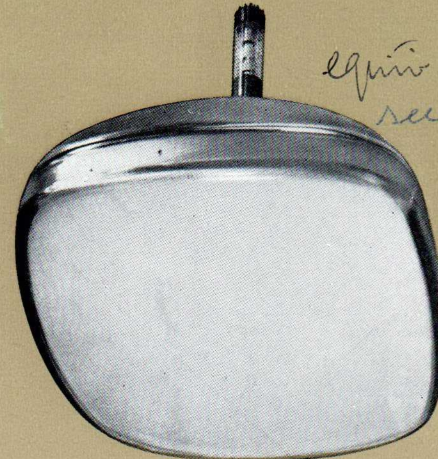
② was M78 T.P.D. ②

TOS 1

FTD 6011

8-60

Toshiba



SPECIAL TUBES

TOKYO SHIBAURA ELECTRIC CO., LTD.

CONTENTS

TOSHIBA SPECIAL TUBES

TUNGAR BULBS

Toshiba Tungar Bulbs are used as a rectifying tubes for the tungar rectifier which is extensively used for charging batteries or as a DC source of small capacity. They have the oldest history in Japan, having enjoyed great popularity in application owing to the advantage of opererating simplicity and inherent superiority in quality.

TYPES OF TUNGAR BULBS

The Tungar Bulbs are available in two types: one is Type TN of Toshiba speciality which seals in argon gas and the other Type TH which seals in mercury. The following photos show external view of the Toshiba Tungar Bulbs, and the following table their rating.

DISTINCTIVE FEATURES OF TUNGAR BULBS

1. The rectifying system using the Toshiba Tungar Bulb is generally simple in operation and practically free from any trouble in service. Particularly, the Type TN Toshiba Tungar Bulb, being of instantaneous heating type, requires no time for heating its cathode and can be loaded simultaneously on ignition of its filaments.

2. High efficiency and excellent rectifying characteristics.

Being designed to mark arc discharge at low voltage, they can start discharge at the voltage as low as the order of about 18V, and have an extremely small power loss due to voltage drop in the tube (about 8V). Since the voltage drop in the tube remains practically constant regardless of the variation of load current, their rectifying characteristics such as voltage regulation, rectified waveform are also excellent.

3. High uniformity in performance and long life.

They are remarkably uniform in performance characteristic and have very long life, as they are manufactured from highly selected materials by the mechanized production facilities after technical improvements based on incessant study, and further passed rigid final tests.

4. High inverse voltage.

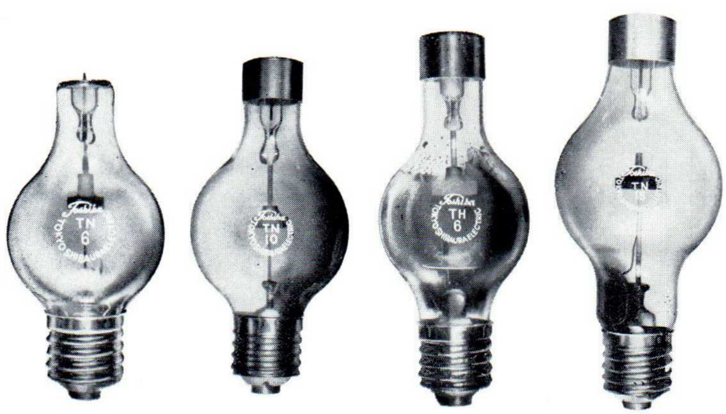
Of the Toshiba Tungar Bulb, Type TH in particular has inverse as high as 700V which is the highest among the rectifier tubes of this type.

APPLICATION OF TUNGAR BULBS

They are most adapted to a DC source of medium and small capacity, and the Tungar rectifiers using these bulbs are very widely used in the following fields.

Battery charging......For telegraphs, telephones, trains, automobiles, signals, alarms, emergency lights, and fishing lights.

DC power sources...... For projecting pictures, electroplating, DC electric welding, and conducting laboratory experiments.



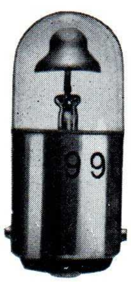
TN-6 TN-10 TH-6 TN-15

Type	Rated Output		Filament			Starting Voltage		Tube Voltage Drop		Peak Inverse Voltage	Overall Dimensions	
	Voltage	Current	Voltage	Current	Heating Time						Total Length	Max. Dia.
	(V)	(A)	(V)	Approx. (A)	Min. (sec.)	Max. (V)	Average (V)	Max. (V)	Average (V)	Max. (V)	Max. (mm)	Max. (mm)
TN-2	Half wave 90 Full wave 75	2	1.8	11.0	Instant	15.5	13.0	10.0	8.0	300	110	55
TN-6	Half wave 90 Full wave 75	6	2.0	15.5	Instant	18.0	13.0	10.0	8.0	300	175	81
TN-10	Half wave 90 Full wave 75	10	2.1	17.0	Instant	18.0	13.0	10.0	8.0	300	190	90
TN-15	Half wave 75 Full wave 60	15	2.2	24.5	Instant	18.0	13.0	11.0	8.0	270	225	97
TH-6	Half wave 200 Full wave 160	6	2.1	13.0	300	20.0	15.0	12.0	9.0	700	195	81
TH-10	Half wave 200 Full wave 160	10	2.2	15.5	300	20.0	15.0	12.0	10.0	700	225	97
TH-15	Half wave 200 Full wave 160	15	2.3	18.5	300	20.0	15.0	14.0	11.0	700	250	113
TH-15L	Half wave 150 Full wave 120	15	2.3	18.5	300	20.0	15.0	14.0	11.0	525	245	108
TS-5	Half wave 20 Full wave 17	5	2.0	12.0	Instant	7.5	5.0	8.0	6.0	70	145	56

TOSHIBA VOLTAGE REGULATOR

The stability of power source voltage is indispensable for accurate determination with the measuring instruments for the communication apparatus. By the use of the voltage regulator tube, power source of comparatively stabilized voltage can be obtained very easily. In general, when causing glimmering discharge between a pair of electrodes, the voltage between the electrodes can remain at a fixed value almost independent of the current within a certain range of

TOSHIBA VOLTAGE REGULATOR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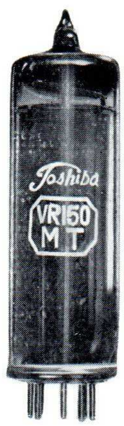
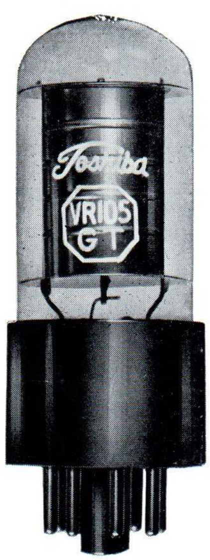
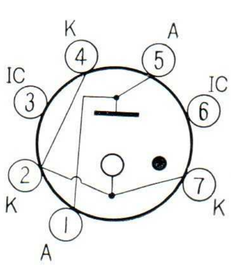


VR150-MT

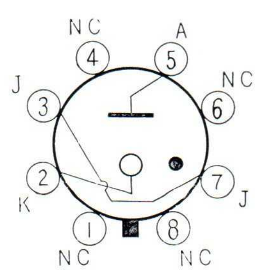


VR105-GT

Type	Overall Dimensions (mm)		Base
	Max. Length	Max. Diameter	
VRA65/80	138	30	Small 4-pin A4-5
VR 75-GT	90	34	Small shell octal 8-pin B8-6
VR 75-ST	108	39	Small shell octal 6-pin B6-3
VR 90-GT	90	34	Small shell octal 8-pin B8-6
VR 90-ST	108	39	Small shell octal 6-pin B6-3
VRD90/50	96	30	Small 4-pin A4-5
VR105-MT	67	19	Miniature button 7-pin E7-1
VR105-GT	90	34	Small shell octal 8-pin B8-6
VR105-ST	108	39	Small shell octal 6-pin B6-3
VRA135-T	106	30	Small 4-pin A4-5
VRA145-T	106	30	Small 4-pin A4-5
VR150-MT	67	19	Miniature button 7-pin E7-1
VR150-GT	90	34	Small shell octal 8-pin B8-6
VR150-ST	108	39	Small shell octal 6-pin B6-3
991	13.6	15.8	Bayonet S15-2
5651	54	19	Miniature button 7-pin E7-1



VR105-MT
VR105-MT
5651



VR 75-GT
VR 90-GT
VR105-GT
VR150-GT

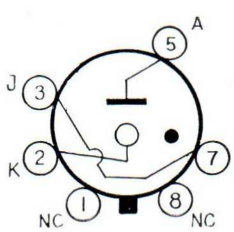
AND VOLTAGE REFERENCE TUBES

discharge current by selecting properly the construction and materials of the electrodes or the kind and pressure of sealed-in gas. Because of this characterisic, the voltage regulator tube operates to keep the voltage at the load constant at a fixed value regardless of variation in load current or power source voltage.

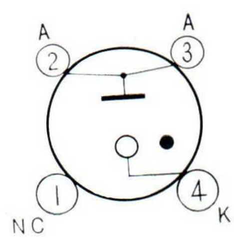
The voltage regulator tube is now used extensively for stabilizing the voltage for the great majority of measuring instruments for communication apparatus.

VOLTAGE REFERENCE TUBES

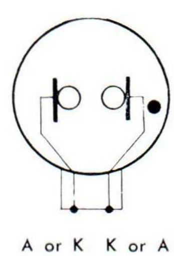
Anode Supply Voltage Min. (V)	Voltage Between Electrodes (V)	Operating Current (mA)		Regulating (Approx.) (V)	Equivalent Tube	Type
		Min.	Max.			
90	65	20	80	4	—	VRA65/80
105	75	5	40	4	Equivalent to 0A3	VR75-GT
105	75	5	40	4	Equivalent to 0A3	VR75-ST
130	90	5	30	4	Equivalent to 0B3	VR90-GT
130	90	5	30	4	Equivalent to 0B3	VR90-ST
130	90	15	50	4	—	VRD90/50
133	105	5	20	3	Equivalent to 0B3	VR105-MT
133	105	5	40	3	Equivalent to 0C3	VR105-GT
133	105	5	40	3	Equivalent to 0C3	VR105-ST
180	135	5	50	4	—	VRA135-T
180	145	5	50	4	—	VRA145-T
185	150	5	30	4	Equivalent to 0A2	VR150-MT
185	150	5	40	4	Equivalent to 0D3	VR150-GT
185	150	5	40	4	Equivalent to 0D3	VR150-ST
92	59	0.4	2	5	Equivalent to 991	991
115	87	1.5	3.5	2	Equivalent to 5651	5651



VR 75-ST
VR 90-ST
VR105-ST
VR150-ST



VRA 65/80
VRD 90/50
VRA135-T
VRA145-T



COLD CATHODE TRIGGER TUBES

Toshiba Cold Cathode Trigger Tubes are innert-gas filled cold-cathode trigger tubes specifically designed for electronic relay and switching service.

Type	Overall Dimensions		Base	Anode Breakdown Voltage (V Max.)	Grid Starting Voltege (V)	Starter Current (μA Max.)	Anode Voltage Drop (V)	Peak Cathode Current (mA Max.)	Average Cathode Current (mA Max.)	Equivalent Tube
	Max. Total Lengh (mm)	Max. Diameter (mm)								
0A4-G	108	39	B6-3	225	85	100	70	100	25	0A4-G
5832	54	19	E7-1	200	85	400	65	100	25	5823

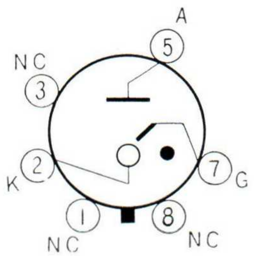
Type	Overall Dimensions		Base	Starting Voltage (V)	Anode Supply DC Voltage (V Min.)	Anode Voltage Drop (V)	Peak Anode Foward Voltage (V)	Peak Anode Inverse Voltage (V)	Peak Anode Current (mA)	Averge Anode Current (mA)	Equivalent Tube
	Total Length (mm)	Max. Diameter (mm)									
DR4-GT	85	34	B8-6	550	600	—	600	50	Min. 5	—	
2012S	54	19	E7-1	150	190	85	—	—	4	1	
R4410	247	31	A14S	—	1800	—	1900	—	—	100	R4410

STROBOSCOPIC ARC DISCHARGE TUBES

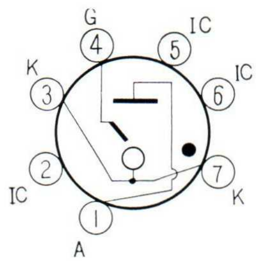
Toshiba Stroboscopic Arc Discharge Tubes are cold cathodes, tetrodes filled with neon so as to discharge instantly a condenser through the anode and flash a distinct light on neon red.

Their discharge time is of the order 1/10^3 second and the crest value of their discharge current amounts to 100 A. As they can repeat discharge precisely at a regular interval in responese to the control of an oscillator, they are best adapted to the light source for the stroboscope.

Type	Overall Dimensions		Anode Breakdown Voltage (V Min.)	Max. Average Anode Current under 50 PPS (mA)	Max. Repetition of the Arc Discharge (PPS)	Signal Voltage Crest Value to 1st Grid (V)	2nd Grid Breakdown Voltage (V)	Equivalent Tube
	Total Length (mm)	Max. Diameter (mm)						
SN-4A1	110	30	300	50	250	-200	80-130	JAN SN-4 JAN 631-P1
SN4-GT	85	34	〃	〃	〃	〃	〃	



0A4-G



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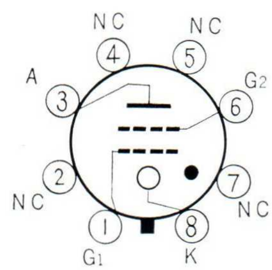
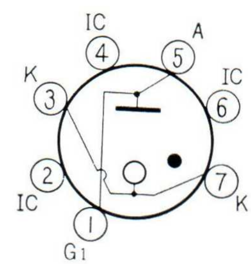
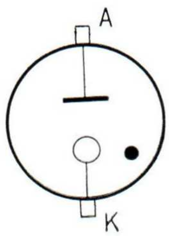


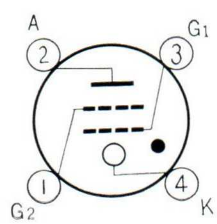
DR4-GT



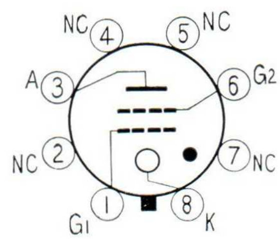
2012S



R4410



SN-4A1

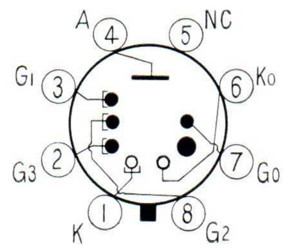


SN4-GT

COUNTING TUBES

Toshiba Counting Tubes DK20 are single pulse Dekatrons of single output, decimal system with the maximum speed of 20 kc, the operation being very steady, reliable and durable.

Type	Overall Dimensions		Base	Starting Voltage (V)	Voltage drop (V)	Anode DC Current (mA)	Pulse Per Second Max. (pps.)	Pulse duration Min. (s)	Pulse gap Min. (s)	Anods Supply DC Voltage (V)	Anode Series Resis-tance (k)	Signal Voltage (V)	Grid Supply DC Voltage (V)	Equivalent Tube
	Total Length (mm)	Max. Diameter (mm)												
DK20	83	34	B8-6	300	180	0.9	20.000	25	25	400	250	−150	--75	GC10D

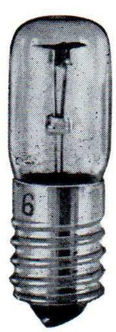


DK20

NEON GLOW LAMPS

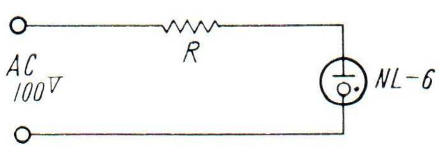
Toshiba Neon Glow Lamps are small sized glow discharge tubes consisting of two metallic electrodes in an atmosphere of neon gas sealed in a clear glass bulb. A beautiful red light is produced only when the voltage applied to the electrodes exceeds a certain striking voltage, and as the voltage decreases, the glow suddenly vanishes at a point somewhat lower than the striking voltage, and does not persist after the flow of current has ceased. Thus it has inerita on the production of the light and, in addition, all the characteristics that are required for the pilot lamp, so that it is not only suitable for the signal lamp of various electrical apparatus, but also for many applications as the parts of electric communication apparatus in particular.

Type	Wattage (W)	Voltage (V)	Current (mA)	Base	Total Length (mm)	Max. Diameter (mm)	Electrode Shape	Starting Voltage Max. (V)	Series Resistance (k)
NL-1	1.0	100	10	E 26 Screw	75	29	Plate	AC 75 DC 105	10 EX
NL-5	0.03	100	0.3	E 10 Miniature screw	30	11	Plate	AC 75 DC 105	50~100 EX
NL-5R	0.03	100	0.3	E 10 Miniature screw	30	11	Plate	AC 73	50~100 EX
NL-5S	0.03	100	0.3	S 9-1 Miniature bayonet	30	11	Plate	AC 75 DC 105	50~100 EX
NL-6	0.03	100	0.3	E 10 Miniature screw	30	11	Plate	AC 75 DC 105	50~100 EX
NL-6S	0.03	100	0.3	S 9-1 Miniature screw	30	11	Plate	AC 75 DC 105	50~100 EX
NL-7A	0.08	DC 250	0.3	E 17 Screw	45	18	Plate and rod	DC 180	50~100 EX
NL-14	0.8	200	4	E 17 Screw	58	20	Double spiral	AC 160 DC 225	26 IN
NE-48	0.2	100	2	S 15-2 Bayonet	40	16	Bell	AC 75 DC 105	30 EX
NE-51	0.03	100	0.3	S 9-1 Miniature bayonet	30	11	Rod	AC 75 DC 105	150 EX



NL 6

PRECAUTION IN SERVICE USE



R : 50~100kΩ
Nominal Current 0.3mA

Fig. 1

Fig. 1 shows an example of a circuit using the lamp. The series resistance R is indispensable to protect the destruction of the lamp by a high current of the discharge. When DC impressed to the lamp, the glow appears only on one side (negative side) of the electrodes.

CURRENT REGULATOR TUBES

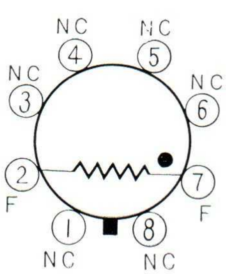
Toshiba Current Regulator Tubes are used for maintaining load current at a fixed value, consequently the voltage at the load regardless of fluctuation in the power source voltage by connecting in series with the load.

They are now extensively used for the purpose of maintaining at a fixed value the voltage to be applied to the filaments of vacuum tubes used in precise measuring instruments for communication apparatus etc.

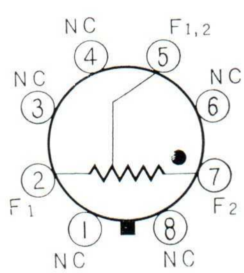
Type	Overall Dimensions		Base	Voltage Range		Current Range		Equivalent Tube
	Max. Length (mm)	Max. Diameter (mm)		Min. (V)	Max. (V)	Min. (mA)	Max. (mA)	
3-16	90	34	B8-6	12	19.5	280	320	Amperite 3-16
3H-1-7	90	34	B8-6	(I) 1.6* (II) 6.6**	4.0 12.0	330	390	〃 3H-1-7
3H-7	90	34	B8-6	5	10	320	380	〃 3H-7
6-4	90	34	B8-6	4.5	9.5	570	630	〃 6-4
7H4B	90	34	B8-6	4	9	760	840	〃 7H4B
B-37	96	30	A4-5	27	47	135	165	—
BL30/100	150	52	H17S	70	130	285	315	—
BL60/20	150	52	H17S	10	30	570	630	—
BL128/19	150	52	A4-9	12	26	1 240	1 320	—
BL160/12	120	34	B8-6	8	16	1 450	1 750	—

* pin-2 to pin-5 ** pin-5 to pin-7

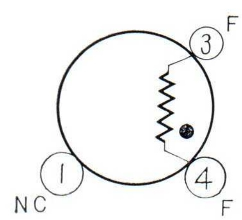
BOTTOM VIEW OF BASE



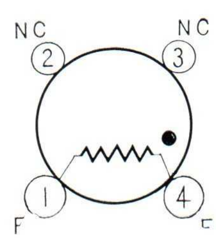
3-16 BL30/100
3H-7 BL60/20
6-4 BL160/12
7H4B



3H-1-7



B-37



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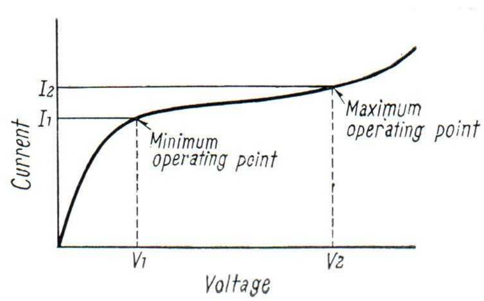
VOLTAGE - CURRENT CHARACTERISTIC CURVE OF CURRENT REGULATOR TUBE



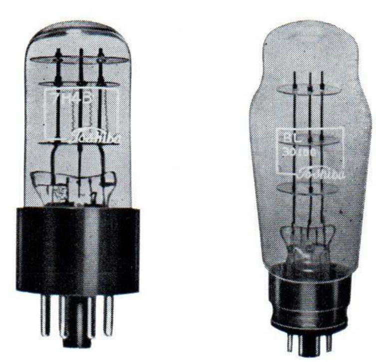
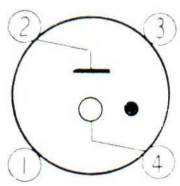


Fig. 2

GEIGER MUELLER TUBES

Type	Base	Overall Dimensions		Thickness Mica or Wall	Operating Voltage	Static			Connection
		Overall Max. (mm)	Max. Dia. Max. (mm)	(mg/cm²)	(V)	Plateau (V)	Plateau Plope Max.	Natural Count Max. (C/M)	
GH-B-3	A4-9	104	35	2.5	1 150±115	Operating voltage ±5%	10%/100V	50	I
GM-B-4	A4-9	104	35	3.5	1 150±115	〃	〃	〃	I
GM-B-5	A4-9	104	35	1.9 Max.	1 150±115	〃	〃	〃	I
GM-G-1	A4-9	104	35	—	1 150±115	〃	〃	〃	I
GM-X-1	A4-9	157	32	3.5	1 300±130	200 Min.	10%/100V	〃	I
GMH-B-1	S15-1	83	33	3.5	300±20	30 Min.	3%/10V	60	II
GMH-G-1	S15-1	83	33	—	300±20	30 Min.	3%/10V	〃	II



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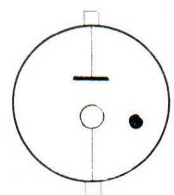


(II)

MERCURY-POOL

Toshiba Mercury-pool Arc Rectifier tubes are glass rectifier tubes utilizing the valve action of mercury-arc, and have been widely used with excellent results as a means of rectifying AC to DC such as in electric railways, chemical industries, for projecting moving pictures and other arc sources, charging storage batteries, etc.

Types and ratings of the mercury-pool arc rectifier tubes

The types, ratings and dimensions are enumerated in Table 2. In the designation of types, the first letters, M stands for a mercury-arc rectifier tube, the following figure on the second column indicates the number of main anodes, and the letter on the third column the rated rectified voltage, namely L stands for 75 V, M for 250 V, and H for 600 V. The last figure designates the rated rectified current. Those with controlled grids have G inserted between the figure on the second column and the letter on the third, and those with E3 following the last figure are provided with three exciting electrodes. Those having C on the third column are of such design that they can be used in common for two projectors to supply current for projection by changing-over from one projector to the other.

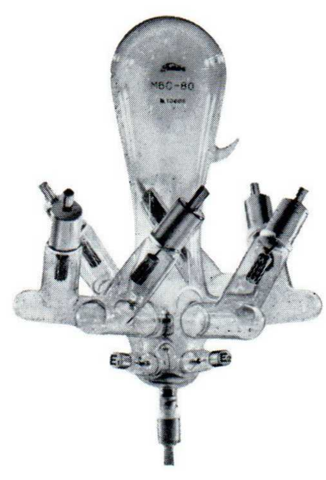
Outstanding features of the mercury-pool arc rectifier tubes

They have invariable the following characteristics:

1. High efficiency, high stability under light load current.
2. Small in size, large in current capacity.
3. They have no fear of causing arc-back and there is no necessity of the safety apparatus against it.

Specification / Type	Rectifying Method	Output		Cooling Method	Exciting		Magnetic Coil	
		Voltage (V)	Current (A)		Voltage (V)	Current (A)	Voltage (V)	Current (A)
M2M-20	Single phase full wave	250	20	Natural cooled	50~65	4~6	32~40 (A C)	0.8~1.0
〃 30	〃	〃	30	〃	〃	〃	〃	〃
〃 50	〃	〃	50	Forced air-cooled	〃	〃	〃	〃
M3M-20	3-phase half wave	〃	20	Natural cooled	〃	〃	〃	〃
〃 30	〃	〃	30	〃	〃	〃	〃	〃
〃 50	〃	〃	50	Forced air-cooled	〃	5~6	〃	〃
〃 75	〃	〃	75	〃	〃	〃	〃	〃
〃 100	〃	〃	100	〃	〃	〃	〃	〃
M3GM-30E₃	〃	〃	30	Natural cooled	60~70	〃	〃	〃
〃 50E₃	〃	〃	50	Forced air-cooled	〃	〃	〃	〃
〃 75E₃	〃	〃	75	〃	〃	〃	〃	〃
M6M-100	6-phase half wave	〃	100	〃	50~65	〃	〃	〃
M6C-80	(3-phase, half wave)×2	〃	80	〃	〃	〃	〃	〃

Note: (1) Exciting current: The total rectified current by through exciting electrode.
(2) Degree of grid control: This is the value when the output current is maintained at the rated value under a resistance load.
(3) Arc voltage: This value is measured by the rectification method.

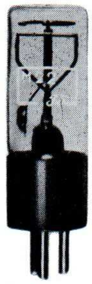


M6C-80

RECTIFIER TUBES

Ignition Current (A)	Overall Dimensions		Arc Voltage Max. (V)	Wall Temperature (on the tube top) Max. (°C)	Allowable Overload		Grid Control	Ambient Temperature (°C)	Application		Equivalent Tube	Toshiba Rectifier in Use
	Total Length Max. (mm)	Max. Width Max. (mm)										
1.0	430	330	19	100	300%	5 sec.	—	10~40	For battery	For DC source	MR1-H-20SL	
〃	490	415	〃	105	〃	〃	—	〃	〃	〃	〃 30SL	MF1/240/30
〃	580	430	〃	65	〃	〃	—	〃	〃	〃	〃 50SL	
〃	430	300	18	100	〃	〃	—	〃	〃	〃	MR3-H-20SL	
〃	490	330	19	105	200%	5 sec.	—	〃	〃	〃	〃 30SL	
〃	580	360	〃	65	〃	〃	—	〃	〃	〃	〃 50SL	M3F/240/50 MV3/120/50
〃	640	460	〃	80	〃	〃	—	〃	〃	〃	〃 75SL	MV3/120/75
〃	720	485	21	85	300%	5 sec.	—	〃	〃	〃	〃 100SL	MV3/120/100
〃	580	355	20	95	200%	5 sec.	Up to 40%	〃	〃	〃	MRG3-H-30E3-SL	MG3/160/30
〃	580	450	21	65	〃	〃	〃	〃	〃	〃	〃 50E3-SL	MG3/160/50
〃	720	475	〃	70	〃	〃	〃	〃	〃	〃	〃 75E3-SL	MG3/160/75
〃	720	465	〃	85	〃	〃	—	〃	〃	〃	MR6-H-100SL	
〃	720	480	〃	70	300%	5 sec.	—	〃	For picture	For projection	MR3C-75SL	Projection 3/55/75A Projection 3/55/80B

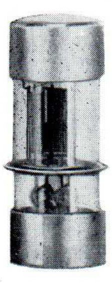
PHOTO



PT-17-V2

PT-25-G2

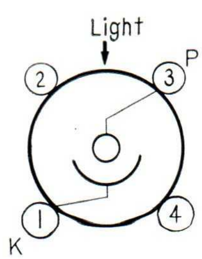
PS-50-V



20C-S3

930

Toshiba Type	CES Type	Equivalent Tube	Kind	Kind of Cathode	Max. Length (mm)	Max. Dia. (mm)	Height from the Bottom of Base to Cathode Center (mm)	Area of Window (mm)	Sensitivity (A/lm) Min.	Anode Voltage (V) Max.
PT-17-G1	17A-S2	RCA-927	Gas filled	Ag-Cs	61	18.5	38	10×15	75	90
PT-17-V1	17A-S1	—	Vacuum	〃	〃	〃	〃	〃	15	250
PT-17-V2	17B-S1	—	〃	〃	73	〃	〃	〃	〃	〃
7209A	—	PS-17-V1 CES17A-S3	〃	Sb-Cs	61	〃	37	〃	12	〃
1P40	—	RCA-1P40	Gas filled	Ag-Cs	78	33	41	16×21	80	90
PT-25-G1	25B-S2A	—	〃	〃	93	30	53	15×22	120	〃
PT-25-G2	25C-S2	RCA-918	〃	〃	103	〃	63	〃	〃	〃
PT-25-V	25B-S1	—	Vacuum	〃	93	〃	53	〃	25	250
PT-25-V1	25A-S1	—	〃	〃	104	〃	〃	〃	〃	〃
7211	—	PS-25-V1 CES-25A-S3	〃	Sb-Cs	〃	〃	50	15×29	〃	〃
25H-S4	30B-S4	PS-25-G 7212	Gas filled	〃	93	〃	〃	〃	70	90
930	—	RCA-930	〃	Ag-Cs	78	33	41	16×21	80	〃
PG-50-G	50B-S2	—	〃	〃	93	51	50	40	〃	〃
PL-50-V	50A-S1	—	Vacuum	〃	100	〃	57	〃	25	250
PS-50-V	50A-S3	—	〃	Sb-Cs	〃	〃	〃	〃	〃	〃
20C-S3	20C-S3	7208	〃	〃	63	26.5	35	10×15	8	—
PSV-50Y	20C-S3	—	〃	〃	141	51	89	50	1.3×10^{-1}	250
M7224	17D-S4	—	Gas filled	〃	61	18.5	41	11	40	90



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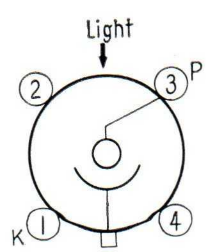

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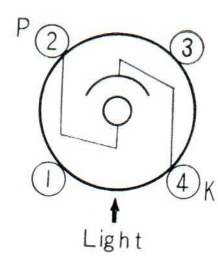
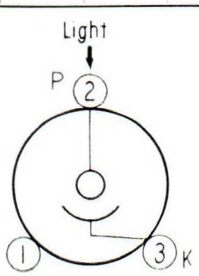


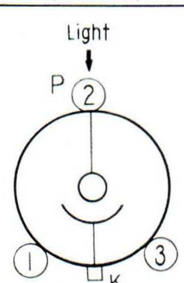
C

TUBES

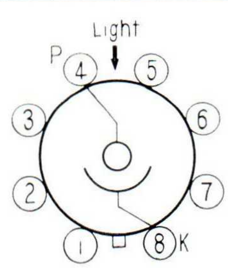
Max. Permissible Current (μA)	Dark Current (μA) Max.	Gas Amplification I p at 90V / I p at 25V Max.	Ambient Temperature (°C) Max.	Capacity Between electrokes (pF)	Base	Socket	Top Base	Connection	Application	Remarks	Toshiba Type
2	0.1	10	50	4	3C	Special	—	D	For sound reproduction of 16mm talkie record. For small relays.		PT-17-G1
〃	0.1	—	〃	〃	〃	〃	—	〃	For photoelectric thermometers, small measuring instruments, infra-red ray measurement, (Toshiba color filter IR-D1 used) colorimeter and other general measurement.		PT-17-V1
〃	0.01	—	〃	〃	〃	〃	1A-A1	E			PT-17-V2
〃	0.1	—	〃	〃	〃	〃	—	D	For measurement of vision sensitivity (Toshiba filter V-A1 to be used in combination with this). For measurement in the neighbor of 4,000Å		7209A
3	0.005	10	〃	3	8GB	US	—	F	For autalarm, photo relays.		1P40
〃	0.1	7.5	〃	4	4C	UX	—	A	For sound reproduction of 16mm, 35mm talkie records. For relays autalarm and calculating machines.		PT-25-G1
〃	〃	〃	〃	〃	4H	〃	—	C	For sound reproducing of 35 mm talkie records.		PT-25-G2
〃	0.1	—	〃	〃	4C	〃	—	A	For photoelectric thermometer, small measuring instruments, infra-red ray measurement (Toshiba filter IR-D1 used) colorimeter and other general measurement.		PT-25-V
〃	0.01	—	〃	〃	〃	〃	1A-A1	B			PT-25-V1
〃	〃	—	〃	〃	〃	〃	—	〃	For measurement of vision sensitivity (Toshiba color filter V-A1 to be used in combination with this).		7211
〃	0.1	5.5	〃	〃	〃	〃	—	A	For facsimile transmission.		25H-S4
〃	〃	8.5	〃	3	8GB	US	—	F	For sound reproducing 16 mm talkie records.		930
10	〃	7.5	〃	7.5	4C	UX	—	A	For sound reprocucing 16 mm talkie records. For photorelays such as autalarm machine, etc.		PG-50-G
〃	0.01	—	〃	〃	〃	〃	1A-A1	B	For autalarm photo reloys.		PL-50-V
〃	〃	—	〃	〃	〃	〃	〃	〃	For measurement of vision sensitivity (Toshiba color filter V-A1 used) color comparison meters, illumination photometers, autoray (outdoor service).		PS-50-V
2	0.002	—	〃	3	Special	Special	Special	G	For facsimile transmission.	Differential two electrode type.	20C-S3
—	—	—	〃	7.5	4C	UX	1A-A1	B	For measuring visible rays up to ultra-violet rays. For measuring the output ultura-violet rays of the germicidal light.	* the value of the photoelectric current expressed in μA when the ultra-violet rays of unit intensity (1 A/cm²) is directed to the whole surface of the cathode.	PSV-50Y
1	0.1	8.5	〃	3	3C	Special	—	D	For relay application.	End type (head-on operation)	M7224



D



E



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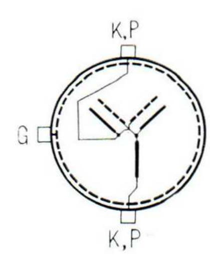


G

MULTIPLIER

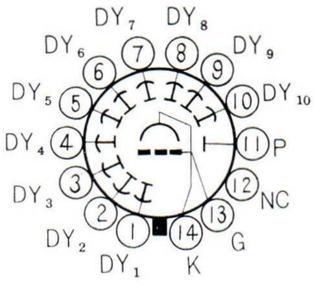
Toshiba Type	Equivalent Tube	Kind	Kind of Photo Cathode	Kind of Secondary Emission Surface	Max. Length (mm)	Max. Diameter (mm)	Height from the Bottom of Base to Cathode Center (mm)	Area of Window (Min.) (mm)	Sensitivity (Nominal)	
									Cathode (A/lm)	Anode (A/ lm)
MS-9S	RCA-931-A	High vacuum	Sb-Cs	Sb-Cs	94	34	49	8×24	20	20
MS-9SY	RCA-1P28	〃	〃	〃	〃	〃	〃	〃	20	20
7305	RCA-1P22	〃	Bi-Cs	〃	〃	〃	〃	〃	3	0.6
7309	(Like Du Mont 6292 or Du Mont 7064 or EMI 9536B)	〃	Semitrans-parent Sb-Cs	〃	148	57.5	124	40φ	50	25

MS-9S

7309

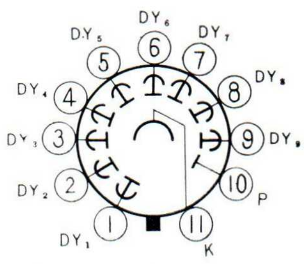
PHOTOTUBES

Anode Voltage Nominal (V)	Anode Voltage Maximum (V)	Max. Permissible Current (mA)	Dark Current (Anode) (Max.) (μA)	Ambient Tempra-ture (Max. °C)	Capacity between Last Dynode to Anode (pF)	Base	Base Connec-tion	Application	Toshiba Type
1 000 Divided per stage 1/10	1 250	0.1	0.2	50	4.3	Small-shell submagnal 11-pin	A	For X-ray exposure control and for general applications involving low light levels.	MS-9S
〃	〃	〃	〃	〃	〃	〃	〃	For applications involving very low ultraviolet radiation level.	MS-9SY
〃	〃	〃	0.25	〃	〃	〃	〃	For measuring response similar to that of eye. Especially useful in colorimetry.	7305
1 250 Divided Ek-dy1 1/6, E others 1/12	1 500	0.75	0.05	〃	1.3	Medium-shell diheptal 14-pin	B	For scintillation spectrometer and other application involving low-level large-area light source.	7309



Direction of Light: Into end of bulb

A



Direction of Light:

B

CHARACTERISTIC CURVES OF PHOTOTUBES

Spectral Sensitivity Curve of Ag-Cs Phototube

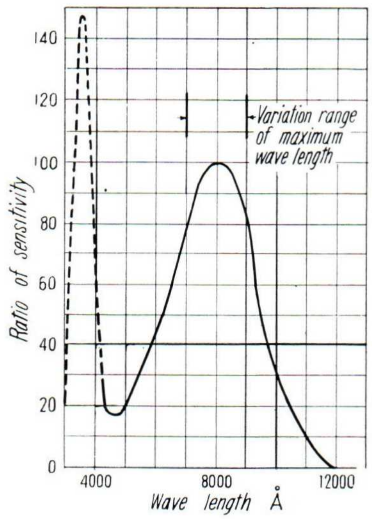


Fig. 3

Anode Voltage-Current Characteristics of Gas-filled Phototube

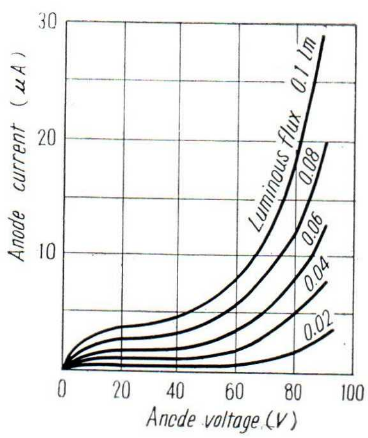


Fig. 6

Anode Voltage-Current Characteristics of Vacuum Type Phototube

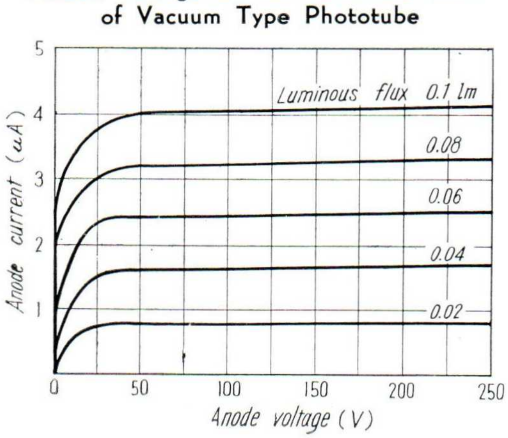


Fig. 8

Radiation Intensity Curve of Light Source & Visibility Curve

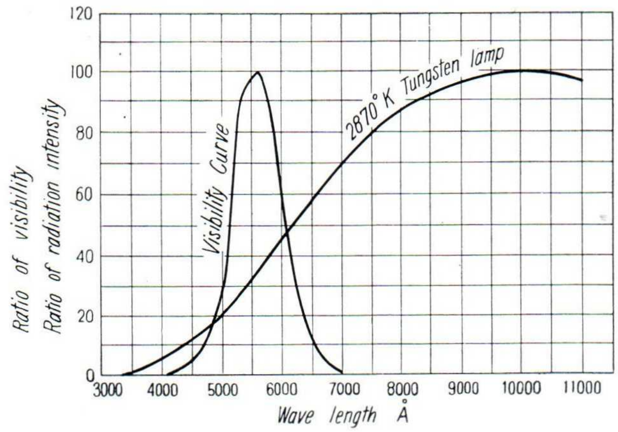


Fig. 4

Spectral Sensitivity Curve of Sb-Cs Phototube

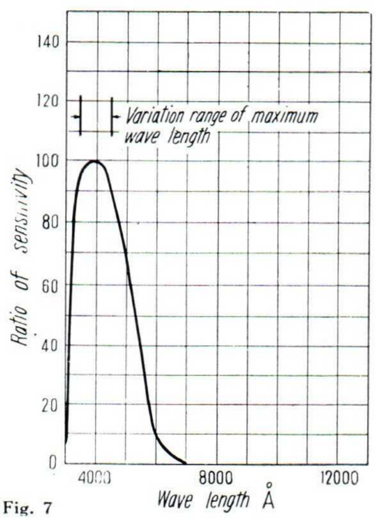


Fig. 7

Spectral Sensitivity Curve of Sb-Cs Phototube for Ultra-violet Rays

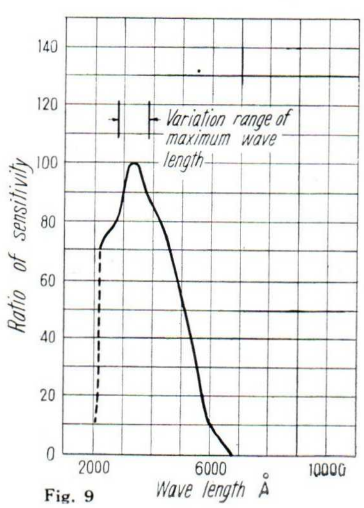


Fig. 9

Relation Between Wave Length and Color

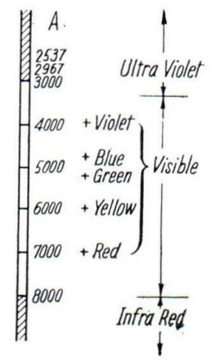


Fig. 5

Anode Voltage-Current Characteristics of 20C-S3 Color Temperature 2870°K

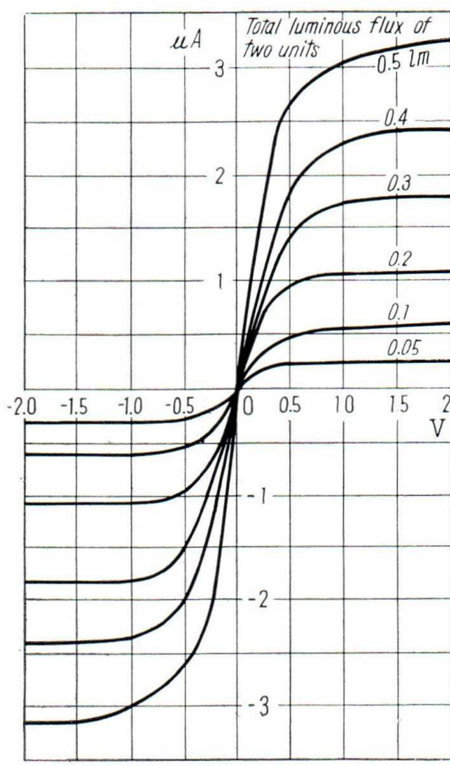


Fig. 10

The curves show the typical characteristics of the wave length-sensitivity characteristics which are plotted with the ratios of sensitivities and maximum sensitivity at Sb−Cs=3400Å for ultraviolet rays, Ag−Cs=8000Å, Sb−Cs=4000Å, vibility curve=566 mμ, 2870°K tungsten lamp of about 1000Å intensity which is taken as 100 when radiation energy of equal intensity is directed.

Since the characteristics of individual photoelectric tubes vary somewhat besides their maximum values varying within the above range, it is necessary that the accurate wave length characteristics of various phototubes should be individually measured.

Typical examples of the anode characterics of phototubes are shown above for vacuum and gas-filled types respectively.

In the gas-filled type, as the voltage exceeds 90 V, photoelectric current increases considerably to become unstable, and further develops to glow discharge which may cause breakdown of the tube. Therefore, great care should be exercised not to let the voltage exceed 90 V even instantaneously.

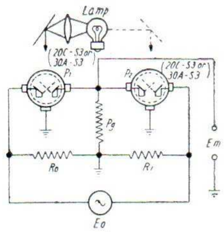


Fig. 11

Typical examples of the anode characteristics of the differential phototubes, 20C-S3, 30A-S3 are shown Fig. 11. It is characteristic of this type that the current saturates at low voltage, and that it does not necessitate DC amplification as shown in the application below, but can effect AC application directly without the use of an intrrupter.

CATHODE-RAY TUBES

Toshiba has been manufacturing cathode-ray tubes with successive improvements in quality since 1924 and now come to cover as many as 100 types including those for observation and television service. The cathode-ray tubes for various observations in this catalog have been designed by the engineering staff of the company which has a long tradition in electronics with the most up-to-date knowledge. They have therefore been enjoying nation-wide reputation as the products of international standard and can be recommended with confidence.

I. CONSTRUCTION AND PERFORMANCE

According to construction and performance, Toshiba Cathode-ray Types for the purpose of observation are roughly divided into four kinds. The performance being different depending on the construction of electron guns, selection of the tube shall be made by taking into account the speed of phenomena to be observed and the required accuracy of measurement; their brief description is being as follows:

(1) Uni-potential Type Cathode-ray Tubes

All the Cathode-ray tubes for observation purpose manufactured by the company are of the type employing uni-potential electron guns. This type is as illustrated in a figure on the bases, the second grid is placed next to the first grid, and connected to the second anode inside tube. Then, the first and the second anodes are made to form an electron beam, which is deflected by deflecting electrodes X and Y. In this type, the presence of the second grid prevents the brightness from changing even if the first anode voltage is regulated for the adjustment of the focus, and makes the bright spot sharp and bright enough to observe high speed phenomena. Since almost no current flows through the first anode for the focus adjustment, the bleeder resistance may be made higher.

(2) Post Deflection Accelerator Type Cathode-ray Tubes

They are designed for the observation and photographing of transient or speedy phenomena, and also for having after-glow.

The construction of electron guns, being of the uni-potential type, is so contrived that, while retaining the deflection sensivity equal to or higher than Cathode-ray tubes for general observation as well as the features mentioned in Item 1, the third anode is provided to make possible the observation of specially high-speed phenomena by giving sufficient brightness to the spot. The one having one set of their anode is termed "one stage post deflection accelerator type" and one with three anodes "three stage post deflection accelerator type." As for Cathode-ray tubes having more than two stage accelerator, care must be taken to divide the voltage, to be impressed between the second anode and the last post acceleration electrode, by equal resistances in applying to each stage.

(3) Two Element Cathode-ray Tubes

Having two electron guns in the same tube, they are intended for the observation of two phenomena. Each electron tube is of the uni-potential type. They are very efficient when applied to the amplifier for observing two phenomena which are impracticable to have accurate or very precise measurement of the matual relation between them.

(4) Cathode-ray Tubes for Radar

Like T.V. receiving tubes, they are of magnetic deflection type employing magnetic or static focussing of the beam. They have a phosphor screen for plane position indication, but they are also fitting for observation requiring after-glow.

(5) These are two kinds of connection for the deflection electrodes; Symmetrical and asymmetrical type.

In 40AB15, types, one side of the deflection electrode is connected to the second anode inside the tube so as to be asymmetrical. Those other than this type are designed to suit the symmetrical, deflection, while the asymmetrical connection generally causes trapezoid distorsion which will dull the spot line.

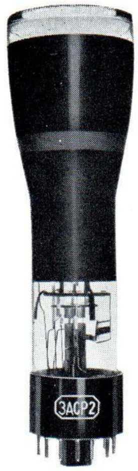
II. FLUORESCENT SCREENS

P1 (B1)......P7 (B7) indicating the property of fluorescent light are meant to indicate as follows:—

Type	Fluorescence and Phosphorescence	Persistence of Phosphorescence
P1 (B1)	Green	Medium
P4 (B4)	White	Medium
P7 (B7)	Blue	Long
P11 (B11)	Blue	Short
P15 (B15)	Bluish green	Specially short

Since the phosphor screen is designed to have such brightness that it enables clear observation with high speed wave form as well as slow repeating one, care should be taken to use these tubes with suitable brightness, as using with undue brightness has a danger of burning the phosphor screen.

CATHODE-RAY TUBES

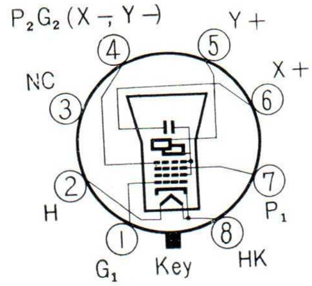


3ACP2

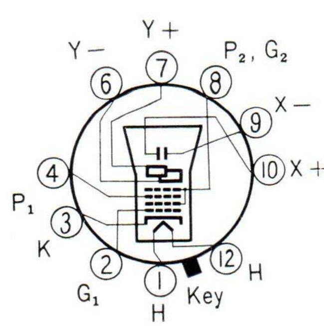
3RP1

5FP7-A

Nomenclature by JIS. or R.T.M.A	Application	Focusing Method	Deflecting Methods	Maximum Dimensions: Over-all Length (mm)	Maximum Dimensions: Envelope Dia. (mm)	Color Fluorescent	Persistence & Color Phosphorescent	Faceplate & Aluminized Screen	Ratings: Heater Voltage Ef (V)	Ratings: Heater Current If (A)	Ratings: Anode No. 3 Voltage Eb3 (V)	Ratings: Anode No. 2 Voltage Eb2 (V)
40A B15	Observation	E	E	150	42	Bluish green	Extremely short	C	6.3	0.6	—	500 Max.
2B P1	Observation	E	E	199	52.6	Green	Medium	C	6.3	0.6	—	2 500 Max.
3A C P1	Observation	E	E	260	78	Green	Medium	C, F	6.3	0.6	6 000 Max.	2 000 Max.
3A C P2	Observation					Blue-green	Long yellow					
3A C P7	Of residual light					Blue	Long yellow					
3A C P11	Photograph					Blue	Shrot					
3A D P1	Observation	E	E	260	78	Green	Medium	C, F	6.3	0.6	6 000 Max.	3 000 Max.
3A D P2	Observation					Blue green	Long green					
3A D P7	Of residual light					Blue	Long yellow					
3A D P11	Photograph					Blue	Short					
3B P1A	Observation	E	E	260	78	Green	Medium	C	6.3	0.6	—	2 200 Max.
3 J P1	Observation	E	E	260	78	Green	Medium	C	6.3	0.6	4 000 Max.	2 000 Max.
3 J P7	Of residual light					Blue	Long yellow					
3 J P11	Photograph					Blue	Short					
3K P1	Observation	E	E	298	78	Green	Medium	C	6.3	0.6	—	2 500 Max.
3K P4	Observation					White	Medium					
3K P7	Of residual light					Blue	Long yellow					
3K P11	Photograph					Blue	Short					
3R P1	Observation	E	E	238	78	Green	Medium	C	6.3	0.6	—	2 500 Max.
3R P7	Of residual light					Blue	Long yellow					
3R P11	Photograph					Blue	Short					



(A)



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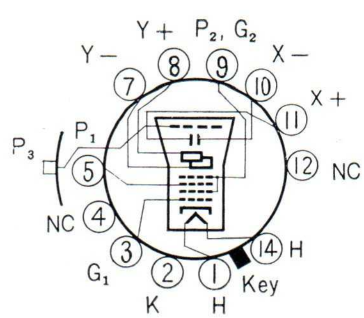
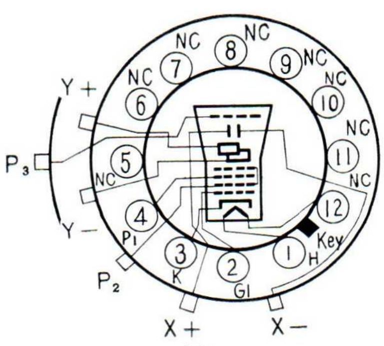


(C)

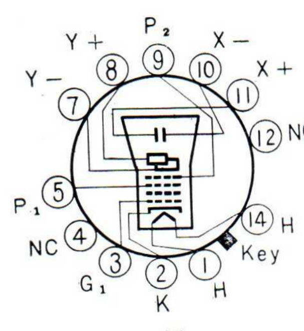
none entered

FOR OBSERVATION (1)

Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage Ec_1 (V)	Deflection Factors X-axis 10^{-3} Vdc/cmEb_2	Deflection Factors Y-axis 10^{-3} Vdc/cmEb_2	Base	Application Example: Anode No. 3 Voltage Eb_3 (V)	Anode No. 2 Voltage Eb_2 (V)	Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage for Visual Cutoff Ec_0 (V)	Minimum Useful Screen Dia. (mm)	Deflection Factor X-axis Vdc/cm	Deflection Factor Y-axis Vdc/cm	Note
Eb_2 × 20%	(500 Max.)	Normally negative	110	105	Octal 8-pin (A)	—	250 350	35~75 47~107	(250) (350)	-50~0 -70~0	32	less than38 〃 54	less then36 〃 51	
Eb_2 × 15~28%	(2 500 Max.)	〃	45.3~61.1	29.1~39.4	Duodical 10-pin (B)	—	1 000 2 000	150~280 300~560	(1 000) (2 000)	-67.5~0 -135~0	44	45.3~61.1 90.6~122.2	29.1~39.4 58.2~78.8	
Eb_2 × 19.5~34.5%	(2 000 Max.)	〃	△ 35.5~43.5	△ 26.2~32.1	Diheptal 12-pin (C) recessed small ball cap	4 000	2 000	390~690	(2 000)	-45~-75	69	71~87	52.4~64.2	△: Eb_3=Eb_2 Post-deflection accerelation
Eb_2 × 16~23.5%	(13 000 Max.)	Normally negative	△ 21.6~24.5	△ 9.6~11.1	Duodceal 12-pin (D) recessed small ball cap	4 000	2 000	320~470	(2 000)	-52~-87	*52 **38	55.0~61.0	24.0~26.8	△: Eb_3=2Eb_2 Post-deflection accerelation *X-axis **Y-axis
Eb_2 × 20~34.4%	(2 200 Max.)	〃	31.6~42.5	23.2~35	Diheptal 12-pin (C)	—	1 500 2 000	300~515 400~688	(1 500) (2 000)	22.5~-67.5 -30~-90	60	47.4~63.7 73.2~83.0	34.8~52.5 46.4~70.0	
Eb_2 × 20~34.5%	(2 000 Max.)	〃	△ 33.5~45.2	△ 24.6~33.5	Diheptal 12-pin (C)	2 000 3 000 4 000	2 000 1 500 2 000	400~690 300~515 400~690	(2 000) (1 000) (2 000)	-30~-90 -22.5~-67.5 -30~-90	69	53.6~72.4 50.0~68.1 67.0~90.5	39.4~53.5 37.0~50.3 49.3~66.9	△: Eb_3=Eb_2 Post-deflection acceleration
Eb_2 × 16~30%	(2 500 Max.)	〃	19.6~26.8	14.9~20.5	Magnal 11-pin (F)	—	1 000 2 000	160~300 320~600	(1 000) (2 000)	-45~0 -90~0	69	19.6~26.8 39.3~53.6	14.9~20.5 29.5~41.0	2 000V is recommended for Eb_2 of 3KP7
Eb_2 × 16.5~31%	(2 500 Max.)	〃	28.8~38.9	20.5~27.5	Duodical 10-pin (B)	—	1 000 2 000	165~310 330~620	(1 000) (2 000)	-67.5~0 -135~0	69	28.8~38.9 57.5~78.0	20.5~27.5 21.0~55.1	



(D)



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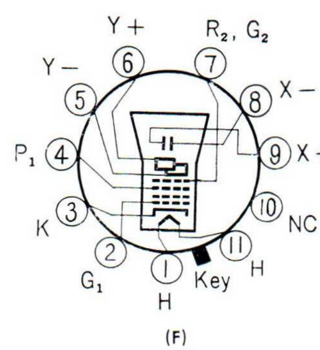

(F)

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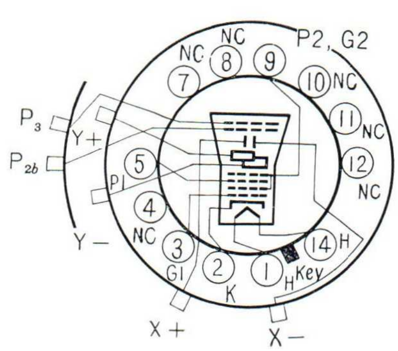
CATHODE-RAY TUBES

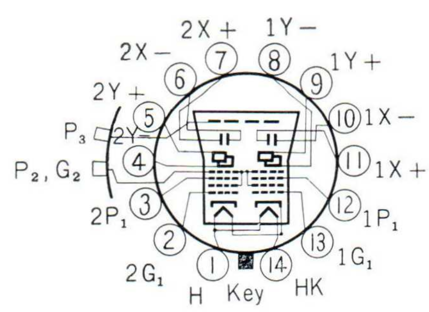
130SB1

5ABP7

Nomenclature by JIS or R.T.M.A	Application	Focusing Method	Deflecting Method	Muximum Dimensions: Over-all Length (mm)	Muximum Dimensions: Enve-lope Dia. (mm)	Fluores-cent	Persist-ence & Phospho-rescent	Faceplate & Aluminized Screen	Ratings: Heater Voltage Ef (V)	Ratings: Heater Current If (A)	Ratings: Anode No. 3 Voltage Eb_3 (V)	Ratings: Anode No. 2 Voltage Eb_2 (V)
3RP1A	Observation	E	E	238	78	Green	Medium	C, F	6.3	0.6	—	2 500 Max.
3RP7A	Of residual light					Blue	Long yellow					
3RP11A	Photogragh					Blue	Short					
130HB1	Observation	E	E	435	136	Green	Medium	C, F	6.3	0.6	6 000 Max.	2 000 Max.
130HB2	Observation					Blue-green	Long					
130HB7	Of residual light					Blue	Long yellow					
130HB11	Photograph					Blue	Short					
130SB1	Observation	E	E	435	136	Green	Medium	C, F	6.3	1.2	6 000 Max.	2 600 Max.
130SB7	Observation two elements					Blue	Long yellow					
130SB11	Observation two elements					Blue	Short					
130TB1	Observation two elements	E	E	435	136	Green	Medium	C, F	6.3	1.2	—	2 500 Max.
130TB7	Observation two elements					Blue	Long yellow					
130TB11	Observation two elements					Blue	Short					
5ABP1	Observation	E	E	435	136	Green	Medium	C, F	6.3	0.6	6 000 Max.	2 600 Max.
5ABP2	Observation					Blue-green	Long					
5ABP7	Of residual light					Blue	Long yellow					
5ABP11	Photograph					Blue	Short					
5BHP1	Observation	E	E	486	136	Green	Medium	C, F, A	6.3	0.6	12 000 Max.	2 000 Max.
5BHP2	Observation					Blue-green	Long green					
5BHP7	Of residual light					Blue	Long yellow					
5BHP11	Photograph					Blue	Short					



(G)

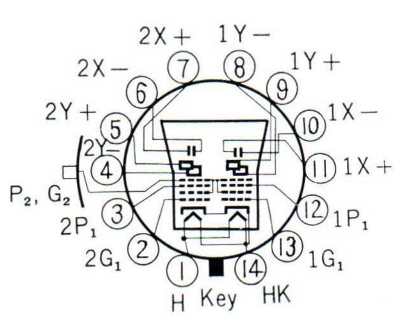


(H)

none entered

FOR OBSERVATION (2)

Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage Ec_1 (V)	Deflection Factors X-axis 10^{-3}Vdc cmEb₂	Deflection Factors Y-axis 10^{-3}Vdc cmEb₂	Base	Application Example: Anode No. 3 Voltage Eb_3 (V)	Anode No. 2 Voltage Eb_2 (V)	Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage for Visual Cutoff Ec_0 (V)	Minimum Useful Screen Dia. (V)	Deflection Factors X-axis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
Eb_2× 16.5~31%	(2 500 Max.)	Normally negative	28.8~38.9	20.5~27.5	Duodical 10-pin (B)	—	1 000 2 000	165~310 330~620	(1 000) (2 000)	-67.5~0 135~0	69	28.8~33.9 57.5~78.0	20.5~27.5 21.0~55.1	
Eb_2× 20~34.5%	(2 600 Max.)	〃	△ 10.5~14.41	△ 7.1~9.4	Diheptal 12-pin (G) recessed small ball cap minuature cap	2 000 3 000 4 000	2 000 1 500 2 000	400~690 300~515 400~690	(2 000) (1 500) (2 000)	-52~-87 -39~-65 -52~-87	116 *116 **100 *116 **100	17.0~22.8 15.8~21.2 20.9~28.3	11.5~15.3 10.7~14.1 14.1~18.8	△: Eb_3=2Eb_2 Post-deflection acceleation *X-axis **Y-axis
Eb_2× 17~32%	(2 600 Max.)	〃	△ 9.10~15.2	△ 9.1~12.2	Diheptal 14-pin (H) recessed small ball cap	3 000 4 000	1 500 2 000	255~480 240~640	(1 500) (2 000)	-67.5 -90	116	20.9~28.8 27.8~38.4	17.3~23.1 22.5~20.8	△: Eb_3=2Eb_2 Tow elements post-deflection acclerations
Eb_2× 17~32%	(2 500 Max.)	〃	11.0~15.2	9.1~12.2	Diheptal 14-pin (I) recessed small ball cap	—	2 000	340~640	(2 000)	-90~0	116	22.0~30.3	18.1~24.4	Tow elements
Eb_2× 20~34.5%	(2 600 Max.)	〃	△ 10.5~14.1	△ 7.1~9.4	Diheptal 12-pin (C) recessed small ball cap	2 000 3 000 4 000	2 000 1 500 2 000	400~690 300~515 400~690	(2 000) (1 500) (2 000)	-52~-87 -39~-65 -52~-87	116 *116 **100 *116 **100	17.0~22.8 15.8~21.2 20.9~28.3	11.5~15.3 10.7~14.1 14.1~18.8	△: Eb_3=2Eb_2 Post-deflection acclerations *X-axis **Y-axis
Eb_2× 10.8~35.3%	(2 000 Max.)	〃			Diheptal 12-pin (J) cavity cap special pin	10 000	1 650	150~590	1 650	-50~-80	*100 ** 40	27.5~33.4	5.90~7.2	Post-deflection accleration *X-axis **Y-axis



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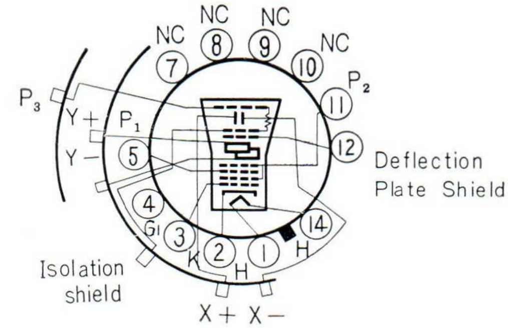


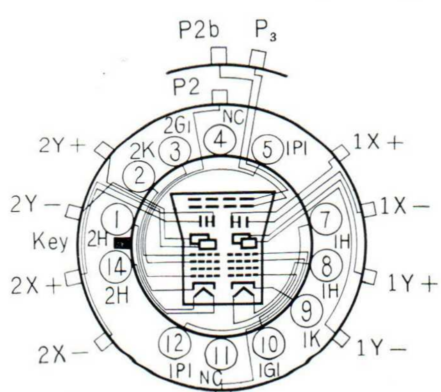
(J)

CATHODE-RAY TUBES

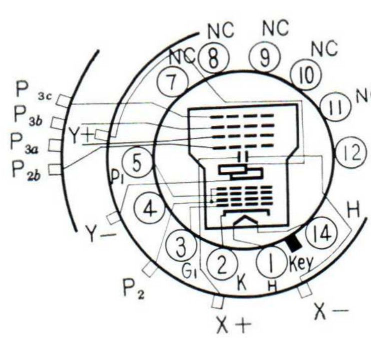
5CP1A

5XP1A

Nomenclature by JIS or R.T.M.A	Application	Focusing Method	Deflecting Method	Muximum Dimensions Over-all Length (mm)	Muximum Dimensions Envelope Dia. (mm)	Color Fluorescent	Persistence & Cclor Phosphorescent	Faceplate & Aluminized Screen	Ratings: Heater Voltage Ef (V)	Ratings: Heater Current If (A)	Ratings: Anode No. 3 Voltage Eb_3 (V)	Ratings: Anode No. 2 Voltage Eb_2 (V)
5CP1A	Observation	E	E	435	136	Green	Medium	C	6.3	0.6	4 000 Max.	2 000 Max.
5CP7A	Of residual light					Blue	Long yellow					
5CP11A	Photograph					Blue	Short					
5UP1	Observation	E	E	385	136	Green	Medium	C	6.3	0.6	—	2 500 Max.
5UP7	Of residual light					Blue	Long yellow					
5UP11	Photograph					Blue	Short					
5SP1A	Observation two elements	E	E	474	136	Green	Medium	C, F	6.3	0.6	7 500 Max.	2 500 Max.
5SP7A						Blue	Long yellow					
5SP11A						Blue	Short					
5XP1A	Observation high speed phenomena	E	E	458	136	Green	Medium	C, F	6.3	0.6	25 000 Max.	3 650 Max.
5XP2A						Blue-green	Long					
5XP7A						Blue	Long yellow					
5XP11A						Blue	Short					
5XP1B	Observation high speed phenomena	E	E	458	136	Green	Medium	C, F, A	6.3	0.6	25 500 Max. 5 000 Min.	3 650 Max.
5XP2B						Blue-green	Long					
5XP7B						Blue	Long yellow					
5XP11B						Blue	Short					
7VP1	Observation	E	E	378	181	Green	Medium	C	6.3	0.6	—	4 000 Max.
7VP7	Of residual light					Blue	Long yellow					
7VP11	Photograph					Blue	Short					
7115	Photographing high speed	E	E	430	130	Blue	Short	C, F, A	2.5	1.6	—	10 000 Max.



(K)

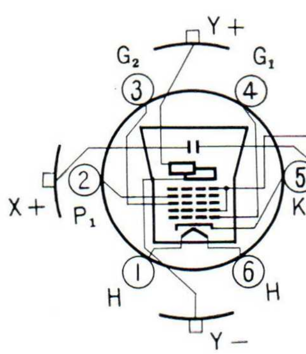


(L)

none entered

FOR OBSERVATION (3)

Anode No. 1 Voltage Eb_1 (V)	Greed No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage Ec_1 (V)	Deflection Factors X-axis 10^{-3}Vdc cmEb_2	Deflection Factors Y-axis 10^{-3}Vdc cmEb_2	Base	Application Example: Anode No. 3 Voltage Eb_2 (V)	Anode No. 2 Voltage Eb_2 (V)	Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage for Visual Cutoff Ec_0 (V)	Minimum Useful Screen Dia. (V)	Deflection Factors X-axis Vdc cm	Deflection Factors Y-axis Vdc cm	Note
Eb_2× 18.7~ 34.5%	(2 500 Max.)	〃	△ 15.4~20.8	△ 13.0~17.7	Diheptal 12-pin (C) recessed small ball cap	2 000 3 000 4 000	2 000 1 500 2 000	375~690 280~515 375~690	(2 000) (1 500) (2 000)	-30~-90 -22.5~-67.5 -30~-90	114	24.4~33.0 23.3~31.4 30.7~41.7	21.3~29.1 19.7~26.7 26.0~35.4	△: $Eb_3=2Eb_2$ Post-deflectoin acceleration
Eb_2× 17~32%	(2 500 Max.)	〃	11.0~15.2	9.1~12.2	Duodecal 10-pin (B)	—	1 000 2 000	170~320 240~640	(1 000) (2 000)	-45~0 -90~0	114	11.0~15.2 22.0~30.3	9.1~12.2 18.1~24.4	2 000V is recommended for Eb_2 of 5UP7 Two elements
Eb_2× 18.1~ 34.8%	(2 500 Max.)	〃	△ 12.8~51.9	△ 11.2~14.0	Diheptal 12-pin (K) resseced small ball cap minuature cap	3 000 4 000	1 500 2 200	272~521 363~695	(1 500) (2 000)	-56~-34 -75~-45	116	24.4~29.9 32.6~39.8	20.8~25.6 27.5~22.9	△: $Eb_3=2Eb_2$ △: Each gun Post-deflectoin acceleration
Eb_2× 18.1~ 34.8%	(3 650 Max.)	〃	△ 16.2~18.9	△ 5.3~6.4	Diheptal 12-pin (L) recessed minuature ball cap	6 000 8 000 10 000	2 000 2 000 2 000	362~695 362~695 362~695	(2 000) (2 000) (2 000)	-45~-75 -45~-75 -45~-75	*108**55 *108**50 *108**44.4	38.6~47.1 42.8~52.4 46.5~57.0	12.5~14.9 13.8~16.4 15.2~18.1	△: $Eb_3=2Eb_2$ *X-axis **Y-axis Post-deflection acceleration
Eb_2× 18.1~ 34.5%	(3 650 Max.)	〃	△ 16.2~18.9	△ 5.3~6.4	Diheptal 12-pin (L) recessed minuature cap	6 000 8 000 10 000	2 000 2 000 2 000	362~695 362~695 362~695	(2 000) (2 000) (2 000)	-45~-75 -45~-75 -45~-75	*108**55 *108**50 *108**44.4	38.6~47.1 42.8~52.4 46.5~57.0	12.5~14.9 13.8~16.4 15.2~18.1	△: $Eb_3=2Eb_2$ *X-axis **Y-axis Post-deflection acceleration
Eb_2× 27~40%	(4 000 Max.)	Normally negative	12.2~16.1	9.9~13.3	Diheptal 12-pin (E)	—	1 500 3 000	400~600 800~1 200	(1 500) (3 000)	-42~0 -82~0	150	18.5~24.4 36.7~48.4	15.0~20.0 29.6~40.1	
Eb_2× 15~25%	450 Max.	〃	10.3~16.5	9.4~14.3	JIS 6A-12 (M) C1-1	—	5 000 10 000	750~250 1 500~2 500	250 250	-30~-90 -30~-90		51.5~77.5 103~155	47.0~71.5 94~413	



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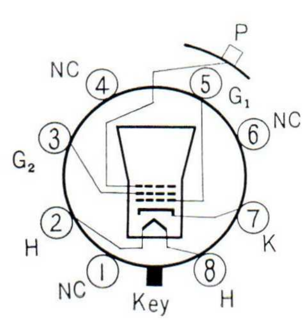

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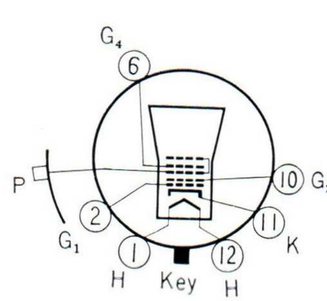


(O)

none entered

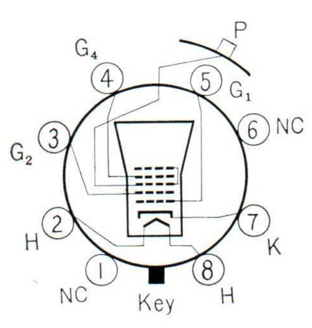
CATHODE-RAY TUBES

10SP4

12SP7B

Nomenclature by JIS or R.T.M.A	Application	Ratings									
		Focusing Method	Deflecting Method	Maximum Dimensions		Fluorescent	Persistence & Phosphorescent	Faceplate & Aluminized Screen	Heater		Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)
				Over-all Length (mm)	Envelope Dia. (mm)				Voltage Ef (V)	Current If (A)		
5AHP7A	For radar	E	M	298	128	Blue	Long yellow	C. F. A	6.3	0.6	—	10 000 Max.
5FP7A	For radar	M	M	293	128	Blue	Long yellow	G F C	6.3	0.6		8 000 Max.
7ABP7	For radar	E	M	347	186	Blue	Long yellow	G C. F	6.3	0.6	—	10 000 Max.
7ABP7A	For radar	E	M	347	186	Blue	Long yellow	G F C. A	6.3	0.6		10 000 Max.
7BP7A	For radar	M	M	347	177	Blue	Long yellow	G F C	6.3	0.6	—	8 000 Max.
7MP7	For radar	M	M	334	186	Blue	Long yellow	G F C	6.3	0.6	—	8 000 Max.
7MP7(M)	For radar	M	M	334	186	Blue	Long yellow	F G/C A	6.3	0.6	—	8 000 Max.
10KP7	For radar	M	M	458	270	Blue	Long yellow	G F C	6.3	0.6	—	10 000 Max.
10KP7(M)	For radar	M	M	458	270	Blue	Long yellow	F G/C A	6.3	0.6	—	10 000 Max.
10WP7A	For radar	E	M	440	270	Blue	Long yellow	F G/C A	6.3	0.6	—	12 000 Max.
12DP7A	For radar	M	M	508	310	Blue	Long yellow	F C	6.3	0.6	—	10 000 Max.
12DP7A(M)	For radar	M	M	508	310	Blue	Long yellow	F. G. A C	6.3	0.6	—	10 000 Max.
12SP7B	For radar	M	M	486	319	Blue	Long yellow	F. G. A C	6.3	0.6	—	10 000 Max.
5FP4A(M)	For monitor	M	M	293	128	White	Medium	F. G. A C	6.3	0.6	—	800 Max.
7TP4	For monitor	E	M	343	186	White	Medium	F. G. A C	6.3	0.6	—	12 000 Max.
10FP4A	For monitor	M	M	448	267	White	Medium	F. G. A C	6.3	0.6	—	12 000 Max.
10SP4	For monitor	E	M	433	267	White	Medium	F. G. A	6.3	0.6	—	14 000 Max.
12KP4A	For monitor	M	M	448	316	White	Medium	F. G. A	6.3	0.6	—	11 000 Max.
5ZP16	For F.S.S.	E	M	365	127	Violet	Extremely short	F. C. A	6.3	0.6	—	27 000 Max.
5AUP24	For F.S.S.	E	M	317	127	Blue-green	Extremely short	F. C. A	6.3	0.6	—	27 000 Max.
10NP11	For transcriber	M	M	450	270	Blue	Short	F. C. A	6.3	0.6	—	25 000 Max.

A: Aluminized soften E: Electrostatic M: Magnetic F: Flatface C: Clean glass G: Grey filter glass



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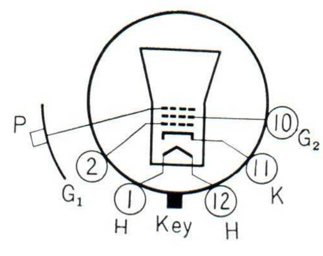

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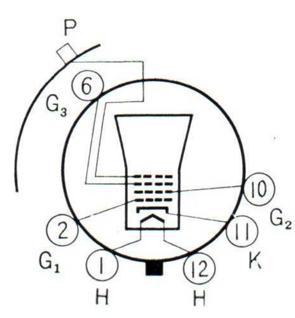

(R)

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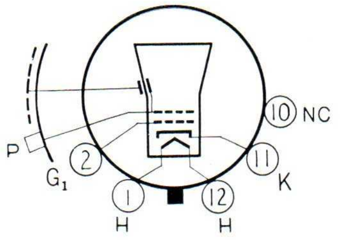
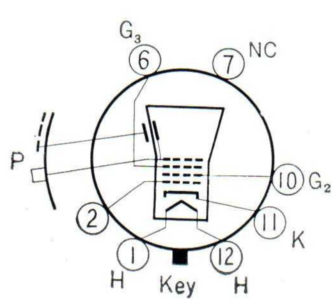
FOR OBSERVATION (4)

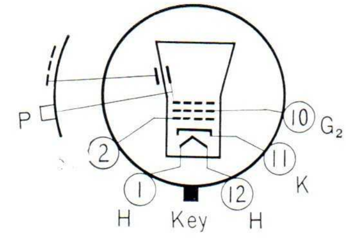
Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage Ec_1 (V)	Deflection Factors X-axis 10^{-3}Vdc $cmEb_2$	Deflection Factors Y-axis 10^{-3}Vdc $cmEb_2$	Base	Application Example: Anode No. 3 Voltage Eb_3 (V)	Anode No. 2 Voltage Eb_2 (V)	Anode No. 1 Voltage Eb_1 (V)	Grid No. 2 Voltage Ec_2 (V)	Grid No. 1 Voltage for Visual Cutoff Ec_0 (V)	Minimum Useful Screen Dia. (V)	Deflection Fuctors X-axis 10^{-3}Vdc $cmEb_2$	Deflection Fuctors Y-axis 10^{-3}Vdc $cmEb_2$	Note
1 000 Max.	700 Max.	〃	—	—	Octal (P) 8-pin recessed small ball cap	—	7 000	0~250	300	-33~-77	108			
—	700 Max.	〃	—	—	Octal 8-pin (N) recessed small ball cap	—	4 000	0~250	250	-25~-70	108	—	—	
—	700 Max.	〃	—	—	Duodical 6-pin (O) cavity cap	—	7 000	0~250	300	-28~-72	152	—	—	
—	700 Max.	〃	—	—	Duodical 6-pin (O) cavity cap	—	7 000	—	300	-28~-72	152	—	—	
—	700 Max.	〃	—	—	Octal 8-pin (N) cavity cap	—	7 000 4 000	—	250 250	-25~-70 -25~-70	152	—	—	
—	700 Max.	〃	—	—	Duodical 5-pin (Q) cavity cap	—	4 000 7 000	—	250 250	-27~-63 -27~-63	152	—	—	
—	700 Max.	〃	—	—	Duodical 5-pin (Q) cavity cap	—	4 000 7 000	—	250 250	-27~-63 -27~-63	152	—	—	
—	700 Max.	〃	—	—	Duodical 5-pin (Q) cavity cap	—	7 000 9 000	—	250 250	-27~-63 -27~-63	152	—	—	
—	700 Max.	〃	—	—	Duodical 5-pin (Q) cavity cap	—	7 000 9 000	—	250 250	-27~-63 -27~-63	229	—	—	
—	700 Max.	〃	—	—	Duodical 6-pin (O) Cavity cap	—	10 000	0~300	250	-27~-63	228	—	—	
—	700 Max.	〃	—	—	Octal 8-pin (N) medium cap	—	4 000 7 000	—	250 250	-25~-70 -25~-70	228	—	—	
—	700 Max.	〃	—	—	Octal 8-pin (N) medium cap	—	4 000 7 000	—	250 250	-25~-70 -25~-70	254	—	—	
—	410 Max.	〃	—	—	Duodical 5-pin (Q) cavity cap	—	9 000	—	250	-25~-60	279	—	—	
—	700 Max.	〃	—	—	Octal 8-pin (N) recessed small ball cap	—	6 000	—	250	-25~-70	108	—	—	
2 000 Max.	410 Max.	〃	—	—	Duodical 6-pin (R) cavity cap	—	10 000	1 160~1 580	200	-22~-52	183	—	—	
—	410 Max.	〃	—	—	Duodical 5-pin (S) cavity cap	—	11 000	—	250	-27~-63	232	—	—	
2 700 Max.	410 Max.	〃	—	—	Duodical 6-pin (R) cavity cap	—	12 000	1 400~1 900	200	-22~-52	232	—	—	
—	410 Max.	〃	—	—	Duodical 5-pin (S) cavity cap	—	11 000	—	250	-27~-63	283	—	—	
7 000 Max.	350 Max.	〃	—	—	Duodical 7-pin (T) cavity cap	—	27 000 20 000	6300±12% 7400±12%	200±40%	-70	108	—	—	
6 000 Max.	350 Max.	〃	—	—	Duodical 7-pin (T) cavity cap	—	27 000	4 600~5 800	200	-40~-100	108	—	—	
—	—	〃	—	—	Duodical 5-pin (U) cavity cap	—	18 000	—	—	-65~-125	232	—	—	



(S)



(T)



(U)

none entered

IMAGE ORTHICONS

IMAGE

5820

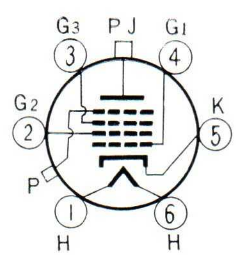
Type	Description	Heater Rating Voltage (V)	Heater Rating Current (A)	Max. Image or Pattern Size (mm)
5820	Image Orthicon: magnetic focus and deflection type. For outdoor and studio pick-up. Featurs high sensitivity and very stable in performance at all incident light levels. 7-pin shoulder base and smmall-shell diheptal 14-pin end base.	6.3	0.6	27.5×36.5

■ Ratio of peak-to-peak high light video-signal current to rms noise current.
● At center of picture.

MONOSCOPES

Type	Description	Heater Rating Voltage (V)	Heater Rating Current (A)	Max. Image or Pattern Size (mm)
7012A	Toshiba 7012A is a monoscope, electrostatic focus and magnetic deflection type with RETMA type pattern. It is recommended for testing video performance of television equipments required high resolution capacity.	6.3	0.6	Pattern size 70.5×94
7012B	Toshiba 7012B is the same as Toshiba 7012A except for the use of Toshiba Standard Pattern, and is suitable for testing video characteristics of television receivers and transmitters.	6.3	6.3	Pattern size 70.5×94

7012A
7012B



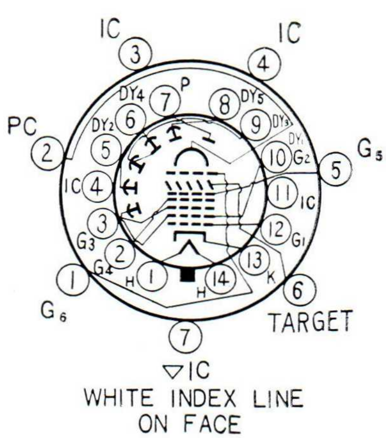
7012A
7012B

AND MONOSCOPES

ORTHICONS

MaX. High Voltage Supply (Volt)	Photo Cathode Spectral Response	Minimum Scene Illumination (Ft-c) With f-2.8 Lens			Resolution Capability Line ●	Signal-to-Noise Ratio Approx. ■	Equivalent Type	Type
		Daylight	Tungsten	Fluorescent				
1350	High blue, high green, good red, no infra-red.	5 to 20	5 to 20	5 to 20	better than 500	35	5820	5820

1500	Resolution capability (with full scanning), 600 lines. Pattern-electrode. Signal current (peak-to-peak), Approx. 0.5 μA.		7012A
1500	Resolution capability (with full scanning), 500 lines. Pattern-electrode Signal current (peak-to-peak), Approx. 0.5 μA.	2F21 Nearly equivalent	7012B



5820

Toshiba

TOKYO SHIBAURA ELECTRIC CO., LTD.

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