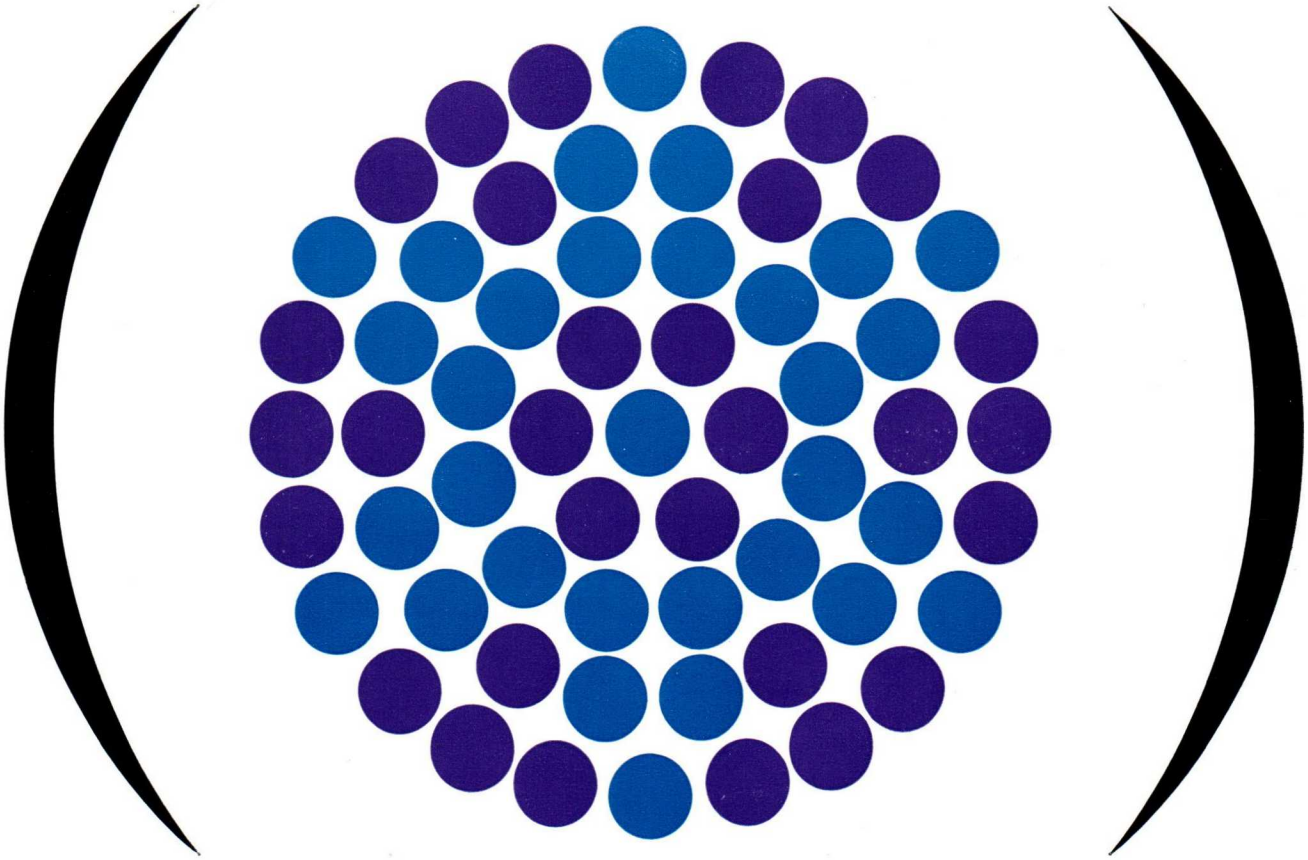
Toshiba
QUALITY SINCE 1875

Special Tubes



TOKYO SHIBAURA ELECTRIC CO., LTD.

CONTENTS

TOSHIBA SPECIAL TUBES

TUNGAR BULBS

The Toshiba Tungar Bulb is used as the rectifying tube for the tungar rectifier which is extensively used for charging batteries or small capacity DC sources. They have the oldest history in Japan, having enjoyed great popularity in application owing to the advantage of operating simplicity and inherent superiority in quality.

Types of Tungar Bulbs

Tungar Bulbs are available in three types: The TN-type filled argon gas, the TH-type filled mercury-vapor and the TS-type filled argan gas and Mercury vapor. Following photographs show external views of Toshiba Tungar Bulbs, and the following table shows their ratings.

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 TN-type Toshiba Tungar Bulb, being of instantaneous heating type, requires no time for pre-heating its cathode and can be loaded simultaneously on ignition of its filaments.

2. High efficiency and excellent rectifying characteristics:

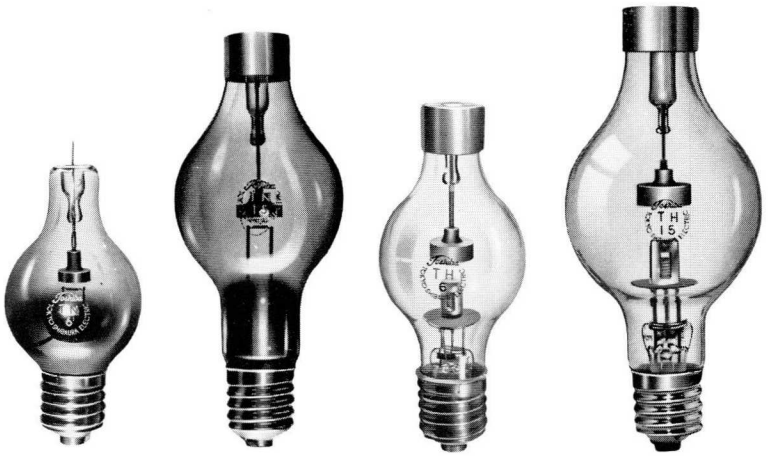
Being designed to make arc discharge at low voltage, they can start discharge at about 18V, and have an extremely small power loss. Since the voltage drop in the tube remains practically constant regard-less ofthe variation of load current, their rectifying characteristics such as voltage regulator, rectified waveforms are also excellent.

3. High uniformity in performance and long life:

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

4. High inverse voltage:

Of the Toshiba Tungar Bulb, TH-type in particular has inverse voltage as high as 700V, which is the highest among tungar bulbs.



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

Application of Tungar Bulbs

They are most adapted to a DC source of medium and small capacity, and tungar rectifiers using these bulbs are extensively 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.

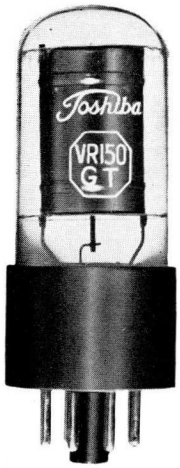
Type	Rated Output		Filament			Starting Voltage		Tube Voltage Drop		Peak Inverse Voltage	Dimensions	
	Voltage (V)	Current (A)	Voltage (V)	Current Approx. (A)	Heating Time Min. (sec.)	Max. (V)	Medium (V)	Max. (V)	Medium (V)	Max. (V)	Overall Length Max. (mm)	Max. Dia. (mm)
TN-2	Half wave 90 Full wave 75	2	1.8	11.0	3	15.0	13.0	10.0	8.0	300	110	55
TN-6	Half wave 90 Full wave 75	6	2.0	15.5	3	18.0	13.0	10.0	8.0	300	175	81
TN-10	Half wave 90 Full wave 75	10	2.1	17.0	3	18.0	13.0	10.0	8.0	300	190	90
TN-15	Half wave 75 Full wave 60	15	2.2	24.5	15	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	3	8.0	5.0	8.0	6.0	70	145	56

TOSHIBA VOLTAGE REGULATOR

The stability of power source voltage is indispensable for the 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 a glow discharge glimmers between electrodes, the voltage between two electrodes can maintain a constant value almost independent of the current within a certain range of discharge current

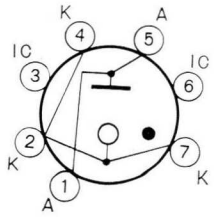
0A2WA

VR150-MT

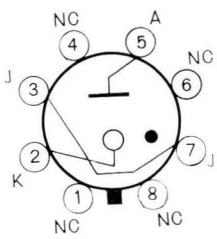


VR150-GT

Type	Dimensions (mm)		Base
	Overall Length Max.	Max. Diameter	
0A2WA	67	19	Miniature button 7-pin E7-1
0B2WA	67	19	Miniature button 7-pin E7-1
0C3W	105	40	Special octal 6-pin
VRA65/80	138	30	Small 4-pin A4-5
VR75-GT	90	34	Small shell octal 8-pin B8-6
VR75-MT	67	19	Miniature button 7-pin E7-1
VR75-ST	108	39	Small shell octal 6-pin B6-3
VR90-GT	90	34	Small shell octal 8-pin B8-6
VR90-MT	67	19	Miniature button 7-pin E7-1
VR90-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
85A2	54	19	Miniature button 7-pin E7-1
5651	54	19	Miniature button 7-pin E7-1



0A2WA
0B2WA
VR75-MT
VR90-MT
VR105-MT
VR150-MT
85A2
5651



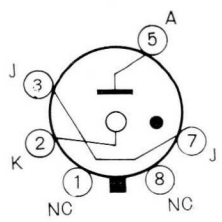
VR75-GT
VR90-GT
VR105-GT
VR150-GT

AND VOLTAGE REFERENCE TUBES

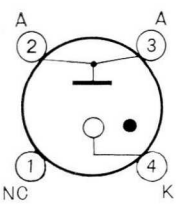
by selecting properly the construction and material of the electrode or the kind and the pressure of filling gas. Because of this characteristic, the voltage regulator tube is operated to keep the constant voltage regardless of variations in load current or power source voltage.

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

Anode Supply Voltage (Vdc) Min.	Voltage Between Electrodes (Vdc)	Operating Current (mAdc)		Regulation (Approx.) (Vdc)	Equivalent Tube (Similar Tube)	Type
		Min.	Max.			
165	150	5	30	2	0A2WA	0A2WA
130	108	5	30	1.5	0B2WA	0B2WA
133	108	5	40	3	0C3W	0C3W
90	65	20	80	4	—	VRA65/80
105	75	5	40	4	(0A3A)	VR75-GT
115	75	5	30	3	0C2	VR75-MT
105	75	5	40	4	0A3	VR75-ST
130	90	5	40	4	(0B3A)	VR90-GT
130	90	5	30	4	—	VR90-MT
130	90	5	30	4	0B3	VR90-ST
130	90	15	50	4	—	VRD90/50
133	108	5	30	3	0B2	VR105-MT
133	108	5	40	3	(0C3A)	VR105-GT
133	108	5	40	3	0C3	VR105-ST
180	135	5	50	4	—	VRA135-T
180	145	5	50	4	—	VRA145-T
180	150	5	30	4	0A2	VR150-MT
185	150	5	40	4	(0D3A)	VR150-GT
185	150	5	40	4	0D3	VR150-ST
125	85	1	10	3	85A2	85A2
115	87	1.5	3.5	2	5651	5651



0C3W
VR75-ST
VR90-3T
VR105-ST
VR150-ST



VRA65/80
VRD90/50
VRA135-T
VRA145-T

COLD CATHODE TRIGGER TUBES

The Toshiba Cold Cathode Trigger Tube is inert-gas filled cold-cathode trigger tube specifically designed for electronic relay and switching service.

Type	Dimensions (mm)		Base	Anode Breakdown Voltage Max. (V)	Grid Starting Voltage (V)	Transfer Current Max. (μA)	Anode Voltage Drop (V)	Peak Cathode Current Max. (mA)	Average Cathode Current Max. (mA)	Equivalent Tube
	Overall Length Max.	Max. Diameter								
0A4-G	108	39	B6-3	225	80	100*	70	100	25	0A4-G
1C21	73	34	B6-8	180	76	50**	73	100	25	1C21
5823	54	19	E7-1	200	80	400*	62	100	25	5823

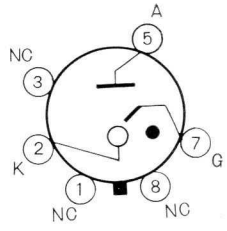
* Anode Voltage=140V dc ** Anode Voltage=100V dc

Type	Dimensions (mm)		Base	Starting Voltage (V)	Anode Supply DC Voltage Min. (Vdc)	Anode Voltage Drop (V)	Peak Foward Anode Voltage (V)	Peak Inverse Anode Voltage (V)	Peak Anode Current (A)	Average Anode Current (mA)	Equivalent Tube
	Overall Length Max.	Max. Diameter									
DR4-GT	85	34	B8-6	550	600	—	600	50	Min. 5	—	
GR11	85	34	B8-6	300	300	—	350	50	Min. 5	—	—
R4410	247	31	A14S	1500	1,800	—	1900	—	—	100	R4410

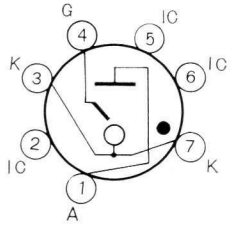
STROBOSCOPIC ARC DISCHARGE TUBES

The Toshiba Stroboscopic Arc Discharge Tube is a cold cathode tetrode filled with neon so as to discharge instantly a condenser through the anode and flash a distinct light of neon red. Its discharge time is of the order $1/10^3$ second and the peak value of its discharge current amounts to 100A. As they can repeat discharge precisely at a regular interval in responese to the control of an oscillator, they are the best adapter to the light source for the stroboscope.

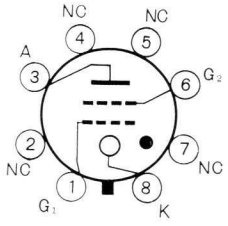
Type	Dimensions (mm)		Peak Anode Foward Voltage (V Max.)	Average Anode Current (mA Max.)	Repetition of the Arc Discharge (PPS Max.)	1st Grid Pulse Voltage (V Min.)	2nd Grid Bias Voltage (V Max.)	Equivalent Tube (Similar Tube)
	Overall Length Max.	Max. Diameter						
SN-4A1	110	30	300	50	250	−200	50	SN-4 631-P1
SN4-GT	85	34	300	50	250	−200	50	(SN-4, 631-P1)



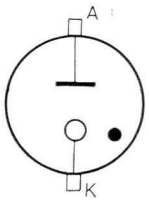
0A4-G
1C21



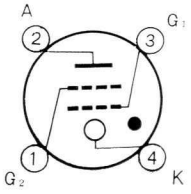
5823



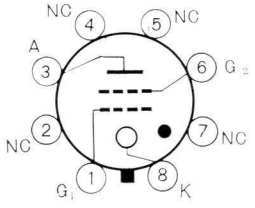
DR4-GT
GR11



R4410



SN-4A1



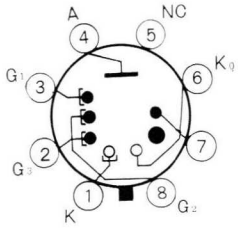
SN4-GT

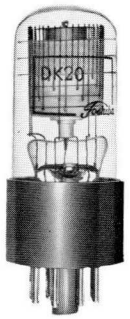
COUNTING TUBES

The Toshiba Counting Tube, DK 20 is a cold single-output single-pulse decade counter tube, which is used for counting out electrical pulses and indicating the state of the count at rates less than 20000 pulses per second.

The Toshiba Counting Tube, DK 21 is a cold 10 output double-pulse decade counter tube, which is used for counting out the addition and substruction of electrical pulses and indicating the state of the count at rates less than 4000 pulses per second.

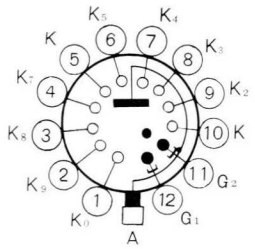
Type	Overall Dimensions		Base	DC Supply Voltage	Voltage drop	Anode DC Current	Pulse Per Second Max.	Pulse duration Min.	Anode Supply DC Voltage	Anode Series Resistance	Signal Voltage	Grid Bias Voltage	Equivalent Tube
	Total Length (mm)	Max. Diameter (mm)		(V)	(V)	(mA)	(pps.)	(μs)	(V)	(k)	(V)	(V)	
DK20	81±2	34	B8-6	430~520	180	0.7~1.2	20,000	25	475±10%	330	−144	60~90	GC10D
DK21	95±3	38	Special	400~550	180~200	0.25~0.55	4,000	80	475±10%	700	−145	18	GS10C





DK20

DK21

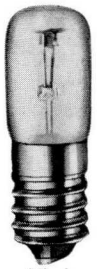


NEON GLOW LAMPS

The Toshiba Neon Glow Lamp is small sized glow discharge tube 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 starting voltage, and as the voltage decreases, the glow suddenly vanishes at a point somewhat lower than the maintaining voltage, and does not persist after the flow of current has ceased. Thus it has feature of the emission of the light and, in addition, all 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 a part of electric communication apparatus in particular.

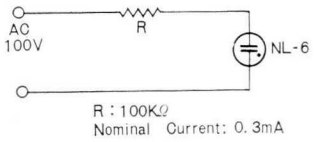
Type	Wattage (W)	Voltage (V)	Current (mA)	Base	Total Length (mm)	Max. Diameter (mm)	Electrode Shape	Starting Voltage (V)	Series Resistance (kΩ)
NE-2	—	100	0.3	25 mm Flexible lead wire	27	7	W	AC 75 Max.	150 (ext.)
NL-5L	—	100	0.3	E10 Miniature screw	30	11	P-2	AC 45~55	100 (ext.)
NL-5LS	—	100	0.3	BA9S Miniature bayonet	30	11	P-2	AC 45~55	100 (ext.)
NL-6	—	100	0.3	E10 Miniature screw	30	11	P-2	AC 75 Max.	100 (ext.)
NL-6S		100	0.3	BA9S Miniature bayonet	30	11	P-2	AC 75 Max.	100 (ext.)
NL-7A	0.8	250	0.3 (Max. 0.7)	E17 Screw	45	18	PW	DC 145~175	500 (ext.)
NL-7C	0.8	250	0.3 (Max. 0.7)	BA15S bayonet	40	18	PW	DC 165~195	500 (ext.)
NL-14	0.8	200	4	E17 Screw	58	20	S	AC 160 Max.	26 (int.)
NL-18	—	250	0.4 (Max. 0.7)	25 mm Flexible lead wire	27	7	W	DC 250 Max.	320 (ext.)
NL-19S	—	200	—	BA9S Miniature bayonet	30	11	P-2	DC 110~150	2,200 (ext.)
NE-34	2.0	100	18	E26 Screw	89	47	P-1	AC 75 Max.	3 (int.)
NE-48	—	100	2	BA15D bayonet	40	16	P-3	AC 75 Max.	30 (ext.)
NE-51	—	100	0.3	BA9S Miniature bayonet	30	11	W	AC 75 Max.	200 (ext.)
NE-68	—	100	0.3	25 mm Flexible lead wire	27	7	W	DC 90 Max.	150 (ext.)

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. No sooner is the voltage (AC 100V) supplied on the lamp, than the glow will appear on electrodes.

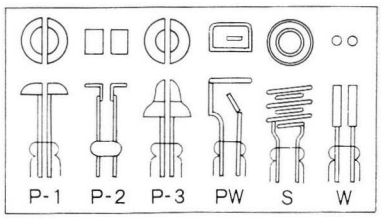


NL-6

EXAMPLE IN SERVICE USE



R : 100KΩ
Nominal Current: 0.3mA



BALLAST TUBES

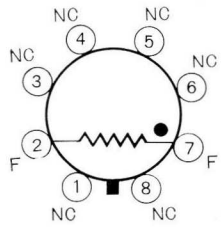
The Toshiba Ballast Tube is used for maintaining the constant load current regardless of variation of the load or the power source voltage by connecting in series with the load.

Nowadays many ballast tubes are extensively used for maintaining the constant filament current to supply on receiving tubes.

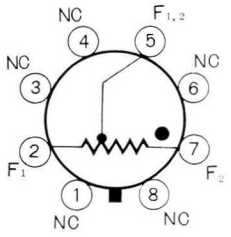
Type	Overall Dimensions (mm)		Base	Voltage Range (V)		Current Range (mA)		Equivalent Tube
	Overall Length	Max. Diameter		Min.	Max.	Min.	Max.	
3-16	90	34	B8-6	12	19.5	280	320	Amperite 3-16
3H-1-7	90	34	B8-6	(I)1.6* (II)6.6**	4.0 12.0	330	390	Amperite 3H-1-7
3H-7	90	34	B8-6	5	10	320	380	Amperite 3H-7
6-4	90	34	B8-6	4.5	9.5	570	630	Amperite 6-4
7H4B	90	34	B8-6	4	9	760	840	Amperite 7H4B
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	1240	1320	—
BL160/12	120	34	B8-6	8	16	1450	1750	—

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

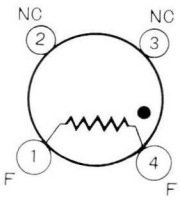
Bottom View of Base



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



3H-1-7



BL-128/19

Voltage-Current Characteristic Curve of Ballast Tube

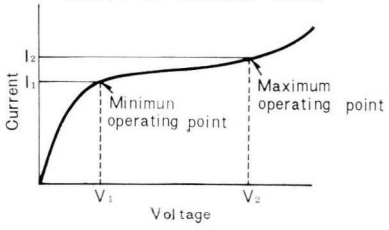
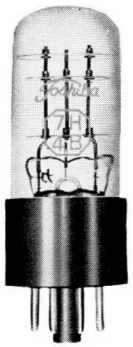
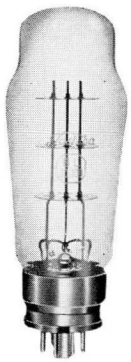


Fig. 2



7H4B

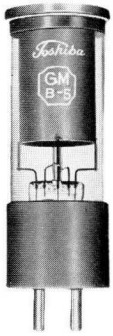


BL30/100

GEIGER MULER TUBES

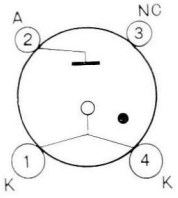
Type	Application	Base	Dimensions Max. (mm)		Thickness Mica or(Wall) (mg/cm²)	Operating Voltage (Vdc)	Static Characteristics			Connection
			Overall Length	Max. Dia.			Plateau Min. (Vdc)	Plateau Slope Max.	Back Ground Max. (C/M)	
GM-B-5	β rays, Mica window	A4-9	107	37	1.9 Max.	1 150±115	200	10%/100V	50	A
GM-B-6	β rays of low energy, Mica window	A4-9	107	37	1.5 Max.	1 150±115	200	10%/100V	50	A
GMD-B-1	β rays, Inserting into esophagus	Coaxial connector	49	8	(95)	450	20	4%/10V	5	B
GMD-B-2	β rays, Inserting into stomach	Coaxial connector	41	6.5	(95)	450	20	4%/10V	5	B
GMH-B-2	β rays, Mica window, Long life, Wide temperature range	A15S	83	33	3.5	600±50	100	20%/100V	60	C
GMH-X-1	Analysis by X rays, Mica window, Long life, Wide temperature range	A7S	158	26	3.5	1 000±100	70	20%/100V	60	C
GMH-X-2	Analysis by X rays, Twin mica window, Long life, Wide temperature range	C1-1	188	31	3.5	1 000±100	50	20%/100V	60	D
M2311	γ rays up to 300r/h, β rays above 0.5 MeV	—	38	7	(90)	500	500~600	15%/100%	5	C
M2319	β, γ rays Mica Window Max. Counting rate 10,000c/s	A7S	158	26	3.5	700±50	100	20%/100%	60	C

GMD-B-2

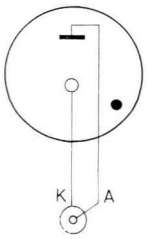


GM-B-5

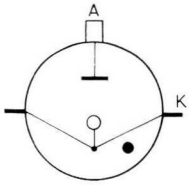
GMH-X-1



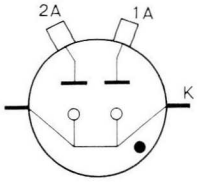
(A)



(B)



(C)

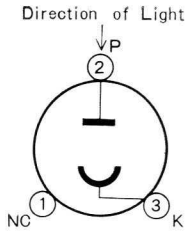


(D)

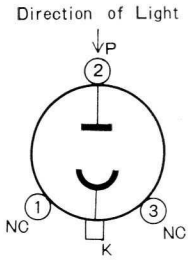
PHOTO

Type	Application	Dimensions				Base	Socket	Cap	Connection	Kind	Spectral Response	Wavelength of Max. Response
		Overall Length Max. (mm)	Max. Diameter Max. (mm)	Height* of Cathode Center (mm)	Effective Area of Cathode Min. (mm)							
1P40	For photo relays.	78	33	41	16×21	B8-6	US	—	I	Gas	S1	8000±1000
PV11	For photoelectric thermometers, small measuring instruments, infra-red ray measurement, (Toshiba color filter IR-D1 used) colorimeter and other general measurement.	61	18.5	37	10×15	A3-1	Special	—	A	Vaccum	S1	8000±1000
PG12	For sound reproduction of 16 mm talkie record. For small relays.	61	18.5	37	10×15	A3-1	Special	—	K	Gas	S1	8000±1000
PV13	For measurement of vision sensitivity (Toshiba filter V-A1 to be used in combination with this). For measurement in the neighborb of 4,000Å.	61	18.5	37	10×15	A3-1	Special	—	A	Vaccum	S4	4000± 500
PG14	For small facsimile transmission.	61	18.5	37	10×15	A3-1	Special	—	K	Gas	S4	4000± 500
PV15	For photoelectric thermometers, small measuring instruments, infra-red ray measurement, (Toshiba color filter IR-D1 used) colorimeter and other general measurement.	73	18.5	37	10×15	A3-1	Special	C1-1	B	Vacuum	S1	8000±1000
PV16	For measurement of vision sensitivity (Toshiba filter V-A1 to be used in combination with this). For measurement in the neighbor of 4,000 Å	73	18.5	37	10×15	A3-1	Special	C1-1	B	Vacuum	S4	4000± 500
PG18	For relay application.	61	18.5	41	10ϕ	A3-1	Special	—	E	Gas	S4	4000± 500
PG19	For sound reproduction of 16 mm talkie record. For small relays.	45	18.5	10 (from head)	10×15	A3-1	Special	—	F	Gas	S1	8000±1000
PV20	For facsimile transmission.	63	26.5	35	10×15	Special	Special	Special	G	Vacuum	S4	4000± 500
PV22	For photoelectric thermometer, small measuring instruments infra-red ray measurement (Toshiba filter IR-D1 used) colorimeter and other general measurement.	104	29	53	15×22	A4-26	UX	C1-1	H	Vacuum	S1	8000±1000
PV24		93	29	53	15×22	A4-26	UX	—	C	Vacuum	S1	8000±1000
PV23A	For measurement of vision sensitivity (Toshiba color filter V-A1 to be used in combination with this).	104	29	50	15×29	A4-26	UX	C1-1	H	Vacuum	S4	4000± 500
PG25	For sound reproduction of 16 mm, 35 mm talkie records. For relays autalarm and calculating machines.	93	29	53	15×22	A4-26	UX	—	J	Gas	S1	8000±1000
PG27	For sound reproducting of 35 mm talkie records.	103	30	63	15×22	A4-A1	UX	—	D	Gas	S1	8000±1000
PG28A	For facsimile transmission.	93	29	50	15×29	A4-26	UX	—	J	Gas	S4	4000± 500
PV29	Color comparison meters.	103	51	50	40ϕ	A4-26	UX	C1-1	H	Vacuum	S1	8000±1000
PV30	For photo relays.	100	51	57	40ϕ	A4-26	UX	C1-1	H	Vacuum	S1	8000±1000

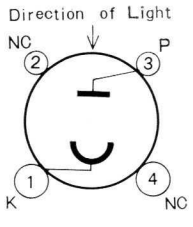
* Height from the Bottom of Base to Cathode Center



(A)



(B)

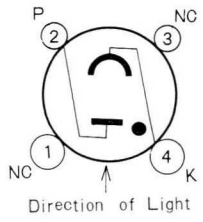


(C)

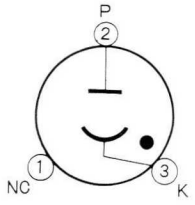
TUBES (2)

Cathode	Maximum Ratings			Characteristics						Equivalent Tube	Remark	Type
	Anode Voltage (V)	Current (μA)	Ambient Temperature (°C)	Sensitivity (μA/lm)			Dark Current	Gas ** Amplification	Capacitance Between electrodes			
				Min.	Medium	Max.	Max. (μA)	Max.	Max. ($\mu\mu$F)			
Ag-Cs	90	3	50	90	180	360	0.005	10	5	1P40		1P40
Ag-Cs	250	2	50	15	25	60	0.05	—	4	—		PV11
Ag-Cs	90	2	50	75	125	360	0.1	10	4	927		PG12
Sb-Cs	250	2	50	15	25	100	0.05	—	4			PV13
Sb-Cs	90	2	50	75	135	360	0.1	10	4	—		PG14
Ag-Cs	250	2	50	15	25	70	0.01	—	4	—		PV15
Sb-Cs	250	2	50	15	25	100	0.01	—	4	—		PV16
Sb-Cs	90	1.5	50	40	90	340	0.1	12	3	—	Head-On type	PG18
Ag-Cs	90	2	50	75	125	360	0.1	10	4			PG19
Sb-Cs	100	2	50	8	12	70	0.002	—	5	—	Composite anode-cathode type	PV20
Ag-Cs	250	3	50	25	35	70	0.01	—	6	—		PV22
Ag-Cs	250	3	50	25	35	70	0.01	—	6	—		PV24
Sb-Cs	250	3	50	25	35	100	0.01	—	6	—		PV23A
Ag-Cs	90	3	50	120	180	360	0.1	7.5	6	—		PG25
Ag-Cs	90	3	50	120	180	360	0.1	7.5	6	918		PG27
Sb-Cs	250	3	50	75	135	360	0.1	5.5	6	—		PG28A
Ag-Cs	250	10	50	20	30	60	0.003	—	4	—		PV29
Ag-Cs	250	10	50	25	35	75	0.01	—	4	—		PV30

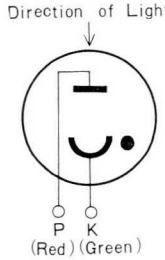
** Gas Amplification $= \frac{\text{Ip (at 90V)}}{\text{Ip (at 25V)}}$



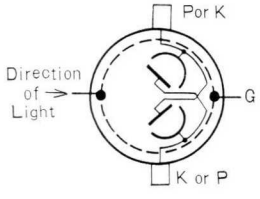
(D)



(E)



(F)

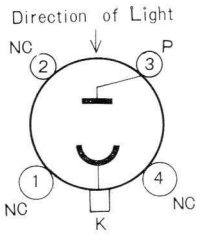


(G)

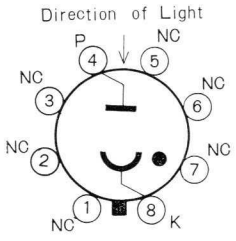
PHOTO

Type	Application	Dimensions				Base	Socket	Cap	Connection	Kind	Spectral Response	Wavelength of Max. Response
		Overall Length Max. (mm)	Max. Diameter (mm)	Height* of Cathode Center (mm)	Effective Area of Cathode Min. (mm^2)							
PV31	For measurement of vision sensitivity (Toshiba color filter V-A1 used) color comparison meters, illumination photometers, autoray (outdoor service).	103	51	50	40ϕ	A4-26	UX	C1-1	H	Vacuum	S4	4000± 500
PV32		100	51	57	40ϕ	A4-26	UX	C1-1	H	Vacuum	S4	4000± 500
PG33	For sound reproduction 16 mm talkie records. For photorelays.	93	51	50	40ϕ	A4-26	UX	—	J	Gas	S1	8000±1000
PV34	For measurement visible rays up to ultra-violet rays. For measurement the output ultraviolet rays of the germicidal light.	141	51	89	50ϕ	A4-26	UX	C1-1	H	Vacuum	S5	3400± 500
PV35	For measurement of ultraviolet rays only. For measurement the output ultraviolet rays of the germicidal light.	141	51	89	50ϕ	A4-26	UX	C1-1	H	Vacuum	Special	—
PV41	For measurement of ultraviolet rays. For measurement the output ultraviolet rays of the germicidal light	133	51	89	50ϕ	A4-26	UX	C1-1	H	Vacuum	Special	—
PV42	For measurement of ultraviolet rays only. For measurement the output ultraviolet rays of the germicidal light.	133	51	89	50ϕ	A4-26	UX	C1-1	H	Vacuum	Special	—
PV43	For measurement of ultraviolet ray only.	133	51	89	50ϕ	A4-26	UX	C1-1	H	Vacuum	Special	—
PV45	For measurement of infra-red rays (Toshiba color filter IR-D1 used).	100	51	57	40ϕ	A4-26	UX	C1-1	H	Vacuum	S1	8000±1000
PV46	For photoelectric thermometers. For small measurement instruments.	45	18.5	10 (from head)	10×15	—	—	—	L	Vacuum	S1	8000±1000
PV47	For measurement of vision sensitivity. For photographic printing.	45	18.5	10 (from head)	10×15	—	—	—	L	Vacuum	S4	4000± 500
PV48	For measurement instruments.	61	18.5	37	10×15	A3-1	Special	—	M	Vacuum	S4	4000± 500
930	For sound reproducting 16mm talkie records.	78	33	41	16×21	B8-6	US	—	I	Gas	S1	8000±1000
PG51	For small facsimile transmission. For small relays.	61	18.5	41	11	A3-1	Special	—	K	Gas	S4	4000± 500
PV52	For measurement instruments required no dark current.	110	59	86	40ϕ	B14-38	Toshiba HV-1520	—	N	Vacuum	S20	4700± 500
929	For measurement of visible sensitivity. (together with Toshiba color filter V-A1).	78	33	41	16×21	B8-6	US	—	I	Vacuum	S4	4000± 500

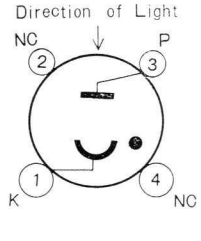
* Height from the Bottom of Base to Cathode Center



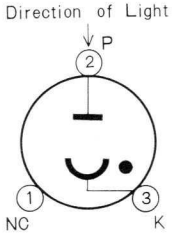
(H)



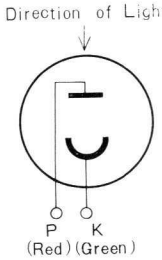
(I)



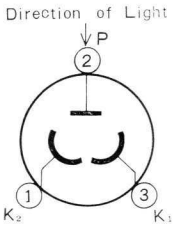
(J)



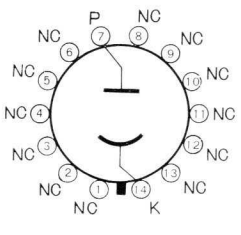
(K)



(L)



(M)



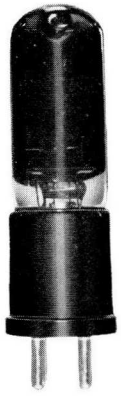
(N)

TUBES (2)

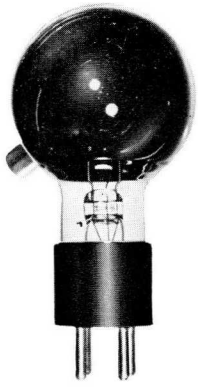
Cathode	Maximum Ratings			Characteristics						Equivalent Tube	Remarks	Type
	Anode Voltage	Current	Ambient Temperature	Sensitivity (μA/lm)			Dark Current	Gas ** Amplification	Capacitance Between electrodese			
	(V)	(μA)	(°C)	Min.	Medium	Max.	Max. (μA)	Max.	Max. (μμF)			
Sb-Cs	250	10	50	20	35	100	0.003	—	4	—		PV31
Sb-Cs	250	10	50	25	35	100	0.01	—	4	—		PV32
Ag-Cs	90	10	50	80	150	350	0.1	7.5	7.5	—		PG33
Sb-Cs	250	—	50	—	1.3×10^{-1}	—	—	—	7.5	—	*the value of the photoelectric current expressed in μA when the ultra-violet rays of unit intensity (1 μA/cm²) is directed to the whole surface of the cathode.	PV34
Cd	250	—	50	—	8×10^{-4}	—	0.001	—	5	—		PV35
Mg	250	—	50	—	4×10^{-3}	—	0.005	—	5	—		PV41
Cr	250	—	50	—	8×10^{-5}	—	0.001	—	5	—		PV42
Sn	250	—	50	—	3×10^{-4}	—	0.001	—	5	—		PV43
Ag-Cs	250	0.1	50	***6	—	—	0.005	—	4	—		PV45
Ag-Cs	250	2	50	15	25	60	0.005	—	4	—		PV46
Sb-Cs	250	2	50	15	25	100	0.01	—	4	—		PV47
Sb-Cs	250	1	50	15	25	70	0.05	—	4	—	Two cathode type.	PV48
Ag-Cs	90	3	50	90	180	360	0.1	8.5	3	930		930
Sb-Cs	90	2	50	100	300	—	0.1	18	4	—		PG51
Multi-alkaline	250	3	50	80	120	—	0.001	—	10	—		PV52
Sb-Cs	250	5	75	25	45	70	0.00125	—	2.6	929		929

** Gas Amplification = $\frac{\text{Ip (at 90V)}}{\text{Ip (at 25V)}}$ ***The value when the light is directed after passing through Toshiba color filter IR-D1

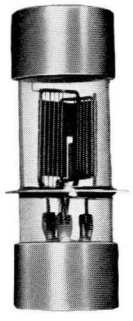
PV15



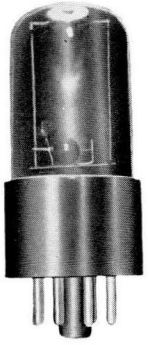
PG27



PV32



PV20



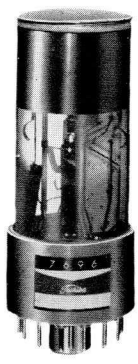
930

MULTIPLIER

Type	Application	Dimensions				Base	Recommended Socket	Base Connection	Kind	Spectral Response	Wavelength of Max. Response		
		Overall Length (mm)	Max. Diameter Max. (mm)	Height of Cathode Center (mm)	Effective Area of Cathode Min. (mm²)							Anode Voltage (Vdc)	Last Dynode Voltage (Vdc)
MS-9S	For X-ray exposure control and for general applications involving low light levels.	Max. 94	34	49	8×24	B11-88	Toshiba HV-1522A	A	High Vacuum	S 4	4000±500	1250	250
MS-9SY	For applications involving very low ultraviolet radiation level.	Max. 94	34	94	8×24	B11-88	Toshiba HV-1522A	A	High Vacuum	S 5	3400±500	1250	250
PM50	For red channel for flying spot scanning equipment.	143±5	59	124	40φ	B14-38	Toshiba HV-1520	B	High Vacuum	S10	4500±300	1500	250
7305	For measuring response similar to that of eye. Especially useful in colorimetry.	Max. 94	34	49	8×24	B11-88	Toshiba HV-1522A	A	High Vacuum	S 8	3650±500	1250	250
7696	For scintillation spectrometer and other application involving low-level large-area light source.	143±5	59	124	40φ	B14-38	Toshiba HV-1520	B	High Vacuum	S11	4400±500	1500	250

* Averaged over any interval of 30 seconds maximum.

MS-9S

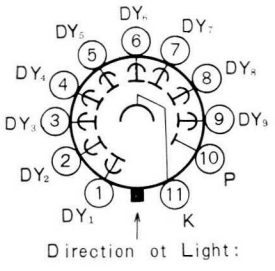


7696

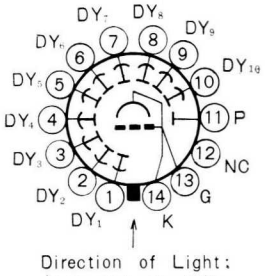
PHOTOTUBES

Maximum Ratings				Typical Characteristics										Equivalent Tube (Similar Tube)	Type
No. 1 Dynode Voltage (Vdc)	Focusing Electrode Voltage (Vdc)	Average Anode Current* (mA)	Ambient Temperature (°C)	Anode Voltage (Vdc)	Last Dynode Voltage (Vdc)	Voltage Between Dynodes (Vdc)	No. 1 Dynode Voltage (Vdc)	Focusing Electrode Voltage (Vdc)	Cathode Luminous Sensitivity (μA/lm)	Anode Luminous Sensitivity (μA/μlm)	Current Amplification Approx.	Anode Dark Current** Max. (μA)	Load Resistance (kΩ)		
300	—	1.0	75	1000 750	100 75	100 75	100 75	— —	30 30	60 6	2×10^6 0.2×10^6	0.05	10 10	931A	MS-9S
300	—	0.5	75	1000 750	100 75	100 75	100 75	— —	40 40	60 6	1.5×10^6 0.15×10^6	0.05	10 10	1P28	MS-9SY
300	300	0.75	75	1250 900	104 75	104 75	208 150	104 75	40 40	60 6	1.5×10^6 0.15×10^6	0.5	10 10	6217	PM50
300	—	1.0	50	1000	100	100	100	—	3	1	0.2×10^6	0.15	10	1P22	7305
300	300	0.75	75	1250 900	104 75	104 75	208 150	104 75	85 85	50 5	0.6×10^6 0.06×10^6	0.05	10 10	(6292)	7696

** Ambient Temperature=25±3°C; After the tube takes incident light of 10^5 lumen and the supply voltage is adjusted so that the anode current may attain to 200 μAdc (7305; 4 μAdc), the tube is measured without the incident light. The lower the supply voltage is, the less the dark current is.



A



B

CHARACTERISTIC CURVES OF PHOTOTUBES

S1
Spectral Sensitivity Curve of Ag-Cs Phototube

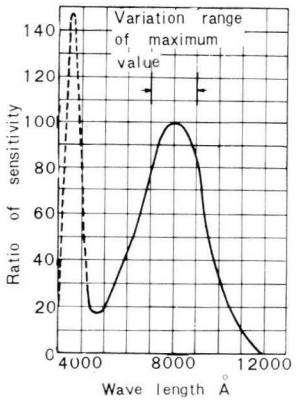


Fig. 3

Radiation Intensity Curve of Light Source & Visibility Curve

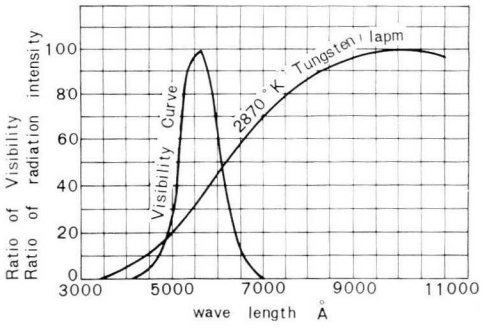


Fig. 4

Relation Between Wave Length and Color

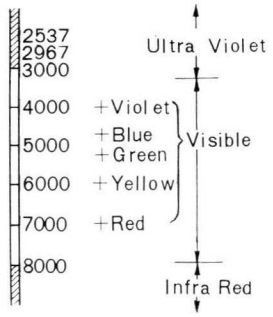


Fig. 5

Anode Voltage-Current Characteristics of Gas-filled Phototube

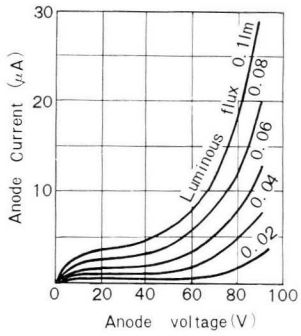


Fig. 6

S4
Spectral Sensitivity Curve of Sb-Cs Phototube

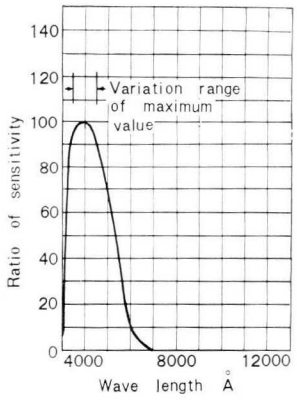


Fig. 7

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

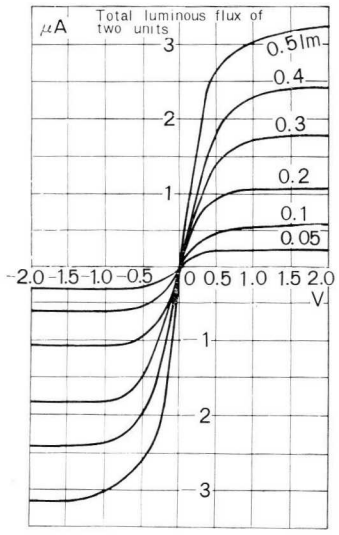


Fig. 10

Anode Voltage-Current Characteristics of Vacuum Type Phototube

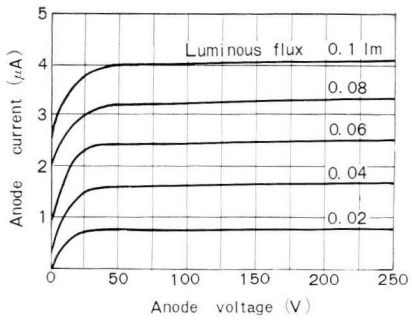


Fig. 8

S5
Spectral Sensitivity Curve of Sb-Cs Phototube for Ultra-violet Rays

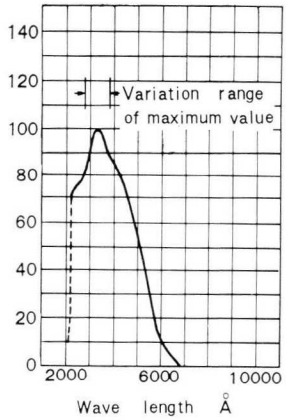


Fig. 9

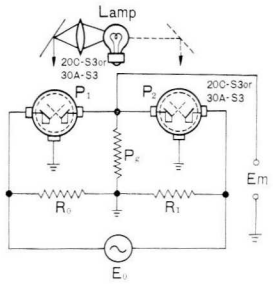
The curves show the typical characteristics of the wave length-sensitivity characteristics which are plotted with the ratios of sensitivities and maximum sensitivity at Sb−Cs= 3400Å for ultraviolet rays, Ag−Cs=8000Å, Sb−Cs=4000Å, vibility curve=566m/μ, 2870°K tungsten lamp of about 1000Å intensity which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

Since the characteristic of individual photoelectric tubes vary somewhat besides their maximum values varying wihtin 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 90V, 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 90V even instantaneously.

Typical examples of the anode characteristics of the differential phototubes, 20 C-S 3, 30A-S 3 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 unipotential 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 with three anodes "three stage post deflection accelerator type." As for Cathode-ray tubes having more than two stage accelerator, care most 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 mutual relation between them.

(4) Cathode-ray Tubes for Radar

Like T.V. picture 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) There 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

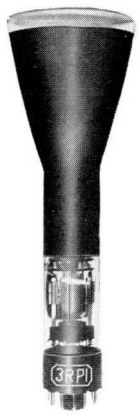
P1(B1)·····P24 indicating the property of fluorescent light are meant to indicate as follows:—

Type	Fluorescence and Phosphorescence	Persistence of Phosphorescence
P1 (B1)	Green	Medium
P2 (B2)	Blue green	Long green
P4 (B4)	White	Medium
P7 (B7)	Blue green	Long
P11(B11)	Blue	Short
P15(B15)	Blue green	Specially short
P16	Violet	Extremely short
P24	Blue green	Extremely short

Since the phosphor screen is designed to have such brightness that it enables clear observation with high speed wave from 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

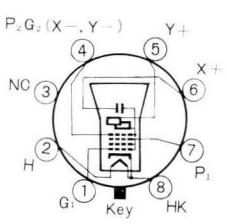
75 UB 2



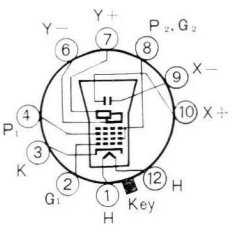
3 RP 1

5 FP 7-A

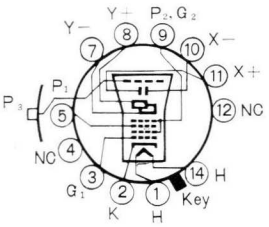
Nomenclature by JIS. or R.T.M.A.	Application	Ratings										
		Focusing Method	Deflecting Methods	Maximum Dimensions		Fluorescence	Persistence	Faceplate & Aluminized Screen	Heater		Anode No. 3 Voltage E_{b3}	Anode No. 2 Voltage E_{b2}
				Overall Length (mm)	Envelope Dia. (mm)				Voltage Ef (V)	Current If (V)	(V)	(V)
40AB15	Observation	E	E	150	42	Bluish green	Specially short	C	6.3	0.6	—	500 Max,
2BP1	Observation	E	E	199	52.6	Green	Medium	C	6.3	0.6	—	2 500 Max.
3ACP1	Observation	E	E	260	78	Green	Medium	C, F	6.3	0.6	6 000 Max.	2 000 Max.
3ACP2	Observation					Blue-green	Long yellow					
3ACP7	Of residual light					Blue	Long yellow					
3ACP11	Photograph					Blue	Short					
3ADP1	Observation	E	E	260	78	Green	Medium	C, F	6.3	0.6	6 000 Max.	3 000 Max.
3ADP2	Observation					Blue green	Long green					
3ADP7	Of residual light					Blue	Long yellow					
3ADP11	Photograph					Blue	Short					
3BHP1	Observation	E	E	350	78	Green	Medium	C, F	6.3	0.3	7 000 Max.	2 000 Max.
3BHP2						Blue green	Long green					
3BHP7						Blue	Long yellow					
3BHP11						Blue	Short					
3BP1A	Observation	E	E	260	78	Green	Medium	C	6.3	0.6	—	2 200 Max.
3JP1	Observation	E	E	260	78	Green	Medium	C	6.3	0.6	4 000 Max,	2 000 Max.
3JP7	Of residual light					Blue	Long yellow					
3JP11	Photograph					Blue	Short					
3KP1	Observation	E	E	298	78	Green	Medium	C	6.3	0.6	—	2 500 Max.
3KP4	Observation					White	Medium					
3KP7	Of residual light					Blue	Long yellow					



(A)



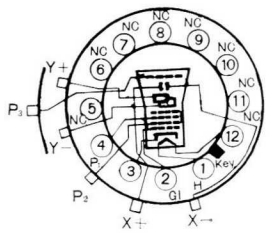
(B)



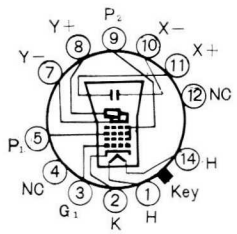
(C)

FOR OBSERVATION (1)

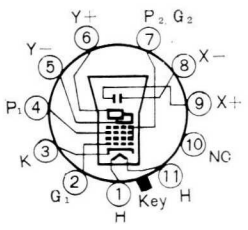
Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage E_{c1} (V)	Deflection Factors X-axis 10^{-3} Vdc/cm E_{b2}	Deflection Factors Y-axis 10^{-3} Vdc/cm E_{b2}	Base & Connection	Application Example: Anode No. 3 Voltage E_{b3} (V)	Anode No. 2 Voltage E_{b2} (V)	Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage for Visual Cutoff E_{c0} (V)	Min. Useful Scan. (mm)	Deflection Factors X-axis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
E_{b2}× 20%	(500 Max.)	Normally negative	110	105	Octal 8-pin (A)	—	250 350	35~ 75 47~107	(250) (350)	−50~0 −70~0	32φ	less than 38 〃 54	less than 36 〃 51	
E_{b2}× 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	44φ	45.3~ 61.1 90.6~122.2	29.1~39.4 58.2~78.8	
E_{b2}× 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	69φ	71~87	52.4~64.2	△: $E_{b3}=2E_{b2}$ Post-deflection accerelation
E_{b2}× 16~ 23.5%	(13 000 Max.)	〃	△ 22.5~30.5	△ 12~13.4	Duodcea! 12-pin (D) recessed small ball cap	4 000	2 000	320~470	(2 000)	−52~−87	*67 **38	55.0~61.0	24.0~26.8	△: $E_{b3}=2E_{b2}$ Post-deflection accerelation *X-axis **Y-axis
800 Max.	—	〃	△ 25.7~33.7	△ 9.4~13.5	Diheptal 12-pin (J)	6 000	1 000	140~260	(1 000)	−30~−55	*57 **40	25.7~33.7	9.4~13.5	△: $E_{b3}=6E_{b2}$ Post-deflection accerelation *X-axis **Y-axis
E_{b2}× 20~34.5%	(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	60φ	47.4~ 63.7 73.2~ 83.0	34.8~52.5 46.4~70.0	
E_{b2}× 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	69φ	53.6~72.4 50.0~68.1 67.0~90.5	39.4~53.5 37.0~50.3 49.3~66.9	△: $E_{b3}=2E_{b2}$ Post-deflection acceleration
E_{b2}× 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	69φ	19.6~26.8 39.3~53.6	14.9~20.5 29.5~41.0	2 000V is recommended for E_{b2} of 3KP7



(D)



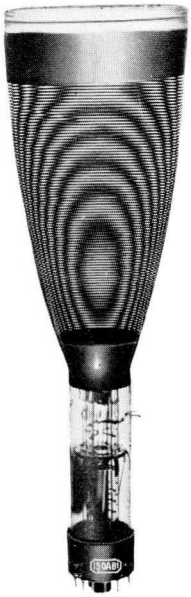
(E)



(F)

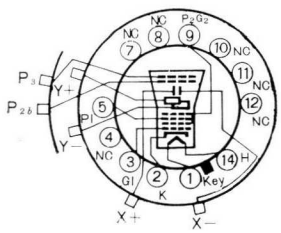
CATHODE RAY TUBES

130GB2

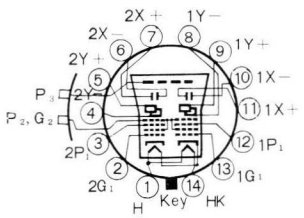


130AB1

Nomenclature by JIS. or R.T.M.A.	Application	Ratings										
		Focusing Method	Deflecting Method	Maximum Dimensions		Fluorescence	Persistence	Faceplate & Aluminized Screen	Heater		Anode No. 3 Voltage E_{b3}	Anode No. 2 Voltage E_{b2}
				Overall Length (mm)	Envelope Dia. (mm)				Voltage Ef (V)	Current If (A)	(V)	(V)
3KP11	Photograph	E	E	298	78	Blue	Short	C	6.3	0.6	—	2 500 Max.
3RP1	Observation	E	E	238	78	Green	Medium	C	6.3	0.6	—	2 500 Max.
3RP7	Of residual light					Blue	Long yellow					
3RP11	Photograph					Blue	Short					
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	Photograph					Blue	Short					
75UB1	Observation Transistor Oscilloscope	E	E	350	78	Green	Medium	C, F	6.3	0.15	7 000 Max.	2 000 Max.
75UB2						Blue green	Long green					
75UB7						Blue	Long yellow					
75UB11						Blue	Short					
130AB1	Observation	E	E	474	136	Green	Medium	C, F	6.3	0.15	6 000 Max.	2 000 Max.
130AB2						Blue green	Long green					
130AB7						Blue	Long yellow					
130AB11						Blue	Short					
130EB1	Observation Curvetracer Oscilloscope	E	E	450	136	Green	Medium	C, F	6.3	0.6	6 000 Max.	1 200 Max.
130EB2						Blue green	Long green					
130EB7						Blue	Long yellow					
130EB11						Blue	Short					
130FB1	Observation two elements	E	E	510	136	Green	Medium	C, F	6.3	0.6	8 000 Max.	2 500 Max.
130FB2						Blue green	Long green					



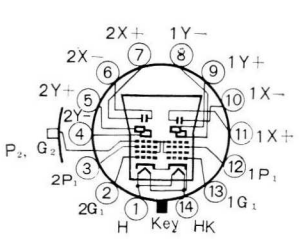
(G)



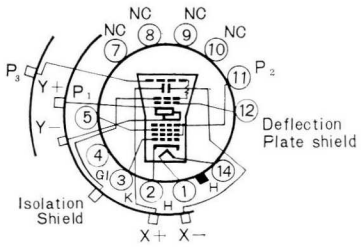
(H)

FOR OBSERVATION (2)

Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage E_{c1} (V)	Deflection Factors X-axis 10^{-3} Vdc cm E_{b2}	Deflection Factors Y-axis 10^{-3} Vdc cm E_{b2}	Base & Connection	Application Example: 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)	Deflection Factors X-axis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
E_{b2}× 16~30%	(2 500 Max.	Normally negative	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	69φ	19.6~26.8 39.3~53.6	14.9~20.5 29.5~41.0	000V is recom-2mended for E_{b2} of 3KP7
E_{b2}× 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	69φ	28.8~38.9 57.5~78.0	20.5~27.5 41.0~55.1	
E_{b2}× 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	69φ	28.8~33.9 57.5~78.0	20.5~27.5 41.0~55.1	
800 Max.	—	〃	△ 18.0~24.0	△ 9.4~13.5	Diheptal 12-pin (J)	3 000	500	70~130	(500)	−15~−27.5	*50 **40	9~12	4.7~6.8	△: E_{b3}=6 E_{b2} Post-deflection acceleration *X-axis **Y-axis
800 Max.	—	〃	△ 8.25~ 11.30	△ 3.00~4.14	Diheptal 12-pin (J)	4 000	1 330	130~400	(1 330)	−35~−56	*100 **60	11.0~15.0	4.0~5.5	△: E_{b3}=3 E_{b2} Post-deflection acceleration *X-axis **Y-axis
550 Max.	—	〃	△ 11.5~14.4	△ 11.5~14.4	Diheptal 12-pin (130E)	4 000	800	120~320	(800)	−25~−45	*80 **80	9.2~11.5	9.2~11.5	△: E_{b3}=5 E_{b2} Post-deflection acceleration *X-axis **Y-axis
1 000 Max.	—	〃	△ 12.0~15.2	△ 3.5~4.7	Diheptal 14-pin (130F)	6 000	2 000	220~700	(2 000)	−50~−80	*100 **60	24~30.5	7.0~9.5	△: E_{b3}=3 E_{b2} Post-deflection acceleration *X-axis **Y-axis

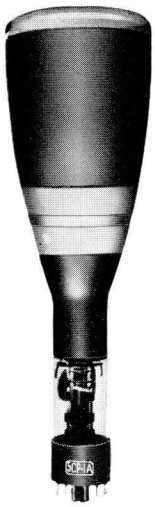


(I)

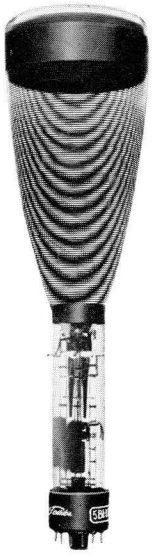


(J)

CATHODE RAY TUBES

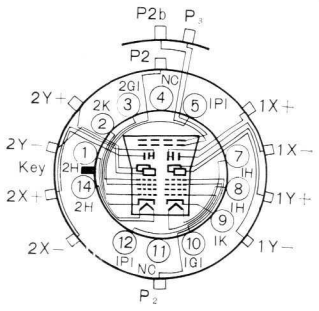


5CP1A

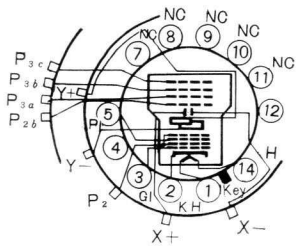


5BHP9

Nomenclature by JIS. or R.T.M.A.	Application	Ratings										
		Focusing Method	Deflecting Method	Maximum Dimensions: Overall Length (mm)	Maximum Dimensions: Envelope Dia. (mm)	Fluorescence	Persistence	Faceplate & Aluminized Screen	Heater: Voltage Ef (V)	Heater: Current If (A)	Anode No. 3 Voltage Eb3 (V)	Anode No. 2 Voltage Eb2 (V)
130FB7	Observation two elements	E	E	510	136	Blue	Long yellow	C, F	6.3	0.6	8 000 Max.	2 500 Max.
130FB11						Blue	Short					
130GB1	Observation two elements	E	E	510	136	Green	Medium	C, F, A	6.3	0.6	10 000 Max.	2 500 Max.
130GB2						Blue green	Long green					
130GB7						Blue	Long yellow					
130GB11						Blue	Short					
130HB1A	Observation	E	E	435	136	Green	Medium	C, F, A	6.3	0.6	6 000 Max.	2 600 Max.
130HB2A	Observation					Blue green	Long					
130HB7A	Of residual light					Blue	Long yellow					
130HB11A	Photograph					Blue	Short					
130SB1	Observation two elements	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	474	136	Green	Medium	C, F, A	6.3	0.6	12 000 Max.	2 000 Max.



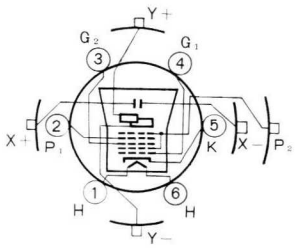
(K)



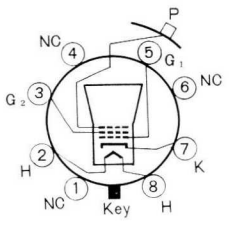
(L)

FOR OBSERVATION (3)

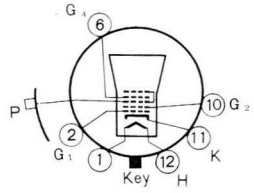
Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage E_{c1} (V)	Deflection Factors X-axis 10^{-3} Vdc cm E_{b2}	Deflection Factors Y-axis 10^{-3} Vdc cm E_{b2}	Base & Connection	Application Example: Anode No. 3 Voltage E_{b3} (V)	Anode No. 2 Voltage E_{b2} (V)	Anode No. 2 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage for Visual Cutoff E_{c0} (V)	Min. Useful Scan. (mm)	Deflection Factors X-axis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
1 000 Max.	—	Normally negative	△ 12.0~15.2	△ 3.5~4.7	Diheptal 14-pin (130F)	6 000	2 000	220~700	(2 000)	−50~−80	*100 ** 60	24~30.5	7.0~9.5	△: $E_{b3}=3\ E_{b2}$ Post-deflection acceleration *X-axis **Y-axis
1 000 Max.	—	〃	△ 12.3~16.0	△ 3.5~5.3	Diheptal 14-pin (130G)	8 000	2 000	220~700	(2 000)	−50~−80	*100 ** 60	24.5~32.5	7.0~10.5	△: $E_{b3}=4\ E_{b2}$ Post-deflection acceleration *X-axis **Y-axis
$E_{b2}\times$ 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	116φ *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	△: $E_{b3}=2E_{b2}$ Post-deflection acceleration *X-axis **Y-axis
$E_{b2}\times$ 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	116φ	20.9~28.8 27.8~38.4	17.3~23.1 22.5~30.8	△: $E_{b3}=2E_{b2}$ Two elements post-deflection accelerations
$E_{b2}\times$ 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	116φ	22.0~30.3	18.1~24.4	Two elements
$E_{b2}\times$ 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	116φ *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	△: $E_{b3}=2E_{b2}$ Post-deflection accelerations *X-axis **Y-axis
$E_{b2}\times$ 10.8~ 35.3%	(2 000 Max.)	〃	△ 15.5~20.1	△ 3.5~4.3	Diheptal 12-pin (J) cavity cap	10 000	1 670	150~590	(1 670)	−50~−80	*100 ** 40	27.5~33.5	5.90~7.2	〃



(M)



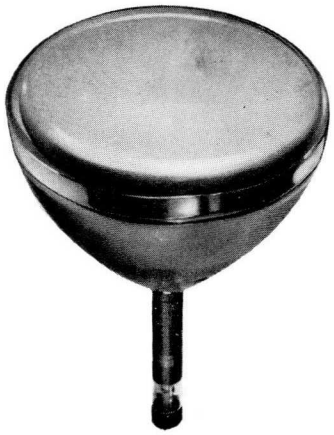
(N)



(O)

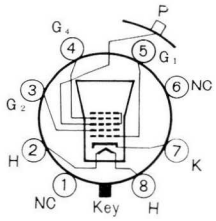
CATHODE RAY TUBES

10SP4

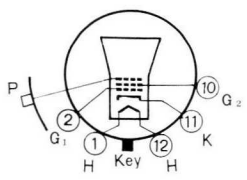


12SP7B

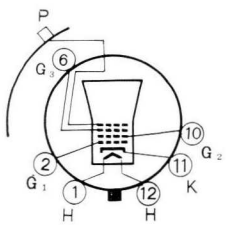
Nomenclature by JIS. or R.T.M.A.	Application	Ratings										
		Focusing Method	Deflecting Method	Maximum Dimensions: Overall Length (mm)	Maximum Dimensions: Envelope Dia. (mm)	Fluorescence	Persistence	Faceplate & Aluminized Screen	Heater: Voltage Ef (V)	Heater: Current If (A)	Anode No. 3 Voltage E_{b3} (V)	Anode No. 2 Voltage E_{b2} (V)
5BHP2	Observation	E	E	474	136	Blue green	Long green	C, F, A	6.3	0.6	12 000 Max.	2 000 Max.
5BHP7	Of residual light					Blue	Long yellow					
5BHP11	Photograph					Blue	Short					
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					
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					
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					
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	6.3	25 000 Max. 5 000 Max.	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.



(P)



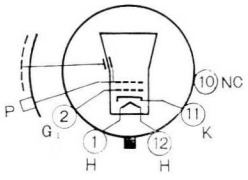
(Q)



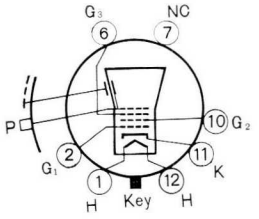
(R)

FOR OBSERVATION (4)

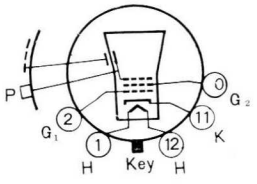
Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage E_{c1} (V)	Deflection Factors X-axis 10^{-3} Vdc cm E_{b2}	Deflection Factors Y-axis 10^{-3} Vdc cm E_{b2}	Base & Connection	Application Example: Anode No. 3 Voltage E_{b3} (V)	Anode No. 2 Voltage E_{b2} (V)	Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage for Visual Cutoff E_{c0} (V)	Min. Useful Scan. (mm)	Deflection Factors X-asis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
E_{b2}× 10.8~ 35.3%	(2 000 Max.)	Normally negative	△ 15.5~20.1	△ 3.5~4.3	Diheptal 12-pin (J) cavity cap special pin	10 000	1 670	150~590	(1 670)	-50~-80	*100 ** 40	27.5~33.5	5.90~7.2	△: $E_{b3}=6E_{b2}$ Post-deflection acceleration *X-axis **Y-axis
E_{b2}× 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	114ϕ	24.4~33.0 23.3~31.4 30.7~41.7	21.3~29.1 19.7~26.7 26.0~35.4	△: $E_{b3}=2E_{b2}$ Post-deflection acceleration
E_{b2}× 17~32%	(2 500 Max.)	〃	11.0~15.2	9.1~12.2	Duodecal 10-pin (B)	—	1 000 2 000	170~320 340~640	(1 000) (2 000)	-45~0 -90~0	114ϕ	11.0~15.2 22.0~30.3	9.1~12.2 18.1~24.4	2 000V is recommended for E_{b2} of 5UP7
E_{b2}× 18.1~ 34.8%	(2 500 Max.)	〃	△ 12.8~51.9	△ 11.2~14.0	Diheptal 12-pin (K) recessed small ball cap minuature cap	3 000 4 000	1 500 2 000	272~521 363~695	(1 500) (2 000)	-56~-34 -75~-45	116ϕ	24.4~29.9 32.6~39.8	20.8~25.6 27.5~33.9	△: $E_{b3}=2E_{b2}$ △: Each gun Post-deflection acceleration
E_{b2}× 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	△: $E_{b3}=2E_{b2}$ *X-axis **Y-axis Post-deflection acceleration
E_{b2}× 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	△: $E_{b3}=2E_{b2}$ *X-axis **Y-axis Post-deflection acceleration
E_{b2}× 27~40%	(4 000 Max.)	〃	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	150ϕ	18.5~24.4 36.7~48.4	15.0~20.0 29.6~40.1	



(S)

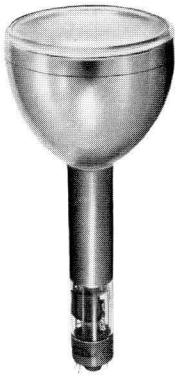


(T)



(U)

CATHODE RAY TUBES



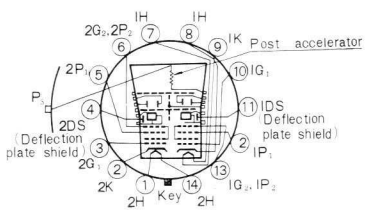
5CNP16

210KB4

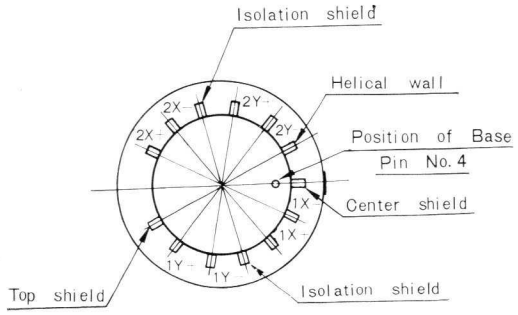
Nomenclature by JIS or R.T.M.A.	Application	Ratings										
		Focusing Method	Deflecting Method	Maximum Dimensions		Fluorescence	Persistence	Faceplate & Aluminized Screen	Heater		Anode No. 3 Voltage E_{b3}	Anode No. 2 Voltage E_{b2}
				Overall Length (mm)	Envelope Dia. (mm)				Voltage Ef (V)	Current If (A)	(V)	(V)
7VP7	Of residual Light	E	E	378	181	Blue	Long yellow	C	6.3	0.6	—	4 000 Max.
7VP11	Photograph					Blue	Short					
M7115B	Photographing high speed	E	E	430	136	Blue	Short	C, F, A	2.5	1.6	—	10 000 Max.
5AHP7A	For radar	E	M	293	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.
7ABP7A	For radar	E	M	347	186	Blue	Long yellow	G F, C, A	6.3	0.6		10 000 Max.
7MP7(M)	For radar	M	M	334	186	Blue	Long yellow	F, G C, A	6.3	0.6	—	8 000 Max.
10KP7(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	511	310	Blue	Long yellow	F, C	6.3	0.6	—	10 000 Max.
12DP7A(M)	For radar	M	M	511	310	Blue	Long yellow	F, G, A C	6.2	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.
210KB4	For monitor	E	M	240	202×156.4	White	Medium	F, G, A	6.3	0.15	—	14 000 Max.
10SP4	For monitor	E	M	432	270	White	Medium	F, G, A	6.3	0.6	—	14 000 Max.
5CNP16	For Flying Spot Scanner	E	M	300	130	Violet	Extremely short	FA	6.3	0.6	—	20 000 Max.
5CNP24	For color flying spot scanner	E	M	300	130	Blue green	Extremely short	FA	6.3	0.6	—	27 000 Max.
5AKP24	For color flying spot scanner	M	M	326	130	Blue green	Extremely short	FA	6.3	0.6	—	40 000 Max.
10NP11	Video Recording Tube	M	M	458	270	Blue	Short	F, C, A	6.3	0.6	—	25 000 Max.

A : Aluminized Screen E : Electrostatic M : Magnetic F : Flatface Plate C : Clear glass G : Grey filter glass

(a) Bottom View of Base



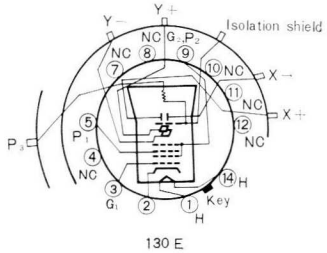
(b) Side Pin Connection



130 F
130 G

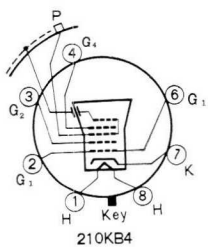
FOR OBSERVATION (5)

Anode No. 1 Voltage E_{b1} (V)	Grid No. 2 Voltage E_{c2} (V)	Grid No. 1 Voltage E_{c1} (V)	Deflection Factors X-axis 10^{-3} Vdc cmE_{b2}	Deflection Factors Y-axis 10^{-3} Vdc cmE_{b2}	Base & Connection	Application Example: 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 Screen. Dia. (mm)	Deflection Factors X-axis Vdc/cm	Deflection Factors Y-axis Vdc/cm	Note
E_{b2}× 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 −84~0	150φ	18.5~24.4 36.7~48.4	15.0~20.0 29.6~40.1	
E_{b2}× 20~30%	(450 Max.)	〃	10.3~15.5	9.4~14.3	JIS A6-12 Small ball cap, minuature cap	—	5 000 10 000	1000~1500 2000~3000	250 250	−30~−75 −30~−90		51.5~77.5 103~155	47.0~71.5 94~143	
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	—	300	−33~−77	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	229	—	—	
—	700 Max.	〃	—	—	Duodical 6-pin (O) cavity cap	—	10 000	0~300	300	−33~−77	228	—	—	
—	700 Max.	〃	—	—	Octal 8-pin (N) medium cap	—	4 000 7 000	—	250 250	−25~−70 −25~−70	254	—	—	
—	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	−27~−63	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	152	—	—	
500 Max.	400 Max.	〃	—	—	Small-Button neoeightar 7-pin	—	10 000	0~350	300	−33~−77	183×137	—	—	Rectangular
2 700 Max.	410 Max.	〃	—	—	Duodical 6-pin (R) cavity cap	—	12 000	1 400~ 1 900	200	−22~−52	232	—	—	
3 500 Max.	410 Max.	〃	—	—	Duodical 6-pin (R)	—	20 000	2 220~ 3 160	200	−22~−52	108	—	—	
4 500 Max.	410 Max.	〃	—	—	Duodical 6-pin (R)	—	20 000	2 220~ 3 160	200	−22~−52	108	—	—	
—	—	〃	—	—	Duodical 5-pin	—	30 000	—	—	−80~−140	108	—	—	
—	—	〃	—	—	Duodical 5-pin (U) cavity cap	—	18 000	—	—	−65~−125	232	—	—	



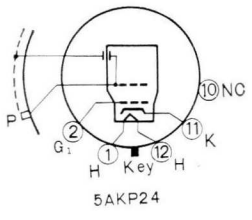
130 E

130E



210KB4

210KB4



5AKP24

5AKP24

IMAGE ORTHICONS

IMAGE

Type	Description	Heater		Maximum Dimensions		Base		Direct Interelectrode Capacitance Anode to all other electrodes (pF)	Maximum Photocathode Image Diagonal (mm)	Focusing Method	Deflection Method
		Voltage (V)	Current (A)	Overall Length (mm)	Diameter (mm)	End Base	Shoulder Base				
5820	General-purpose type, for outdoor or studio use. 3-inch type	6.3	0.6	386	76.2	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Keyed Jumbo Annular 7-pin	12	45	Magnetic	Magnetic
75PC11	General-purpose type, having field mesh. 3-inch type	6.3	0.6	386	76.2	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Keyed Jumbo Annular 7-pin	12	45	Magnetic	Magnetic
75PC12	For high-quailty B. & W. pick-up. High signal-to-noise ratio. 3-inch type	6.3	0.6	386	76.2	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Keyed Jumbo Annular 7-pin	12	45	Magnetic	Magnetic
7295A	For high-quality B. & W. pick-up. High resolution. 4½-inch type	6.3	0.6	492	114.3	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Special ring-shaped, 5 terminals	12	41	Magnetic	Magnetic
7389A	For high-quality B. & W. pick-up. High signal-to-noise ratio and high resolution. 4½-inch type	6.3	0.6	492	114.3	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Special ring-shaped, 5 terminals	12	41	Magnetic	Magnetic
4415	For color pick-up, having field mesh. Used in red and green channels. 3-inch type	6.3	0.6	386	76.2	Small-Shell Diheptal 14-pin (JEDEC No. B 14-45)	Keyed Jumbo Annular 7-pin	12	45	Magnetic	Magnetic
4416	For color pick-up, having field mesh. Used in blue channel. 3-inch type	6.3	0.6	386	76.2	Small-Shell Diheptal 14-pin (JEDEC No, B 14-45)	Keyed Jumbo Annular 7-pin	12	45	Magnetic	Magnetic

■ Ratio of peak-to-peak high light video-signal current to r.m.s. noise current.
● Field mesh voltage: +15 to +25 volts with respect to grid No. 4.

VIDICONS

Type	Description	Heater		Maximum Dimensions		Base	Direct Interelectrode Capacitance Anode to all other electrodes (pF)	Maximum Photoconductive Layer Image Diagonal (mm)	Focusing Method	Deflection Method
		Voltage (V)	Current (V)	Overall Length (mm)	Diameter (mm)					
7038	For live or film pick-up in B. & W. or color cameras.	6.3	0.6	159	28.6	Small-Button Ditetrar 8-pin (JEDEC No. E8-11)	4.6	15.7	Magnetic	Magnetic
7735A	High effective sensitivity. For live pick-up in B. & W. or color cameras.	6.3	0.6	159	28.6	Small-Button Ditetrar 8-pin (JEDEC No. E8-11)	4.6	15.7	Magnetic	Magnetic

7038

5820

AND VIDICONS

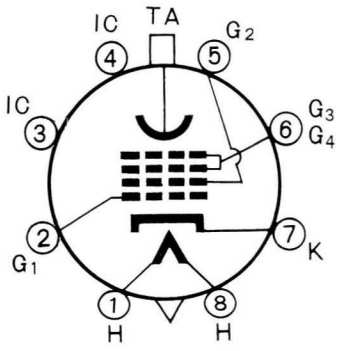
ORTHICONS

Typical Operation

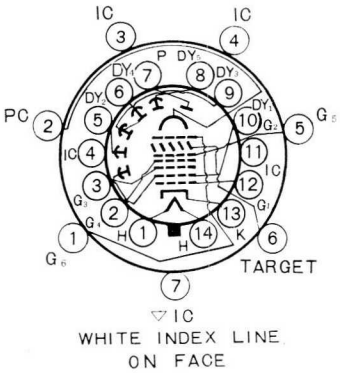
Photo-cathode Voltage (V)	Grid-No. 6 Voltage (V)	Target-cutoff Voltage (V)	Grid-No. 5 Voltage (V)	Grid-No. 4 Voltage (V)	Grid-No. 3 Voltage (V)	Grid-No. 2 Dynode-No. 1 Voltage (V)	Grid-No. 1 Voltage for Picture Cutoff (V)	Dynode-No. 2 Voltage (V)	Dynode-No. 3 Voltage (V)	Dynode-No. 4 Voltage (V)	Dynode-No. 5 Voltage (V)	Anode Voltage (V)	Signal Output Current (μAp-p)	Anode Current (μADC)	Resolution (Center) (Lines)	Signal to Noise Ratio ■	Operating Temp. (°C)	Equivalent Tube
−400~−540	−300~−405	−3~+1	0~125	140~180	225~330	300	−45~−115	600	800	1000	1200	1250	3~24	30	better than 550	40	40~50	5820
−400~−540	−260~−350	−3~+1	0~125	140~180	225~330	300	−45~−115	600	800	1000	1200	1250	4~30	30	better than 525	37	40~50	—
−400~−540	−260~−350	−3~+1	0~125	140~180	225~330	300	−45~−115	600	800	1000	1200	1250	5~38	30	better than 525	55	40~50	—
−600	−250~−350	−3.6~+1	40	● 70~160	250~275	280	−45~−115	600	800	1000	1200	1250	5~30	30	better than 600	65	40~50	7295A
−600	−250~−350	−3.6~+1	40	● 70~160	250~275	280	−45~−115	600	800	1000	1200	1250	5~40	30	better than 600	95	40~50	7389A
−400~−540	−260~−350	−3~+1	0~125	140~180	225~330	300	−45~−115	600	800	1000	1200	1250	4~30	30	better than 525	37	40~50	4415
−400~−540	−260~−350	−3~+1	0~125	140~180	225~330	300	−45~−115	600	800	1000	1200	1250	4~30	30	better than 525	37	40~50	4416

Typical Operation

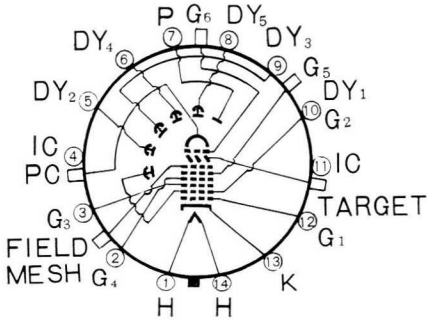
Faceplate Illumination (ft-c)	Signal-Electrode Voltage (V)	Grid-No. 4 & No. 3 Voltage (V)	Grid-No. 2 Voltage (V)	Grid-No. 1 Voltage for Picture cutoff (V)	Highlight Signal-Electrode Current (μA)	Dark Current (μA)	Field Strength of Alignment Coil (gausses)	Field Strength at Center of Focus Coil (gausses)	Resolution (Center) (Lines)	Equivalent Tube
100 15 2	15~ 25 30~ 50 60~100	250~300	300	−45~−100	0.3~0.4 0.3~0.4 0.2~0.3	0.004 0.02 0.2	0~4	40	600	7038
1.0 0.5 0.1	20~ 40 30~ 60 35~ 70	250~300	300	−45~−100	0.20 0.27 0.14	0.02 0.1 0.2	0~4	40	600	7735A



7038
7035A



5820 4415
75PC11 4416
75PC12



7295A
7389A

Toshiba

TOKYO SHIBAURA ELECTRIC CO., LTD.

FOREIGN TRADE DIVISION

Hibiya Mitsui Bldg. 12, Yurakucho 1-chome, Chiyoda-ku, Tokyo, Japan

Cable : TOSHIBA TOKYO

Printed in Japan
Daito Art Printing Co., Ltd. 3-2