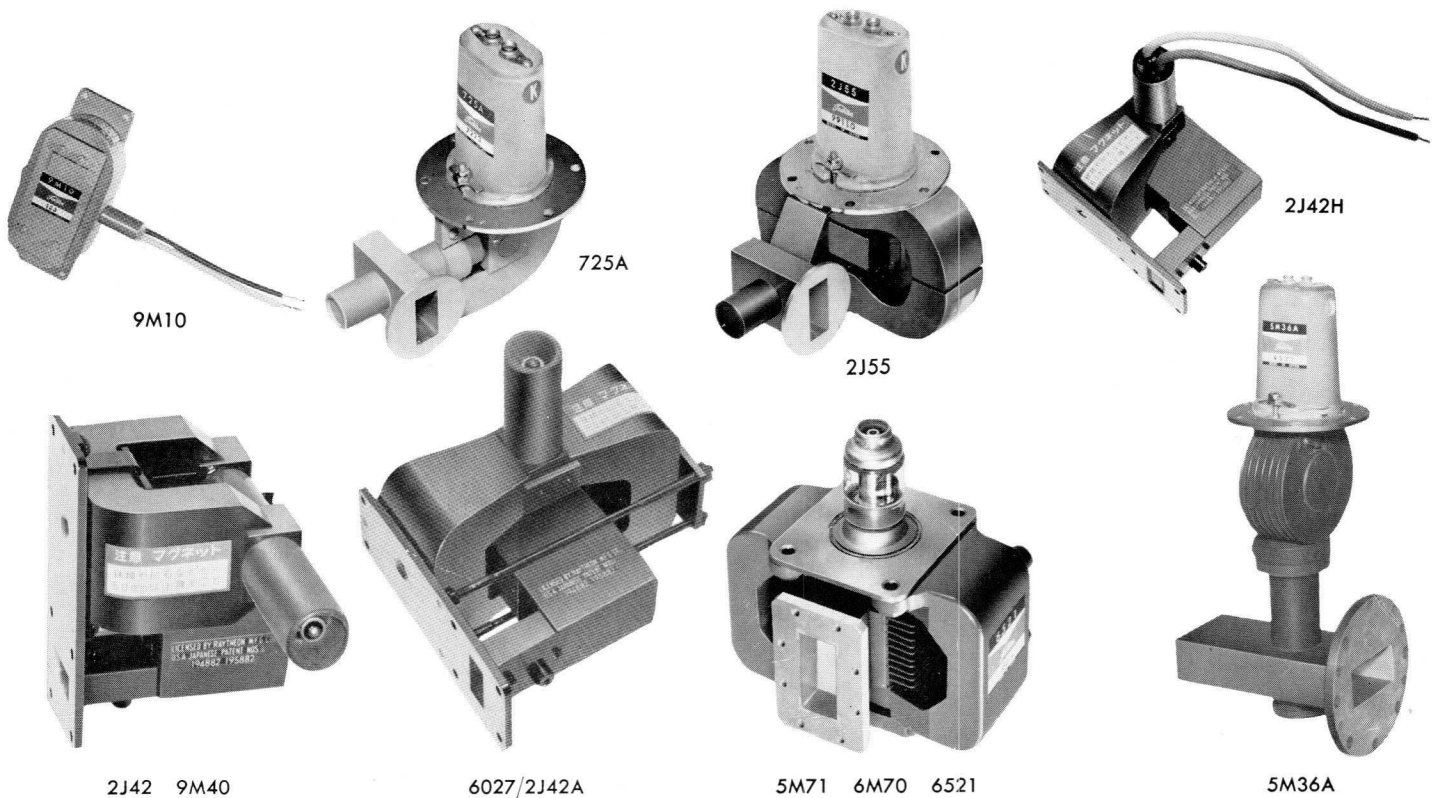
MICROWAVE TUBES

PULSED MAGNETRONS

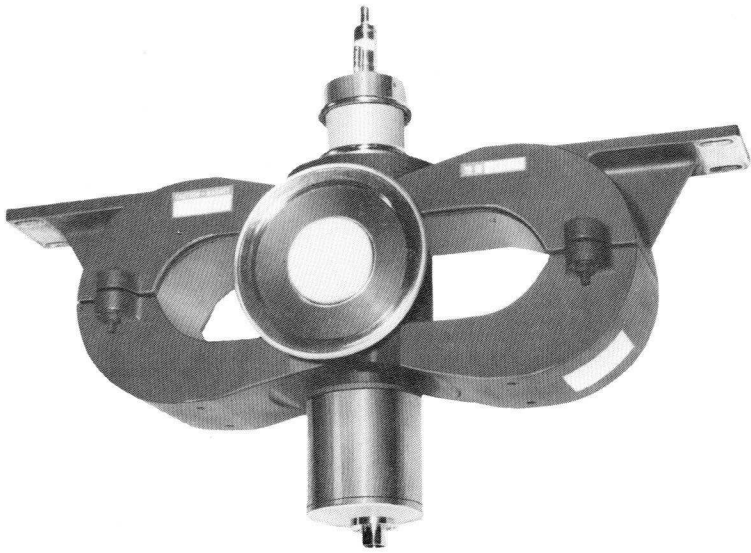
Pulsed Oscillators

Type	Frequency	Heater		Output coupling	Typical operation									Foreign equivalent tube
		Voltage (V)	Current (A)		Pulse Anode Voltage (kV)	Pulse Anode Current (A)	Average Anode Current (mA)	Heater▲ Voltage (V)	Pulse width (μs)	Pulse Repetition Frequency (pps)	Pulse Power Output (kW)	Magnetic field (G)	Cooling system	
3 M 95■	2700~2850	8.2	79	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	—
7529■	2700~2850	7.7	76	WR 284△	62	115	83	75A※※※	2	360	3900	Pkg	W	7529, QKH 327
3 M 901■	2750~2780	8.2	79	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	QKH 883
3 M 902■	2780~2810	8.2	79	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	QKH 883
6410 A	2805	7.7	76	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	6410 A QK 338 A
3 M 903■	2810~2840	8.2	79	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	QKH 883
3 M 904■	2840~2870	8.2	79	WR 284△	70	130	130	76A※	2	500	4800	Pkg	W	QKH 898
6406 A	2880	7.7	76	WR 284△	52	85	51	76A※※	2	300	2000	Pkg	W	6406 A QK 428 A
5 M 36 A	5300	6.3	3.25	UG-148B/U	21	40	20	2.5	1	500	350	3100□	R	—
5 M 71	5335	10	3.2	WR 187△	15	13.5	10.8	9.1	2	400	85	Pkg	R	—
6521●	5400	10	3.2	WR 187△	15	13.5	10.8	9.1	2	400	85	Pkg	R	6521
6 M 70	5540	10	3.2	WR 187△	12	12	12	9.5	1	1000	50	Pkg	R	—
2 J 42	9375	6.3	0.52	UG-39/U	5.5	4.5	1.44 9.0 4.5	6.3 4.5 6.0	0.4 1.0 2.0	800 2000 500	9	Pkg	N R R	2 J 42
2 J 42 H●	9375	6.3	0.52	UG-39/U	5.5	4.5	1.44 9.0	6.3 4.5	0.4 1.0	800 2000	9	Pkg	N R	2 J 42 H
2 J 55	9375	6.3	1.0	WR 112△	12	12	12	0	1	1000	50	Pkg	R	2 J 55
725 A	9375	6.3	1.0	WR 112△	12	12	12	0	1	1000	50	5400□	R	725 A
6027/ 2 J 42 A	9375	6.3	0.52	UG-39/U	6.9 6.9	7.5 7.5	7.5 0.25	4.4 6.3	1.0 0.15	1000 2000	20	Pkg	R	6027/2 J 42 A
9 M 10	9375	6.3	0.55	UG-39/U	3.5	2.5	0.5	6.3	0.1	2000	2.8	Pkg	N	—
9 M 40**	9375	6.3	0.52	UG-39/U	6.9 6.9	7.5 7.5	7.5 0.25	4.4 6.3	1.0 0.15	1000 2000	20	Pkg	R	JP 9-15

● For high altitude use ■ Tunable Frequency type ** Midget type of 6027/2J42 A ※ Preheating heater current 79 A ※※ Both preheating and operating heater currents 76 A ※※※ Preheating heater current 76 A ▲ The heater voltages (currents) shown are those suitable for conditions of typical operation. If used under other conditions, they should be adjusted according to the average Anode input power. To preheat before applying Anode voltage, supply normal Heater voltage (current) △ Connect to the stated waveguide with a specified R.F. coupler □ To be used a specified magnet



MICROWAVE TUBES



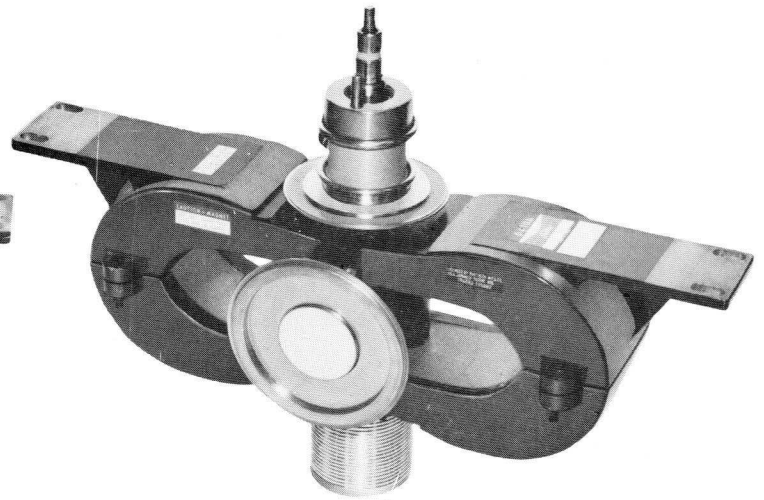
3M901 3M902
3M903 3M904



1AM90



3M95 7529



6410A

MICROWAVE TUBES

PLATINOTRON

Pulsed operation

Type	Frequency Range (Mc)	Heater		Input and Output coupling	Typical operation									
		Voltage (V)	Current (A)		Pulse Anode Voltage (kV)	Pulse Anode Current (A)	Average Anode Current (mA)	Heater▲ Voltage (V)	Pulse width (μs)	Pulse Repetition Frequency (pps)	Power Gain (dB)	Pulse Power Output (kW)	Magnetic field (G)	Cooling system
1 AM 90	1250~1350	30	2.4	1 $\frac{1}{2}$ /s Coaxial	39.5	35	84	0	5	480	10	1000	1325□	W

▲ The heater voltage shown is this suitable for condition of typical operation. If used under other conditions, They should be adjusted according to the average Anode input power. To preheat before applying Anode voltage, supply normal heater voltage □ To be used a Specified Electro-magnetic coil

TR AND ATR TUBES

TR Tubes

Type	Frequency Range (Mc)	Classification	Base	RF Coupling	MAX. Ratings		Typical operation										Foreign equivalent tube
					RF pulse power (kW)		Transmitting pulse		Ignitor current (μA)	Transmitting Characteristics			Receiving Characteristics				
					Max	Min	Frequency (Mc)	Power (kw)		Leakage power		Arc loss	Recovery time (μsec)	Insertion loss (dB)	Ignitor interaction (dB)	Loaded Q	
5 X 10	5230~5675	B P	A6 S	WR 187Δ	10	100	5400	90	150	0.2	40	0.5	5	0.5	0.1	—	BL-605
1 B 24 A	8490~9600	V F	A6 S	UG-39/U⊙	4	100	9375	10	100	15 mW		—	3	1.5	0.1	260	1 B 24 A
1 B 63 A	8490~9578	B P	A6 S	UG-39/U⊙	4	200	9000	40	100	0.1	20	0.3	5	0.5	0.1	—	MA 351 1 B 63 A
6378**	8490~9600	V F	A6 S	UG-39/U⊙	4	100	9375	10	100	15 mW		—	3	1.5	0.1	260	6378 BL-62
9 X 63	8490~9578	B P	A6 S	UG-39/U⊙	4	200	9000	40	100	0.1	20	0.3	5	0.5	0.1	—	1 B 63 A

** Midget type of 1 B 24 A ⊙ Connect to a choke coupler the input side Δ Connect to the stated waveguides with a specified RF coupler

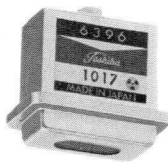
ATR Tubes

Type	Frequency range (Mc)	Classification	RF coupling	MAX. Rating		Typical operation							Foreign equivalent tube
				RF pulse power (kW)		Transmitting Pulse		Transmitting characteristics		Receiving characteristics			
				Max	Min	Power (kW)	Frequency (Mc)	Arc loss (dB)	Voltage standing wave ratio	Recovery time (μsec)	Loaded Q	Equivalent Conductance	
5 AX 10	5230~5675	L Q	WR 187Δ	10	100	90	5400	0.6	1.1 Max	5	5	0.05	BL-606
1 B 35 A	9000~9600	L Q	WR 90Δ	5	250	50	9300	0.6	1.1 Max	6	5	0.05	1 B 35 A
6396**	9000~9600	L Q	WR 90Δ	5	250	50	9300	0.6	1.1 Max	6	5	0.05	6396

** Midget type of 1 B 35 A Δ Connect to the stated waveguide with a specified RF coupler



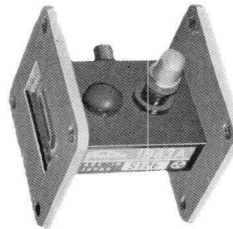
6378



6396



1B35A



9X63 1B63A



1B24A

GAS PHOTO TUBE

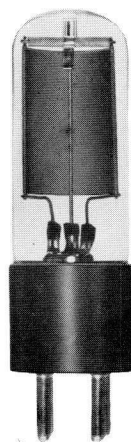
Type	Application	Spectral Response	Wavelength of Max. Response (Å)	Maximum Ratings			Characteristics						Base	Equivalent tube
				Anode voltage (V)	Current (μA)	Ambient Temperature (°C)	Sensitivity (μA/lm) ■			Gas* Amplification Max	Dark Current Max.** (μA)	Capacitance between electrodes Max. (pF)		
							Min.	Medium	Max.					
PG 12 A	For sound reproduction of 16 mm talkie record. For small relays.	S 1	8000 ± 1000	90	2	100	75	125	360	10	0.1	4	A 3-1	RCA 927
PG 14	For small facsimile transmission.	S 4	4000 ± 500	90	2	50	75	135	360	10	0.1	4	A 3-1	
PG 18	For relay application.	S 4	4000 ± 500	90	1.5	50	40	90	340	12	0.1	3	A 3-1	
PG 25	For sound reproduction of 16 mm, 35 mm talkie records. For relays autalarm and calculating machines.	S 1	8000 ± 1000	90	3	50	120	180	360	7.5	0.1	6	A 4-26	
PG 27	For sound reproducing of 35 mm talkie records.	S 1	8000 ± 1000	90	3	50	120	180	360	7.5	0.1	6	A 4-A 1	RCA 918
PG 28 A	For facsimile transmission.	S 4	4000 ± 500	90	3	50	75	135	360	5.5	0.1	6	A 4-26	
1 P 40	For photo relays.	S 1	8000 ± 1000	90	3	50	90	180	360	10	0.005	5	B 8-6	RCA 1 P 40
△ 930	For sound reproducing 16 mm talkie records.	S 1	8000 ± 1000	90	3	50	90	135	205	10	0.1	5	B 5-10	RCA 930
6953		S 1	8000 ± 1000	90	3	100	140	200	330	10	0.1	5	B 5-10	RCA 6953
PG 51	For small facsimile transmission. For small relays.	S 4	4000 ± 500	80	2	75	150	*** 300	—	18	0.0005	4	A 3-1	

* Ratio of anode current at Ebb=90 Vdc (PG 51 Ebb=75 Vdc) and Ebb=25 Vdc. ** At 25°C *** Sensitivities at Ebb=75 Vdc.

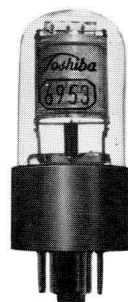
■ With light of 0.05 lumen from tungsten-filament lamp operated at a color temperature of 2870°K; light spot 10mmφ in diameter.



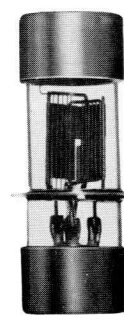
PV52



PG28A



6953



PV20



PG51

PHOTO TUBES

VACUUM PHOTO TUBE

Type	Application	Spectral Response	Wavelength of Max. Response (Å)	Maximum Ratings			Characteristics					Base	Equivalent Tube
				Anode Voltage (V)	Current (μA)	Ambient Temperature (°C)	Sensitivity (μA/lm) ■			Dark Current Max. ** (μA)	Capacitance between Electrodes Max. (pF)		
							Min.	Medium	Max.				
PV 11 A	For photoelectric thermometers, small measuring instruments, infra-red ray measurement, (Toshiba color filter IR-D1 used) colorimeter and other general measurement.	S1	8000 ± 1000	250	2	100	10	25	60	0.05	4	A3-1	Philip 3545
PV 15	"	S1	8000 ± 1000	250	2	50	15	25	70	0.01	4	A3-1	—
PV 13	For measurement of vision sensitivity (Toshiba filter V-A1 to be used in combination with this). For measurement in the neighborhood of 4,000 Å.	S4	4000 ± 500	250	2	50	15	25	100	0.05	4	A3-1	—
PV 16	"	S4	4000 ± 500	250	2	50	15	25	100	0.01	4	A3-1	—
PV 20	"	S4	4000 ± 500	100	2	50	8	12	—	0.002	5	—	—
PV 22	For photoelectric thermometer, small measuring instruments infra-red ray measurement (Toshiba filter IR-D1 used) colorimeter and other general measurement.	S1	8000 ± 1000	250	3	50	25	35	70	0.01	6	A4-26	—
PV 24	"	S1	8000 ± 1000	250	3	50	25	35	70	0.01	6	A4-26	—
PV 23 A	For measurement of vision sensitivity (Toshiba color filter V-A1 to be used in combination with this).	S4	4000 ± 500	250	3	50	25	35	100	0.01	6	A4-26	—
PV 32 A	"	S4	4000 ± 500	250	10	50	25	35	100	0.00015	4	A4-26	—
PV 52	For measurement instruments required no dark current.	S20	4200 ± 500	250	3	50	80	120	—	0.0005	10	B14-38	—
929	For measurement of visible sensitivity. (together with Toshiba color filter V-A1).	S4	4000 ± 500	250	5	75	25	45	70	0.01	2.6	B5-10	RCA 929

■ With light of 0.1 lumen from tungsten-filament lamp operated at a color temperature of 2870°K; light spot 10mmφ in diameter
 ** at 25°C

ULTRAVIOLET RAYS VACUUM PHOTO TUBES

Type	Application	Spectral Response	Wavelength of Max. Response (Å)	Maximum Ratings			Characteristics					Base	Equivalent tube
				Anode Voltage (V)	Current (μA)	Ambient Temperature (°C)	Sensitivity (μA/μW/cm²) ■			Dark Current Max. (μA)	Capacitance between Electrodes Max. (pF)		
							Min.	Medium	Max.				
PV 34	For measurement visible rays up to ultra-violet rays. For measurement the output ultra-violet rays of the germicidal light.	S5	3400 ± 500	250	—	50	—	1.3 × 10 ⁻¹	—	0.001	5	A4-26	—
PV 41	"	Mg	—	250	—	50	—	8 × 10 ⁻³	—	0.005	5	A4-26	—
PV 43	For measurement of ultraviolet ray only.	Sn	—	250	—	50	—	3 × 10 ⁻⁴	—	0.001	5	A4-26	—

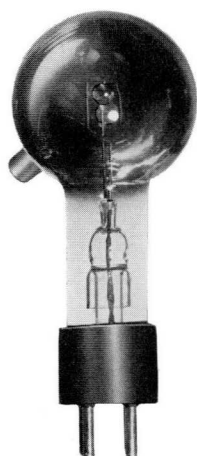
■ Output current be incident radiant power (1 μW/cm²) of 2537 angstrom

PHOTO TUBES

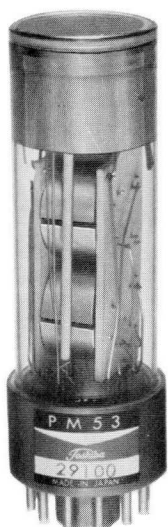
MULTIPLIER PHOTO TUBES

Type	Application	Spectral Response	Wavelength of Max. Response (Å)	Maximum Ratings						Typical Characteristics						Equivalent Tube
				Anode Voltage (Vdc)	Last Dynode Voltage (Vdc)	No. 1 Dynode Voltage (Vdc)	Average Anode Current (mA)	Ambient Temperature (°C)	Cathode Luminous Sensitivity (μA/lm)		Anode Luminous** Sensitivity (μA/lm)			Current Amplification (μ)	Dark Current* Max. (μA)	
									Min.	Medium	Min.	Medium	Max.			
MS-9S	A 9-stage side on type low dark current. For applications involving low levels.	S 4	4000 ± 500	1250	250	300	1.0	75	15	40	20	80	—	2 × 10 ⁶	0.05	931A
1P21		S 4	4000 ± 500	1250	250	300	0.1	75	20	40	40	80	800	2 × 10 ⁶	0.01	1P21
MS-9SY	A 9-stage side on type. For applications involving low light ultraviolet radiation level.	S 5	3400 ± 500	1250	250	300	0.5	75	8	40	10	50	—	1.25 × 10 ⁶	0.05	1P28
PM 50	A 10-stage head on type. For red channel for color flying spot equipment.	S 10	4500 ± 300	1500	250	300	0.75	75	20	40	30	*** 60	—	1.5 × 10 ⁶	0.2	(6217)
7305	A 9-stage side on type. Similar to type MS-9S but has S-8 spectral response useful in colorimetric applications.	S 8	3650 ± 500	1250	250	300	1.0	50	1.5	3	0.115	1	—	3.3 × 10 ⁵	0.15	1P22
7696	A 10-stage head on type. For scintillation spectrometer and flying spot equipment	S 11	4400 ± 500	1500	250	300	0.75	75	40	85	20	*** 50	300	6 × 10 ⁵	0.05	(6292)
PM 53	A 10-stage head on type. For scintillation counting applications.	S 11	4400 ± 500	1500	250	300	0.75	75	20	45	10	*** 27	300	6 × 10 ⁵	0.1	(6467) (6199)

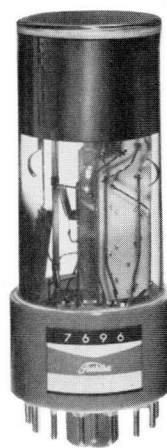
* Measured at a temperature of 25°C and with the supply voltage adjusted to give an anode current of 200 μA amperes per microlumen.
 ** 1. For light source, the standard tungsten-filament lamp of 2870°K in color temperature is used, and light flux of 10 μlm is projected on the photocathode. 2. The voltage (Ebb=1000 Vdc) is divided, supplying 1/10 Ebb to each interelectrode. *** The voltage (Ebb=1250 Vdc) divider providing 1/6 of Ebb between cathode and dynode, and 1/12 of Ebb for each dynode, anode and focusing electrode.



PV4



PM 53



7696



MS-9S

CAMERA TUBES

IMAGE ORTHICON

Type	Description	Dimensions		Construction feature		Typical operation						U.S. A equivalent
		Length (mm)	Max. Dia. (mm)	Field mesh	Target to mesh spacing (micron)	Target volts above cutoff (V)	Signal output current (peak to peak) (μ A)	Photocathode illumination required to reach "knee" (approx) (IX)	Signal to noise ratio*	Limiting resolution	Amplitude response at 400 TV lines (%)	
5820 A	General purpose tube having high sensitivity. For outdoor or studio black-and-white pickup.	386	76.2	no	55	2	3~24	0.1	42:1	625	50	5820
75 PC 11	General purpose tube having field mesh. For outdoor or studio black-and-white pickup.	386	76.2	yes	45	2	4~30	0.1	42:1	675	55	—
7293	General purpose tube having field mesh and "anti-ghost" image section.	386	76.2	yes	55	2	3~28	0.1	40:1	675	55	7293A
M 7050	For high-quality tape-recording and live broadcast pickup. Has field mesh and close target-to-mesh spacing.	386	76.2	yes	30	2	5~30	0.2	50:1	675	55	8093
4415	For color pickup where scene illumination is approximately 150 fc. Supplied as a set having matched characteristics. Type 4415 for red and green channels.	386	76.2	yes	45	2	4~30	0.1	42:1	675	55	4415
4416	For color pickup where scene illumination is approximately 150 fc. Supplied as a set having matched characteristics. Type 4416 for blue channel.	386	76.2	yes	45	2	4~30	0.1	42:1	675	55	4416
7295 A	4 1/2-inch diameter type for high-quality black-and-white pickup. Features high resolution, high signal-to-noise ratio. Uses same optics as 3-inch diameter types.	492	114	yes	55	2	5~30	0.3	60:1	800	70	7295 B
7389 A	4 1/2-inch diameter type similar to 7295 A but has higher signal-to-noise ratio and better half-tone signal reproduction.	492	114	yes	25	2	5~40	0.6	78:1	800	70	7389 B
55 PC 11	55 mm (approx. 2-inch) diameter type for compact TV camera. For outdoor or studio pickup.	270	55	no	25	2	3 up	0.3	35:1	550	—	—

Ratio of peak-to-peak highlight video-signal current to rms noise current.



CAMERA TUBES

VIDICON

Type	Description	Dimensions		Focusing method ※	Deflection method ※	Typical operation						U. S. A equivalent
		Length (mm)	Max. Dia. (mm)			Face Plate illumination (high-light) (lx)	Target voltage (V)	Dark current (μA)	Signal output current (μA)	Center resolution	Amplitude response at 400 TV lines (%)	
7038	Type having good sensitivity and very uniform photoconductive surface. For live or film pick-up in color or black-and-white TV cameras.	159	28.6	M	M	1000 150 20	15~25 30~50 60~100	0.004 0.02 0.2	0.3~0.4 0.3~0.4 0.2~0.3	* 650	* 40	7038
7735 A	Type featuring very high sensitivity. For live pick-up in color or black-and-white TV cameras.	159	28.6	M	M	10 5 1	20~40 30~60 35~70	0.02 0.1 0.2	0.20 0.27 0.14	* 650	* 40	7735 A
7262	Short type having low power heater. For small, compact, transistorized cameras.	130	28.6	M	M	150	30~60	0.02	0.3~0.4	* 600	* 40	7262
7262 A	Short type having low power (0.6 watt) heater. Has very high sensitivity. For small, compact, transistorized cameras. Electrical characteristics similar to type 7735 A.	130	28.6	M	M	5	30~60	0.1	0.27	* 600	* 40	7262 A
8572/ M 7055	High-quality type having separate mesh and wall electrode. For film pickup in color or black-and-white TV cameras.	159	28.6	M	M	1000 150 20	15~25 30~50 60~100	0.004 0.02 0.2	0.3~0.4 0.3~0.4 0.2~0.3	□ 750 ~800	□ 50	8572
8507/ M7055A	A high-resolution version of type 7735A having separate mesh and wall electrodes. For live pickup in black-and-white TV cameras.	159	28.6	M	M	10 5 1	20~40 30~60 35~70	0.02 0.1 0.2	0.2 0.27 0.14	□ 750 ~800	□ 50	8507
25 PE 12	Employs electrostatic focus and electrostatic deflection. Has high sensitivity. For small, compact, transistorized cameras.	159	28.6	S	S	10	30~60	0.02	0.1	** 450	** 12	
M 7051	Employs electrostatic focus and magnetic deflection. Has high sensitivity, low lag, and good resolution. Recommended for compact, lightweight cameras.	159	28.6	S	M	1	30~60	0.1	0.1	▲ 500	▲ 25	8134
M 7058	Very small 18mm diameter type designed for ultra-compact TV cameras	105	19.6	M	M	10 3	20~40 35~70	0.02 0.2	0.1 0.16	□□ 500	□□ 25	
8051	A 1½-inch diameter type having very high resolution capability. For film pickup, or data transmission applications.	197	40.4	M	M	360 80	10~30 20~50	0.005 0.02	0.3 0.3	▲▲ 1000	▲▲ 60	8051
8521	Similar to 8051 except employs a higher-sensitivity photoconductive surface with somewhat higher lag.	197	40.4	M	M	100 10 1	10~20 17~30 33~60	0.005 0.02 0.1	0.3 0.2 0.2	▲▲ 1000	▲▲ 60	8521

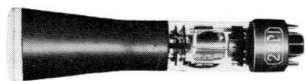
* Grid No. 3 & No. 4 voltage (focusing voltage) = 250-300 V ** Grid No. 5 voltage = 350 V, Grid No. 4 voltage = 200 V □ Grid No. 4 voltage = 345-510 V, Grid No. 3 voltage (focusing voltage) = 230-300 V □□ Grid No. 3 & No. 4 voltage (focusing voltage) = 250-300 V
 ▲ Grid No. 6, No. 3 voltage = 300 V, Grid No. 5 voltage = 180 V ▲▲ Grid No. 4 voltage = 1400 V, Grid No. 3 voltage = 800-1000 V
 ※ M: Magnetic. S: Electrostatic



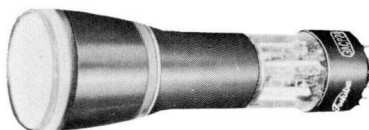
CATHODE-RAY TUBES

CATHODE RAY TUBES FOR OBSERVATION

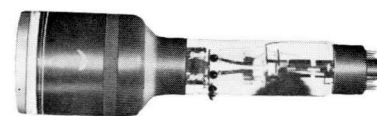
Type	Construction	Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)	Anode No. 1 Voltage Eb1 (V)	Grid No. 2 Voltage Ec2 (V)	Grid No. 1 Voltage Ec1 (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Greatest diameter of bulb (mm)			Voltage Ef (V)	Current If (A)					
		2 BP 1		E	E			199	52.6					
40 AB 15		E	E	150	42	Blue-Green	Short	6.3	0.6	—	550	410	(550)	"
3 ACP 2 A	flat face a post accelerator	E	E	260	78	Blue-Green	Long Green	6.3	0.6	6,000	2,000	1,500	(2,000)	"
3 ADP 1	flat face a post accelerator	E	E	260	78	Green	Medium	6.3	0.6	6,000	3,000	1,000	(3,000)	"
3 ADP 2						Blue-Green	Long Green							
3 JP 1	a post accelerator	E	E	260	78	Green	Medium	6.3	0.6	4,000	2,000	1,000	(2,000)	"
3 JP 7						Blue	Long Yellow							
3 JP 11						Blue	Short							
3 KP 1						Green	Medium							
3 KP 7	flat face	E	E	298	78	Blue	Long Yellow	6.3	0.6	—	2,500	1,000	(2,500)	"
3 KP 11						Blue	Short							
3 KP 1(F)						Green	Medium							
3 KP 7(F)						Blue	Long Yellow							
3 KP 11(F)						Blue	Short							
3 RP 1	flat face	E	E	238	78	Green	Medium	6.3	0.6	—	2,500	1,000	(2,500)	"
3 RP 7						Blue	Long Yellow							
3 RP 11						Blue	Short							
3 RP 1 A						Green	Medium							
3 RP 7 A						Blue	Long Yellow							
3 RP 11 A						Blue	Short							
75 FB 1 B		E	E	300	77	Green	Medium	2.5	1.6	—	2,000	1,000	(2,000)	"
75 UB 1	flat face linear post accelerator	E	E	350	78	Green	Medium	6.3	0.15	7,000	2,000	800	(2,000)	"
75 UB 2						Blue-Green	Long Green							
75 UB 4						White	Medium							
75 UB 7						Blue	Long Yellow							
75 UB 11						Blue	Short							
75 VB 1	flat face linear post accelerator	E	E	290	78	Green	Medium	6.3	0.15	2,500	1,000	1,100	(1,000)	"
75 VB 31						Green	Medium							
75 XB 1	flat face linear post accelerator	E	E	350	78	Green	Medium	6.3	0.15	5,000	850	850	(850)	"
75 XB 2						Blue-Green	Long Green							
75 XB 31						Green	Medium							



2BP1



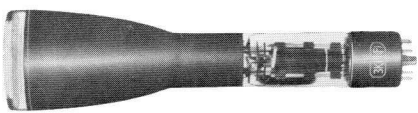
3ACP2A



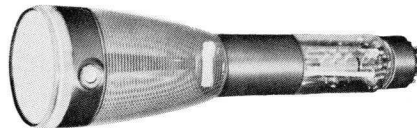
3ADPI

CATHODE-RAY TUBES

Deflection Factors		Base & Bulb Contact	Typical Operating Conditions							Deflection Factors		Note
			Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)	Anode No. 1 Voltage Eb1 (V)	Grid No. 2 Voltage Ec2 (V)	Grid No. 1 Voltage for Visual Cutoff Eco (V)	Min. Useful Scan. (mm)	X-axis (Vdc/cm)			
X-axis 10 ⁻⁸ Vdc/cm Eb2	Y-axis 10 ⁻⁸ Vdc/cm Eb2											
45.3~61.1	29.1~39.4	Duodecal 12-Pin (B 12-43)	—	1,000	150~280	(1,000)	-67.5 Max.	44	45.3~61.1	29.1~39.4		
152	144	Octal 8-Pin (B 8-11)	—	250	35~75	(250)	-50 Max.	32	Less than 38	Less than 36		
				350	47~107	(350)	-70 Max.		Less than 54	Less than 51		
34.0~40.4 (Eb3=2Eb2)	27.2~31.1 (Eb3=2Eb2)	Diheptal 12-Pin (B 12-37)	4,000	2,000	390~690	(2,000)	-45~-75	69	68.9~80.7	54.4~62.2		
26.2~32.1 (Eb3=2Eb2)	11.6~14.4 (Eb3=2Eb2)	Duodecal 12-pin (B12-43) Small ball cap (J 1-22) Miniature ball cap (J 1-25)	4,000	2,000	320~490	(2,000)	-52~-87	X-axis 67 Y-axis 38	52.4~64.2	23.2~28.8		
33.5~45.2 (Eb3=2Eb2)	24.6~33.5 (Eb3=2Eb2)	Diheptal 12-Pin (B 12-37) Small ball cap (J 1-22)	1,500	1,500	300~515	(1,500)	-22.5~-67.5	69	40.2~54.3	29.5~40.2		
			4,000	2,000	400~690	(2,000)	-30~-90		67.0~90.6	49.2~67.0		
			3,000	1,500	300~515	(1,500)	-22.5~-67.5		50.5~68.1	37.0~50.4		
19.6~26.8	14.9~20.5	Magnal 11-Pin (B 11-66)	—	1,000	160~300	(1,000)	-45 Max.	69 flat face form 67	19.6~26.8	14.9~20.5		
				2,000	320~600	(2,000)	-90 Max.		39.3~53.6	29.9~41.0		
28.8~38.9	20.5~27.5	Duodecal 12-Pin (B 12-43)	—	1,000	165~310	(1,000)	-67.5 Max.	69 flat face form 67	28.8~38.9	20.5~27.5		
				2,000	330~620	(2,000)	-135 Max.		57.5~78.0	41.0~55.1		
21.0~35.0	19.0~30.0	7-Pin (A 7-13)	—	1,000	185~285	(1,000)	-135 Max.	64	21.0~35.0	19.0~30.0		
18.0~24.0 (Eb3=6Eb2)	9.4~13.5 (Eb3=6Eb2)	Diheptal 12-Pin (B 12-37) Cavity cap (J 1-21) Special Pin	3,000	500	70~130	(500)	-15~-27.5	X-axis 50 Y-axis 40	9.0~12.0	4.7~6.8		
19~27 (Eb3=2Eb2)	13.6~18.4 (Eb3=2Eb2)	Duodical (B 12-207) Cavity cap (J 1-21)	1,000	500	50~200	(500)	-20~-35	X-axis 60 Y-axis 60	9.5~13.5	6.8~9.2		
18.2~25.7 (Eb3=6Eb2)	9.1~12.1 (Eb3=6Eb2)	Duodical (B 12-207) Cavity cap (J 1-21)	4,000	660	0~270	(660)	-20~-36	X-axis 50 Y-axis 40	12~17	6~8		



3KPI (F)



75VBI

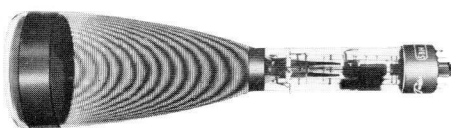


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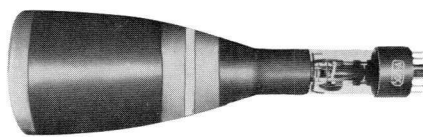
CATHODE-RAY TUBES

OSCILLOGRAPH TUBES

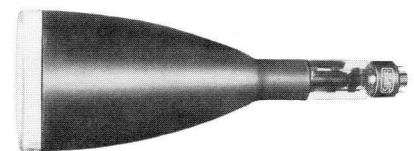
Type	Construction	Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage E _{b3} (V)	Anode No. 2 Voltage E _{b2} (V)	Anode No. 1 Voltage E _{b1} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Maximum Diameter of bulb (mm)			Voltage E _f (V)	Current I _f (A)					
		5 ABP 1	flat face a post accelerator	E	E			435	136					
5 ABP 2	Green	Long Green												
5 ABP 7	Blue	Long Yellow												
5 ABP 11	Blue	Short												
5 BHP 1	flat face linear post accelerator aluminized	E	E	474	136	Green	Medium	6.3	0.6	12,000	2,000	800	(2,000)	Normally negative
5 BHP 2						Blue-Green	Long Green							
5 BHP 7						Blue	Long Yellow							
5 BHP 11						Blue	Short							
5 BHP 31						Green	Medium							
5 CP 1 A	a post accelerator	E	E	435	136	Green	Medium	6.3	0.6	4,000	2,000	1,000	(2,000)	Normally negative
5 CP 7 A						Blue	Long Yellow							
5 CP 11 A						Blue	Short							
5 UP 1	flat face	E	E	385	136	Green	Medium	6.3	0.6	—	2,500	1,000	(2,500)	Normally negative
5 UP 7						Blue	Long Yellow							
5 UP 11						Blue	Short							
5 UP 1(F)						Green	Medium							
5 UP 7(F)						Blue	Long Yellow							
5 UP 11(F)						Blue	Short							
5 XP 1 A	flat face three-multi post accelerator	E	E	458	136	Green	Medium	6.3	0.6	25,500	3,650	1,550	(3,650)	Normally negative
5 XP 2 A						Blue-Green	Long Green							
5 XP 7 A						Blue	Long Yellow							
5 XP 11 A						Blue	Short							
5 XP 1 B	flat face three-multi post accelerator aluminized	E	E	458	136	Green	Medium	6.3	0.6	25,500	3,650	1,550	(3,650)	Normally negative
5 XP 2 B						Blue-Green	Long Green							
5 XP 7 B						Blue	Long Yellow							
5 XP 11 B						Blue	Short							
120 FB 1 B		E	E	400	122	Green	Medium	2.5	1.6	—	2,500	1,000	(2,500)	Normally negative
120 FB 4 B						White	Medium							
120 FB 7 B						Blue	Long Yellow							
120 FB 11 B						Blue	Short							
130 AB 1(M)	flat face linear post accelerator aluminized	E	E	474	136	Green	Medium	6.3	0.15	6,000	2,200	880	(2,200)	Normally negative
130 AB 2(M)						Blue-Green	Long Green							
130 AB 7(M)						Blue	Long Yellow							
130 AB 11(M)						Blue	Short							
130EB 1	flat face linear post accelerator	E	E	450	136	Green	Medium	6.3	0.6	6,600	1,320	550	(1,320)	Normally negative -200V Max.



5BHP2



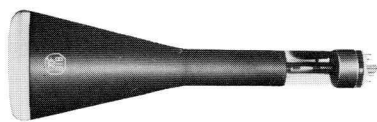
5CP1A



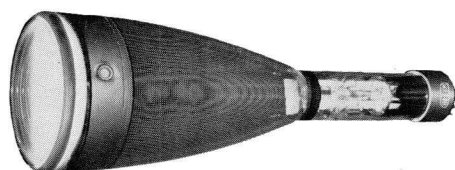
5HP1(F)

CATHODE-RAY TUBES

Deflection Factors		Base & Bulb Contact	Typical Operating Condition						Deflection Factors		Note
			Anode No. 3 Voltage E _{b3} (V)	Anode No. 2 Voltage E _{b2} (V)	Anode No. 1 Voltage E _{b1} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage for Visual Cutoff E _{c0} (V)	Min. Useful Scan. (mm)	X-axis (Vdc/cm)	Y-axis (Vdc/cm)	
10.4~14.2 (E _{b3} =2 E _{b2})	6.9~9.4 (E _{b3} =2 E _{b2})	Diheptal 12-pin (B 12-37) Small ball cap (J 1-22)	2,000	2,000	400~600	(2,000)	-52~-87	116	17.0~22.8	11.5~15.3	
			3,000	1,500	300~515	(1,500)	-39~-65	X-axis 116 Y-axis 100	15.8~21.2	10.6~14.2	
			4,000	2,000	400~690	(2,000)	-52~-87	X-axis 116 Y-axis 100	20.9~28.3	13.7~18.9	
15.1~20.9 (E _{b3} =6 E _{b2})	3.5~4.3 (E _{b3} =6 E _{b2})	Diheptal 12-pin (B 12-37) Cavity cap(J 1-21) Special pin	10,000	1,670	180~590	(1,670)	-50~-80	X-axis 100 Y-axis 40	27.6~33.5	5.9~ 7.2	
15.1~20.9 (E _{b3} =2 E _{b2})	13.0~17.7 (E _{b3} =2 E _{b2})	Diheptal 12-pin (B 12-37) Small bell cap (J 1-22)	2,000	2,000	375~690	(2,000)	-30~-95	144	22.4~33.0	21.3~29.1	
			3,000	1,500	280~515	(1,500)	-22.5~-71		22.8~41.4	19.7~26.7	
			4,000	2,000	375~690	(2,000)	-30~-95		30.3~41.7	26.0~35.4	
11.0~15.2	9.1~12.3	Duodecal 12-pin (B 12-43)	—	1,000	170~320	(1,000)	-45 Max.	114	11.0~15.2	9.1~12.3	
				2,000	340~640	(2,000)	-90 Max.		22.0~30.3	18.1~24.6	
16.2~18.9 (E _{b3} =2 E _{b2})	5.3~6.4 (E _{b3} =2 E _{b2})	Diheptal 12-pin (B 12-37) Small ball cap (J 1-22) Miniature ball cap (J 1-25)	6,000	2,000	362~695	(2,000)	-45~-75	X-axis 107 Y-axis 55	38.6~47.1	12.5~14.9	
			8,000	2,000	362~695	(2,000)	-45~-75	X-axis 107 Y-axis 50	42.8~52.4	13.8~16.4	
			10,000	2,000	362~695	(2,000)	-45~-75	X-axis 107 Y-axis 44.4	46.5~57.0	15.2~18.1	
15.6 Less than	13.2 Less than	10-pin	—	1,500	294~460	(1,500)	-67.5 Max.	106	23.4 Less than	19.8 Less than	
				2,000	367~613	(2,000)	-90 Max.		31.2 Less than	25.4 Less than	
8.25~11.3 E _{b3} /E _{b2} =3	3.0~4.14	Diheptal 12-pin (B 12-37) Cavity cap(J 1-21) Special pin	4,000	1,330	130~400	(1,330)	-35~-56	X: 100 More than Y: 60 More than	11.0~15.0	4.0~ 5.5	
			6,000	2,000	195~600	(2,000)	-52~-83		16.5~22.5	6.0~8.25	
11.5~14.4 E _{b3} /E _{b2} =5	11.5~14.5	Diheptal 12-pin (B 12-37) Cavity cap(J 1-21) Special pin	4,000	800	120~320	(800)	-25~-45	X: 80 More than Y: 80 More than	9.2~11.5	9.2~11.5	



120FB1B



130AB1(M)

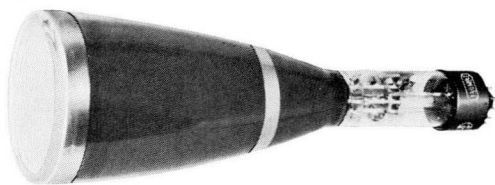


130FB1

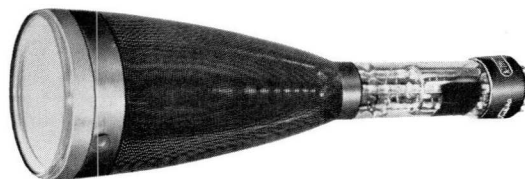
CATHODE-RAY TUBES

OSCILLOGRAPH TUBES

Type	Construction	Ratings												
		Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage E _{b3} (V)	Anode No. 2 Voltage E _{b2} (V)	Anode No. 1 Voltage E _{b1} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Maximum Diameter of Bulb (mm)			Voltage E _f (V)	Current I _f (A)					
130 HB 1	flat face a post accelerator	E	E	435	136	Green	Medium	6.3	0.6	6,000	2,600	1,000	(2,600)	Normally negative
130 HB 2						Blue-Green	Long-Green							
130 HB 1 A	flat face a post accelerator aluminized	E	E	435	136	Green	Medium	6.3	0.6	6,000	2,600	1,000	(2,600)	Normally negative
130 HB 2 A						Blue-Green	Long-Green							
130 HB 7 A						Blue	Long-Yellow							
130 HB 11 A						Blue	Short							
130 UB 11	flat face linear post accelerator aluminized	E	E	460	136	Blue	Short	6.3	0.6	26,400	4,400	2,000	(4,400)	"
M 7115 B	flat face	E	E	430	136	Blue	Short	2.5	1.6	—	10,000	3,000	(450)	"
M 7162 B 1	flat face a post accelerator	E	E	435	136	Green	Medium	6.3	0.6	6,000	2,200	1,000	(2,200)	" -200V Max.
M 6925 B 1	rectangular flat face deflection blanking type	E	E	431	153	Green	Medium	6.3	0.6	—	5,000	1,500	(5,000)	"
M 6925 B 2						Blue-Green	Long-Green							
M 6925 B 31						Green	Medium							
7 VP 1		E	E	378	181	Green	Medium	6.3	0.6	—	4,000	2,000	(4,000)	"
7 VP 7						Blue	Long-Yellow							
7 VP 11						Blue	Short							
M 7171 B 4	rectangular flat face	E	E	475	427	White	Medium	6.3	0.6	—	4,500	2,000	(4,500)	"



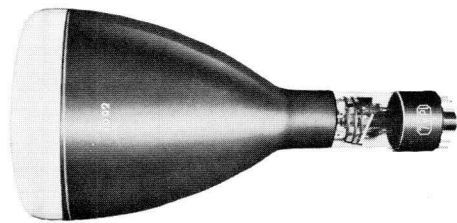
130HB1



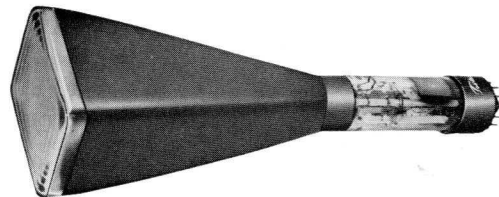
130HB11A

CATHODE-RAY TUBES

Deflection Factors		Base & Bulb Contact	Typical Operating Condition						Deflection Factors		Note
			Anode No. 3 Voltage Eb3	Anode No. 2 Voltage Eb2	Anode No. 1 Voltage Eb1	Grid No. 2 Voltage Ec2	Grid No. 1 Voltage for Visual Cutoff Eco	Min. Useful Scan	X-axis	Y-axis	
10^{-3}Vdc/cm Eb2	10^{-3}Vdc/cm Eb2		(V)	(V)	(V)	(V)	(V)	(mm)	(Vdc/cm)	(Vdc/cm)	
10.6~14.2 (Eb3=2Eb2)	7.1~9.5 (Eb3=2Eb2)	Diheptal 12-pin (B 12-37) Small ball cap (J1-22) Miniature ball cap (J1-25)	2,000	2,000	400~690	(2,000)	-52~-87	116	17.0~22.8	11.5~15.3	
			3,000	1,500	300~515	(1,500)	-30~-65	X-axis 116 Y-axis 100	15.8~21.2	10.6~14.2	
			4,000	2,000	400~690	(2,000)	-52~-87	X-axis 116 Y-axis 100	21.2~28.3	14.2~18.9	
11.2~13.8 (Eb3=6Eb2)	11.3~13.8 (Eb3=6Eb2)	Diheptal 12-pin (B 12-37) Cavity cap (J1-21) Special pin	24,000	4,000	430~1,420	(4,000)	-60~-90	X-axis 100 Y-axis 60	45~55	45~55	
10.3~15.5	9.4~14.3	6-pin (A 6-12) Small ball cap (J1-21) Miniature ball cap (J1-25)	—	5,000	1,000~1,500	250	-30~-75	144	51.5~77.5	47.0~71.5	
				10,000	2,000~3,000	250	-60~-90		103~155	94~143	
7.75~9.25 Eb3/Eb2=1.25	6.75~8.25 Eb3/Eb2=1.25	Diheptal 12-pin (B 12-37) Small ball cap (J1-22) Miniature ball cap (J1-25)	2,500	2,000	400~690	(2,000)	-52~-87	116 more than	15.5~18.5	13.5~16.5	
6.0~7.33	5.09~6.23	Diheptal 14-pin (B 14-38) Special pin	—	3,000	390~760	(3,000)	-40~-70	X-axis 100 Y-axis 80	18.0~22.0	15.3~18.7	
12.2~16.1	9.9~13.3	Diheptal 12-pin (B 12-37)	—	1,500	400~600	(1,500)	-42 Max.	150	18.5~24.4	15.0~20.0	
				3,000	800~1,200	(3,000)	-84 Max.		36.7~48.4	29.6~40.1	
10~12	7.75~9.8	Diheptal 12-pin (B 12-37) Cavity cap (J1-21)	—	3,000	810~1,200	(3,000)	-84 Max.	X-axis 210 Y-axis 160	30~36	23.4~29.5	
				4,000	1,080~1,600	(4,000)	-112 Max.	X-axis 210 Y-axis 160	40~48	31~39	



7VPI

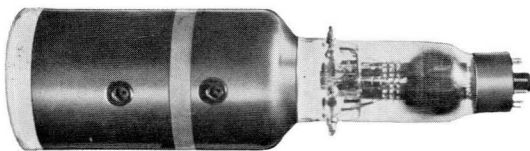


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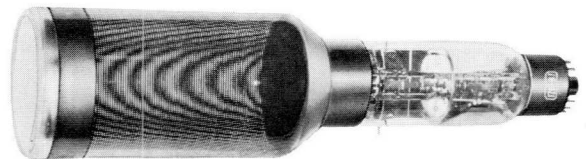
CATHODE-RAY TUBES

OSCILLOGRAPH TUBES (DUAL BEAM TYPE)

Type	Construction	Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage E _{b3} (V)	Anode No. 2 Voltage E _{b2} (V)	Anode No. 1 Voltage E _{b1} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Maximum Diameter of Bulb (mm)			Voltage E _f (V)	Current I _f (A)					
5 SP 1 A	flat face a post accelerator	E	E	474	136	Green	Medium	6.3	0.6	7,500	2,500	1,000	(2,500)	Normally negative
5 SP 7 A						Blue	Long Yellow							
5 SP 11 A						Blue	Short							
130 FB 1	flat face linear post accelerator dual beam type	E	E	510	136	Green	Medium	6.3	0.6	8,000	2,750	1,100	(2,700)	-200V Max.
130 GB 2	dual beam type flat face linear post accelerator	E	E	510	136	Blue-Green	Long-Green	6.3	0.6	12,000	2,750	1,000	(2,750)	-200V Max.
130 GB 11						Blue	Short							
120 SB 1	flat face a post accelerator	E	E	435	136	Green	Medium	6.3	1.2	6,500	2,500	1,000	(2,500)	"
130 SB 7						Blue	Long-Yellow							
130 SB 11						Blue	Short							
130 TB 1	flat face	E	E	435	136	Green	Medium	6.3	1.2	—	2,500	1,000	(2,500)	"
130 TB 7						Blue	Long-Yellow							
130 TB 11						Blue	Short							
130 RB 1	flat face monoaccelerator	E	E	495	136	Green	Medium	6.3	0.6	—	3,500	1,500	(3,500)	"
130 RB 2						Blue-Green	Long-Green							
130 RB 7						Blue	Long-Yellow							
130 RB 11						Blue	Short							
M 7192 B 7	flat face monoaccelerator aluminized	E	E	495	136	Blue	Long-Yellow	6.3	0.6	—	10,000	2,000	(10,000)	"
M 7192 B 11						Blue	Short							



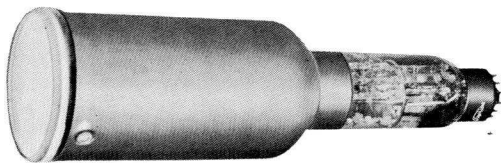
5SP1A



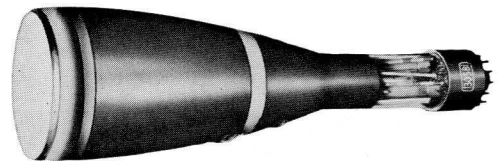
130FB1

CATHODE-RAY TUBES

Deflection Factors		Base & Bulb Contact	Typical Operating Condition					Min. Useful Scan (mm)	Deflection Factors		Note
			Anode No. 3 Voltage Ebs (V)	Anode No. 2 Voltage Eb2 (V)	Anode No. 1 Voltage Eb1 (V)	Grid No. 2 Voltage Ec2 (V)	Grid No. 1 Voltage for Visual Cutoff Eco (V)		X-axis (Vdc/cm)	Y-axis (Vdc/cm)	
12.8~19.9 (Ebs=2Eb2)	13.8~17.0 (Ebs=2Eb2)	Diheptal 12-pin (B 12-37) Small ball cap (J1-22) (C-1)	3,000	1,500	272~521	(1,500)	-34~-56	114	21.6~32.7	18.5~27.9	
			4,000	2,000	363~695	(2,000)	-45~-75		32.7~39.8	27.6~33.9	
12.0~15.2	3.5~4.7 Ebs/Eb2=3	Diheptal 14-pin (B 14-38) Small cavity cap (J1-21)	6,000	2,000	220~700	(2,000)	-50~-80	X: 100 more than Y: 60 more than	24~30.5	7.0~9.0	
12.3~16.0	3.5~5.3 Ebs/Eb2=4	Diheptal 14-pin (B 14-38) Small cavity cap (J1-21) Special pin	8,000	2,000	220~700	(2,000)	-50~-80	X: 100 more than Y: 60 more than	24.0~32.0	7.0~10.5	
13.9~19.2 (Ebs=2Eb2)	11.5~15.4 (Ebs=2Eb2)	Diheptal 14-pin (B 14-38) Small ball cap (J1-22)	—	2,000	340~640	(2,000)	-90 Max.	116	22.1~30.3	18.4~24.6	
			4,000	2,000	240~640	(2,000)	-90 Max.				
11.0~15.2	9.2~12.3	Diheptal 14-pin (B 14-38) Small ball cap (J1-22)	—	2,000	340~640	(2,000)	-90 Max.	116	22.1~30.3	18.4~24.6	
5.3~6.7	3.0~4.0	Diheptal 14-pin (B 14-38) Small cavity cap (J1-21)	—	3,000	300~800	(3,000)	-50~-80	X-axis 100 Y-axis 80	16~20	9~12	
5.55~7.65	36.4~49.3	Diheptal 14-pin (B 14-38) Small cavity cap (J1-21) Special pin	—	7,000	1,100~1,700	(7,000)	-50~-90	X-axis 100 Y-axis 80	39~53	25.5~34.5	



130SBI

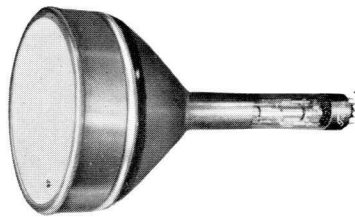


130RBI

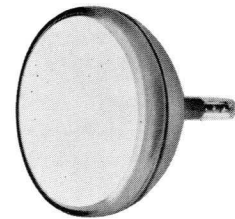
CATHODE-RAY TUBES

RADAR TUBES

Type	Construction	Ratings												
		Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage E _{3s} (V)	Anode No. 2 Voltage E _{2s} (V)	Anode No. 1 Voltage E _{1s} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Maximum Diameter of Bulb (mm)			Voltage E _f (V)	Current I _f (A)					
7 ABP 7 A	aluminized	E	M	347	186	Blue	Long Yellow	6.3	0.6	—	10,000	(E _{c4}) 1,000	700	Normally negative
7 AQP 7	aluminized	E	M	210	180	Blue	Long Yellow	6.3	3.3	—	12,000	(E _{c4}) 1,100	770	"
7 MP 7(M)	aluminized	M	M	334	186	Blue	Long Yellow	6.3	0.6	—	8,000	—	700	"
7 UP 7	aluminized	M	M	347	181	Blue	Long Yellow	6.3	0.6	—	8,000	—	700	"
10 KP 7(M)	aluminized	M	M	458	270	Blue	Long Yellow	6.3	0.6	—	10,000	—	700	"
10 WP 7 A	aluminized	E	M	440	270	Blue	Long Yellow	6.3	0.6	—	12,000	(E _{c4}) 1,000	700	"
12 ABP 7 A	aluminized	E	M	467	319	Blue	Long Yellow	6.3	0.6	—	12,000	(E _{c4}) 1,100	770	"
12 DP 7 A(M)	aluminized	M	M	511	310	Blue	Long Yellow	6.3	0.6	—	10,000	—	700	"
12 SP 7 B	aluminized	M	M	486	319	Blue	Long Yellow	6.3	0.6	—	10,000	—	410	"
16 AKP 7	aluminized	E	M	570	406	Blue	Long Yellow	6.3	0.6	—	14,000	(E _{c4}) 1,000	450	"
16 AKP 26						Orange	Long Orange							



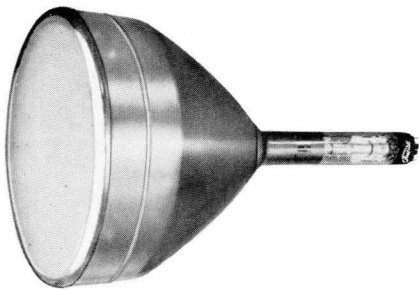
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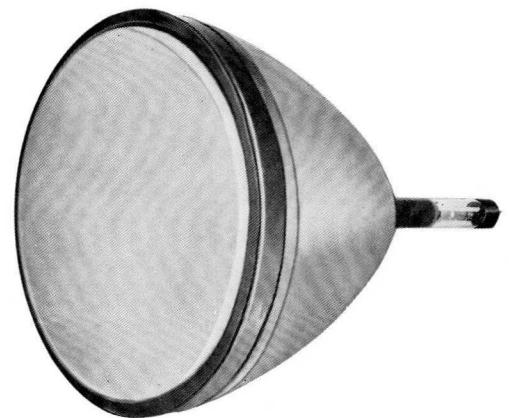
7AQP7

CATHODE-RAY TUBES

Deflection Factors		Base & Bulb Contact	Typical Operating Condition						Deflection Factors		Note
			Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)	Anode No. 1 Voltage Eb1 (V)	Grid No. 2 Voltage Ec2 (V)	Grid No. 1 Voltage for Visual Cutoff Eco (V)	Min. Useful Scan. (mm)	X-axis (Vdc/cm)	Y-axis (Vdc/cm)	
—	—	Duodical 6-pin (B 6-63) Small cavity cap (J 1-21)	—	7,000	(Ec4) 0~250	300	-33~-77	152	—	—	
—	—	Miniature base (E 9-37) Small ball cap (J 1-22)	—	10,000	(Ec4) -50~350	300	-15~-45	152	—	—	
—	—	Duodical 5-pin (B 5-57) Small cavity cap (J 1-21)	—	4,000 7,000	—	250	-27~-63	152	—	—	
—	—	Octal 8-pin or 5-pin (B 8-65) or (B 5-85) Small cavity cap (J 1-21)	—	7,000	—	250	-25~-70	152	—	—	
—	—	Duodical 5-pin (B 5-57) Small cavity cap (J 1-21)	—	7,000 9,000	—	250	-27~-63	228	—	—	
—	—	Duodical 6-pin (B 6-63) Small cavity cap (J 1-21)	—	10,000	(Ec4) 0~300	300	-33~-77	228	—	—	
—	—	Duodical 6-pin (B 6-63) Small cavity cap (J 1-21)	—	10,000	(Ec4) 0	300	-33~-77	279	—	—	
—	—	Octal 8-pin (B 8-11) cap (C 1-15)	—	4,000 7,000	—	250	-25~-70	254	—	—	
—	—	Duodical 5-pin (B 5-57) Small cavity cap (J 1-21)	—	9,000	—	250	-27~-63	279	—	—	
—	—	Duodical 6-pin (B 6-63)	—	12,000	(Ec4) -300~250	300	-35~-75	368	—	—	



10WP7A



16AKP7

CATHODE-RAY TUBES

MONITOR TUBES

Type	Construction	Ratings												
		Ratings		Maximum Dimensions		Fluorescence	Persistence	Heater		Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)	Anode No. 1 Voltage Eb1 (V)	Grid No. 2 Voltage Ec2 (V)	Grid No. 1 Voltage Ec1 (V)
		Focusing Method	Deflecting Method	Overall Length (mm)	Maximum Diameter of Bulb (mm)			Voltage Ef (V)	Current If (A)					
7 TP 4	aluminized	E	M	343	186	White	Medium	6.3	0.6	—	12,000	2,000	410	Normally negative
170 AB 4	rectangular flat face aluminized	E	M	275	174	White	Medium	6.3	0.15	—	14,000	(Ec4) -500~500	550	-154V Max.
210 KB 4	rectangular flat face aluminized	E	M	240	216	White	Medium	6.3	0.15	—	14,000	(Ec4) -500~500	400	-50V Max.
270 AB 4	rectangular flat face aluminized	E	M	365	270	White	Medium	6.3	0.15	—	15,400	3,300	450	-150V Max.
10 FP 4 A	aluminized	M	M	458	270	White	Medium	6.3	0.6	—	12,000	—	410	"
10 SP 4	aluminized	E	M	433	270	White	Medium	6.3	0.6	—	14,000	2,700	410	"

VIEW-FINDER TUBES

75 TB 4	with ion trap	E	M	241	78	White	Medium	6.3	0.3	—	3,000	1,500	410	Normally negative
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FLYING-SPOT SCANNER CATHODE-RAY TUBE

5 AKP 24	aluminized	M	M	326	130	Blue-Green	Extremely short	6.3	0.6	—	40,000	—	—	Normally negative
5 CNP 16	aluminized	E	M	300	130	Violet	Extremely short	6.3	0.6	—	20,000	3,500	410	"
5 CNP 24	aluminized	E	M	300	130	Blue-Green	Extremely short	6.3	0.6	—	27,000	4,500	410	"

TUBES FOR FILMRECORDING

10 NP 11	aluminized	M	M	458	270	Blue	Short	6.3	0.6	—	25,000	—	—	Normally negative -305V Max.
270 DB 11	Sub-screen type	M	M	480	270	Blue	Short	6.3	0.6	—	28,000	—	650	"

MONOSCOPE

M 7060	—	E	M	315	130	—	—	6.3	0.6	Pattern Electrode 1,500	1,500	600	1,600	Normally negative
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DISPLAY STORAGE TUBE

Type	Writing System	Viewing System	General										Screen Voltage (V)	Backplate Voltage (V)	Grid No. 5 Voltage Ec5 (V)
			Maximum		Heater		Focusing Method	Deflection Method	Fluorescence	Persistence	Base & Connection				
			Overall Length (mm)	Greatest Bulb Dia. (mm)	Voltage (V)	Current (A)									
6498	Bistable Display	Transmission Control	480	144	Writing Section 6.3	0.6	E	E	P1 Green	Medium	Diheptal 14-pin (B 14~38)	application Example	3,000	0	85~200
					Viewing Section 6.3	0.6						Maximum Rating	4,000	-50	250
7448	Haef-tone Display	Transmission Control	346	136	Writing Section 6.3	0.6	E	E	P20 Yellow	Medium	Diheptal 14-pin (B 14~38)	application Example	10,000	2	250
					Viewing Section 6.3	0.6						Maximum Rating	11,000	20	300

CATHODE-RAY TUBES

Base & Bulb Contact	Typical Operating Condition						Note
	Anode No. 3 Voltage E _{bs} (V)	Anode No. 2 Voltage E _{b2} (V)	Anode No. 1 Voltage E _{b1} (V)	Grid No. 2 Voltage E _{c1} (V)	Grid No.1 Voltage for Visual Cutoff E _{co} (V)	Min. Useful Scan. (mm)	
Duodical 6-pin (B 6-63) Small cavity cap (J1-21)	—	10,000	1,160~1,580	200	-22~-52	152	
Special 9-pin Small cavity cap (J1-21)	—	10,000	(E _{c4}) 0~350	300	-40~-70	124×93	
Small-button neoeightor 7-pin (B 7-208) Small cavity cap (J1-21)	—	10,000	(E _{c4}) 0~350	300	-33~-79	183×187 more than	
Duodical 6-pin (B 6-36) Small cavity cap (J1-21)	—	10,000	1,150~1,570	200	-22~-52	184×138	
Duodical 5-pin (B 5-57) Small cavity cap (J1-21)	—	11,000	—	250	-27~-63	232	
Duodical 6-pin (B 6-63) Small cavity cap (J1-21)	—	12,000	1,400~1,900	200	-22~-52	232	

Duodical 12-pin (B 12-43)	—	2,500	750~1,200	200	-22~-51	69	
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Duodical 5-pin (B 5-57) Small cavity cap (J1-21)	—	30,000	—	—	-80~-140	108	
Duodical 6-pin (B 6-63) Small cavity cap (J1-21)	—	20,000	2,220~3,160	200	-22~-52	108	
Duodical 6-pin (B 6-63) Small cavity cap (J1-21)	—	20,000	2,220~3,160	200	-22~-52	108	

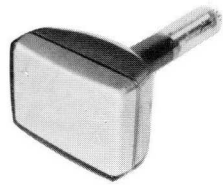
Duodical 5 pin (B 5-57) Small cavity cap (J1-21)	—	18,000	—	—	-65~-125	232	
Duodical 5-pin (B 5-57) Small cavity cap (J1-21)	—	25,000	—	300	-85~-138	—	

6-pin (A 6-12) Small ball cap (J1-22)	Pattern Electrode 1,000	1,050	240~360	1,000	Visual cutoff Voltage -30~-90	—	
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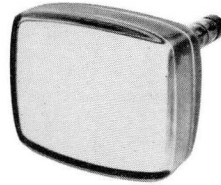
Viewing Section									Writing Section						
Grid No. 4 Voltage E _{c4} (V)	Grid No. 3 Voltage E _{c3} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)	Max. Writing Speed (km/sec)	Number of Half-Tone steps	Viewing Duration (sec)	Reso- lution (lines /cm)	Brightness (fl)	Grid No. 4 Voltage ¹ E _{c4} (V)	Grid No. 3 Voltage E _{c3} (V)	Grid No. 2 Voltage E _{c2} (V)	Grid No. 1 Voltage E _{c1} (V)	Cathode Voltage (V)	Deflection Factors	
(V)	(V)	(V)	(V)	(km/sec)		(sec)	(lines /cm)	(fl)	(V)	(V)	(V)	(V)	(V)	X-axis (Vdc/cm)	Y-axis (Vdc/cm)
250	150	200	-20~-200	2	—	—	20	40	200	450~1,050*	200	-40~-80*	-3,000	30~40	30~40
350	250	300	-200	—	—	—	—	—	300	-3,300	300	-200*	-3,300	—	—
50~150	10~50	150	0~-80	7.5	5	20	20	2,750	125	350~750*	125	0~92*	-2,000	28.3~37.8	27.6~37.0
30~90	10~40	125	0~-60	7.5	5	40	20	1,500							
300	200	200	-200	—	—	—	—	—	200	-1,550	200	-200*	-2,750	—	—

Note 1. * Voltage are show with respect to cathode of writing gun.

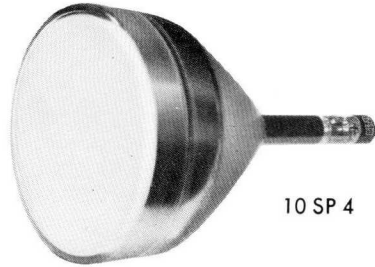
Note 2. Grid No. 2 and grid No. 4 of writing gun are connected together and to grid No. 2 of viewing gun within the tube.



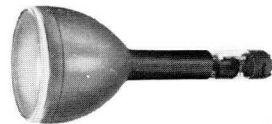
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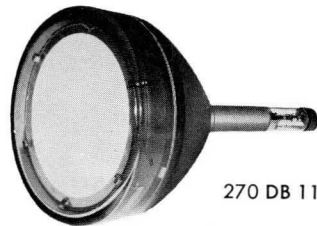
270 AB 4



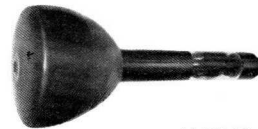
10 SP 4



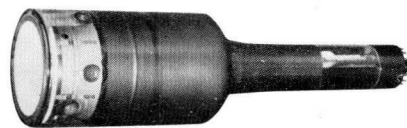
5 CNP 16



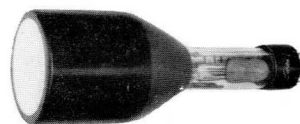
270 DB 11



M 7060



6498



7448

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