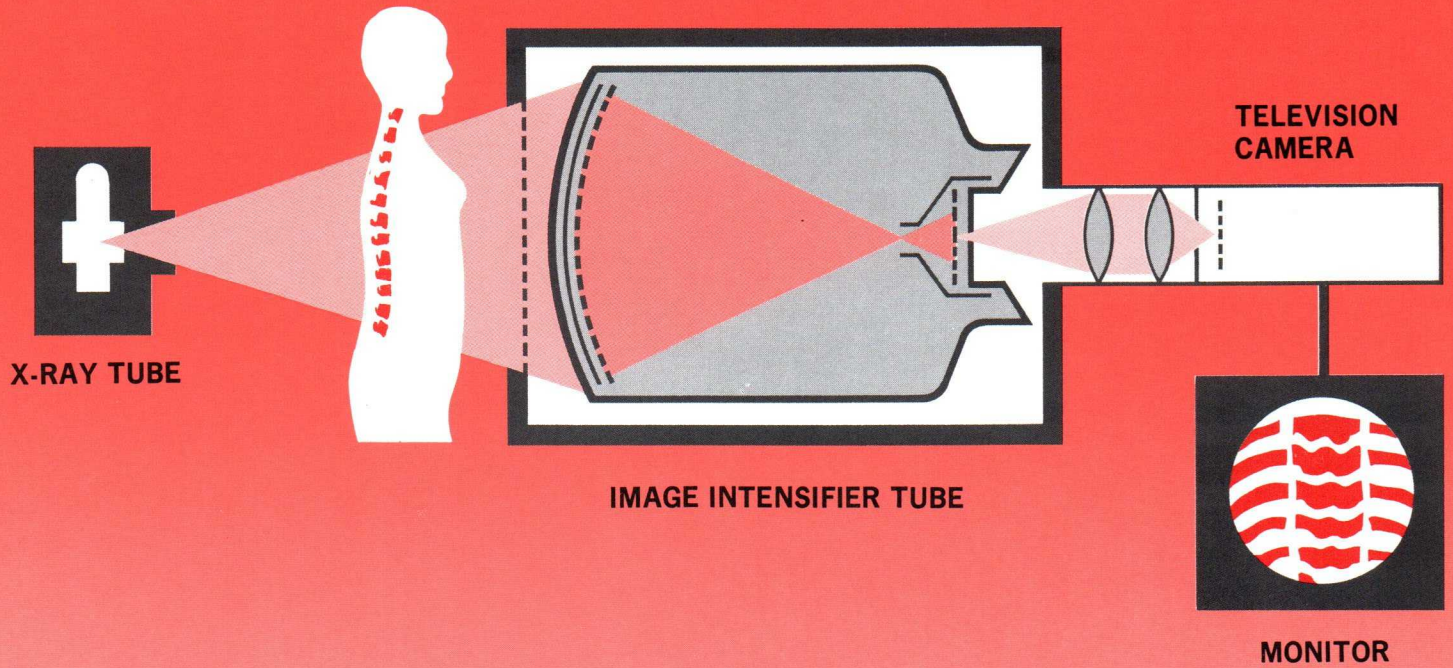




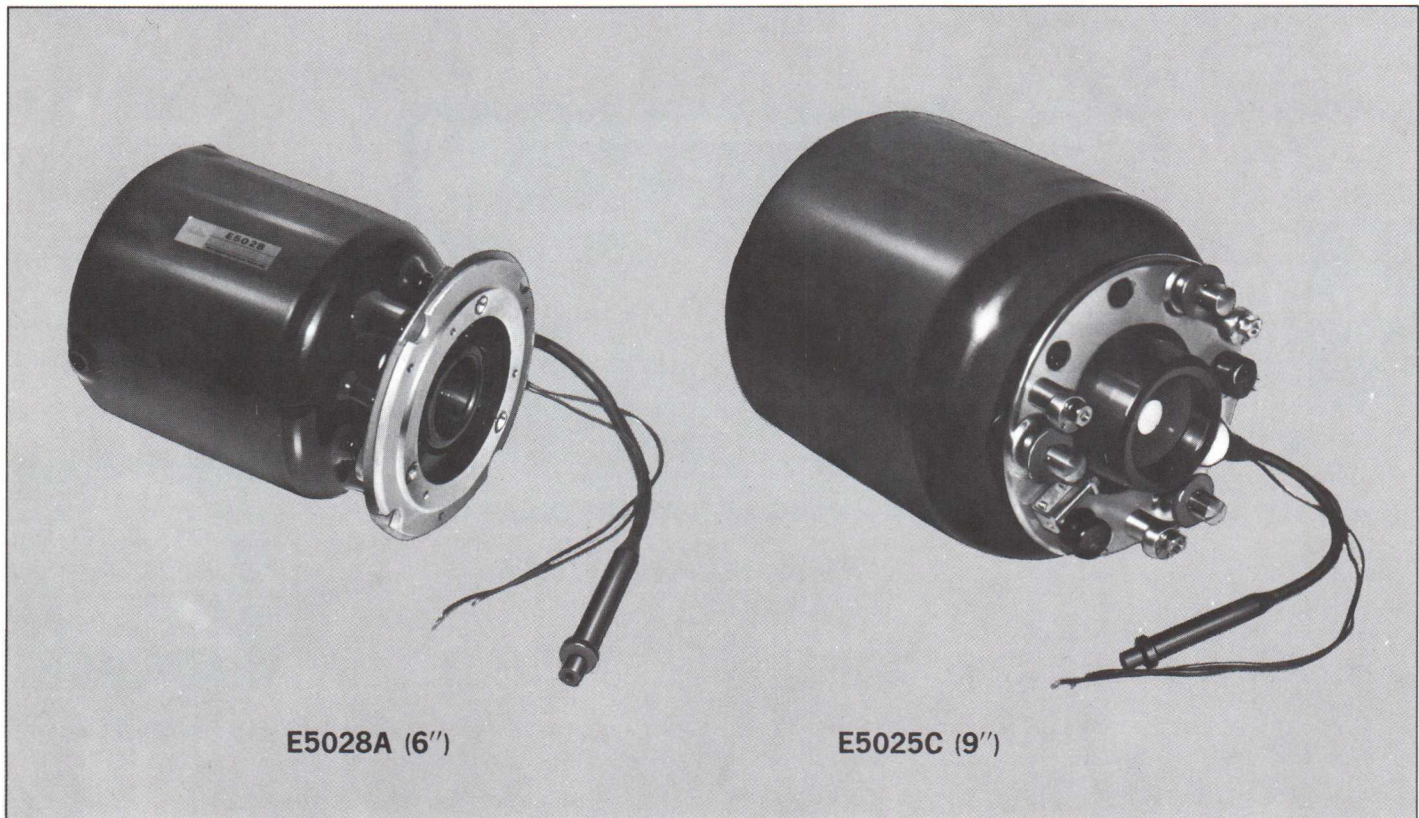
# TOSHIBA

## X-RAY IMAGE INTENSIFIER TUBES **6"** E5028A, **9"** E5025C



**BRIGHTNESS GAIN x10,000**

# 6" <sup>E5028A</sup> & 9" <sup>E5025C</sup> X-RAY IMAGE INTENSIFIER TUBES



E5028A (6'')

E5025C (9'')

Toshiba X-Ray image intensifier tubes have extremely bright and highly contracted visible images in comparison with conventional fluoroscopic images.

Working principle is as follows.

An incident X-Ray image is converted to a light image by the input phosphor screen, the photocathode which is in close contact on the back side of that screen emits electrons which correspond to X-Ray image. These electrons are accelerated and focused on the viewing screen by the electrostatic fields which are formed by cathode, focusing electrode and anode. These electrons give visible image

on the viewing screen. The brightness of that image is several thousands times brighter than that of a good standard fluoroscopic screen.

The high quality getter and ion pump which is unnecessary to be operated by users, keep high vacuum in tube for a long time.

E5028A is to be inserted into the Housing VP-30201, and E5025C into the Housing VP-30301A. These Housings shield off the external magnetic field by their  $\mu$ -metal linings and prevent X-Ray leakage by their lead linings.

## CHARACTERISTICS

### Optical

Useful diameter of input screen .....	
Viewing screen image diameter .....	
Viewing screen colour .....	
<sup>(1)</sup> Conversion factor .....	(Brightness gain)
Resolution .....	<sup>(2)</sup> Central
	<sup>(3)</sup> Peripheral
Contrast .....	

### E5028A

150 mm
14~16 mm
Yellow green (P20)
50 cd·m <sup>-2</sup> /mR·sec <sup>-1</sup>
(5,000~6,000)
18 lp/cm
14 lp/cm
2%

### E5025C

230 mm
19~22 mm
Yellow green (P20)
85 cd·m <sup>-2</sup> /mR·sec <sup>-1</sup>
(8,500~10,000)
16 lp/cm
12 lp/cm
2%

## E5028A and E5025C

### Mechanical

Dimensions .....	
Weight .....	
Maximum temperature for operation and stock .....	

### E5028A

See attached drawings
2 kg
45°C

### E5025C

See attached drawings
5 kg
45°C

### Optical positions (see attached drawings)

Distance from reference plane to viewing screen .....	
Off-parallel of viewing screen .....	
Off-center of viewing screen .....	

25 ± 0.5 mm
Max. 5 min
Max. 0.7 mm

30 ± 0.5 mm
Max. 5 min
Max. 1 mm

### Electrical

Anode voltage .....	
Focusing electrode voltage .....	
Photocathode voltage .....	
Photocathode current for a continuous radiation.....	

25 kV
0 V
-100 ~ -300 Vdc

25 kV
0 V
-100 ~ -300 Vdc

0.2 μA (approx. 10 mR/sec.)

0.5 μA (approx. 10 mR/sec.)

(1) The conversion factor is the ratio of luminance (cd/m<sup>2</sup>) of the viewing screen to the X-Ray also rate (mR/sec.) at the input plane of the tube under the following conditions. H.V.T. 7mm Al (X-Ray tube: approx. 70-85 kV, 22mm Al extra filtration).

(2) Central

**E5028A**

Within 50 mm diameter

**E5025C**

Within 60 mm diameter

(3) Peripheral

**E5028A**

Annular zone 15 mm width just within the useful diameter.

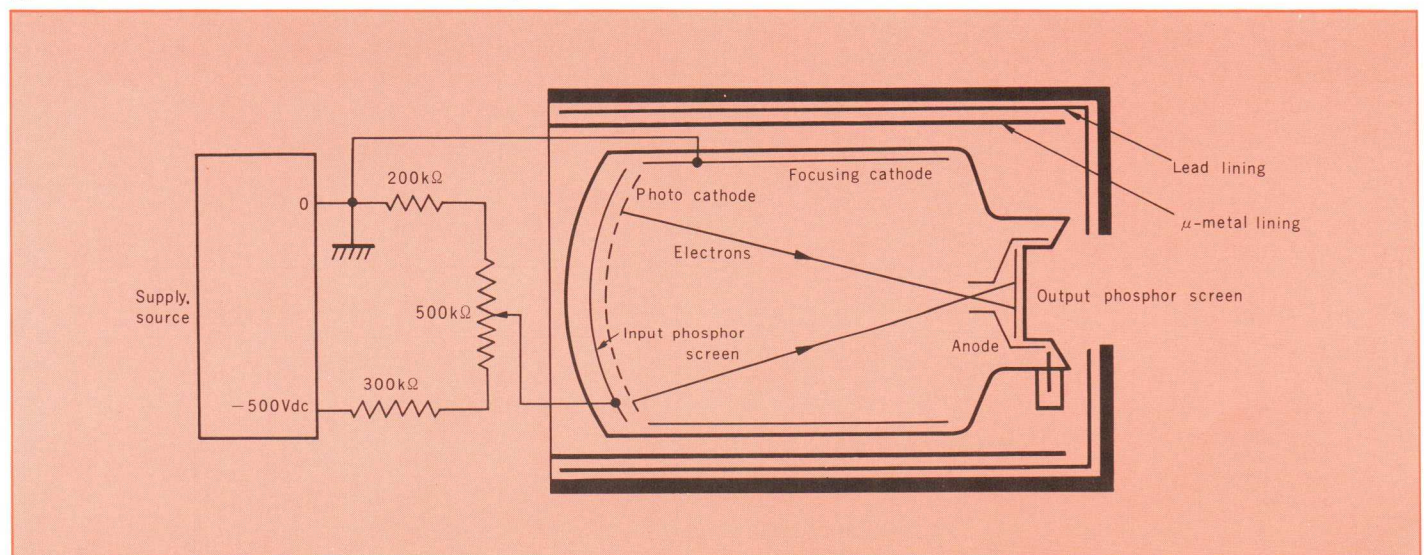
**E5025C**

Annular zone 25 mm width just within the useful diameter.

## OPERATING INSTRUCTIONS

- 27 kV should not be exceeded in any condition. The ripple of power supply must not exceed 1%.
- Since stray magnetic fields may disturb the performance of the tube, keep the tube well away from such fields and block them by magnetic shield (μ-metal of at least 0.5mm thickness).
- Adequate protection must be equipped against X-ray, since the tube itself doesn't block X-ray.
- The tube must be shielded so as to prevent incident light.
- The tube is fragile because it is large vacuum tube of glass. Avoid vibration or mechanical shock in any case, even when the tube is in the Housing.

### ■ Recommendable circuit for focusing electrode



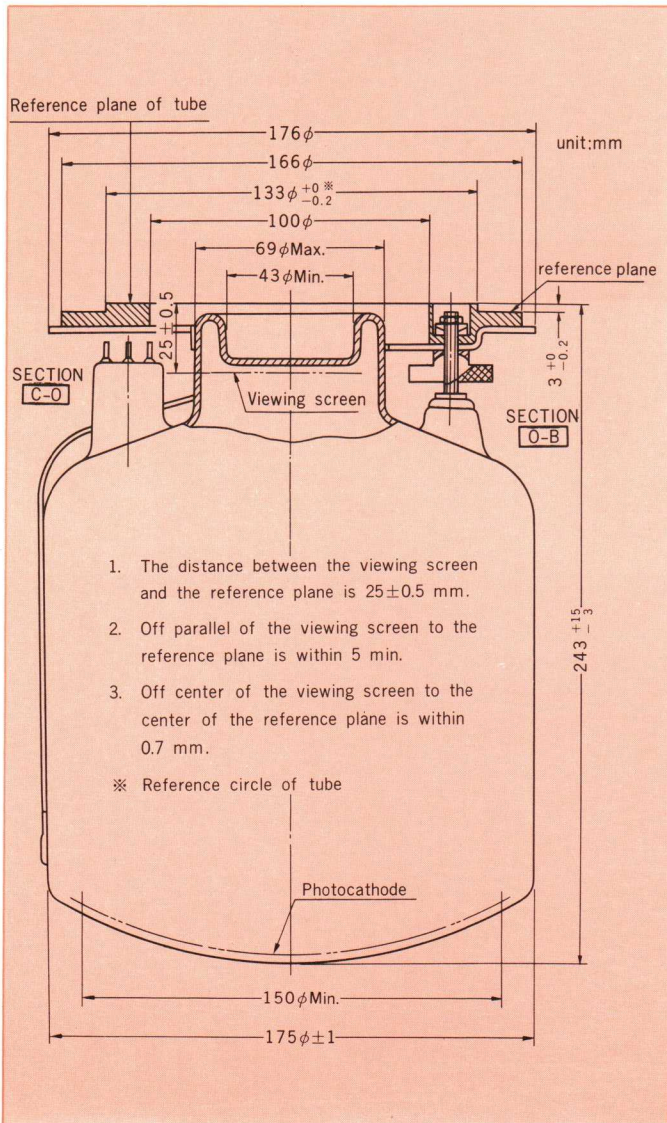
## APPLICATIONS

E5028A and E5025C have images of high brightness and high quality and have many applications both in medical and industrial fields. In every use, the tubes can reduce X-Ray dose considerably both to the patient (object) and the operator. Some applications are as follows.

### Direct observation

The tube is used for fluoroscopy by means of an ocular, a mirror or combination of them. Because of its high brightness, it is unnecessary for the observer to work in dark. Moreover the diagnosis is more reliable since the speed of perception and visual acuity of the human eye increase with the light intensity.

### Outline of E5028A



### Television pick up

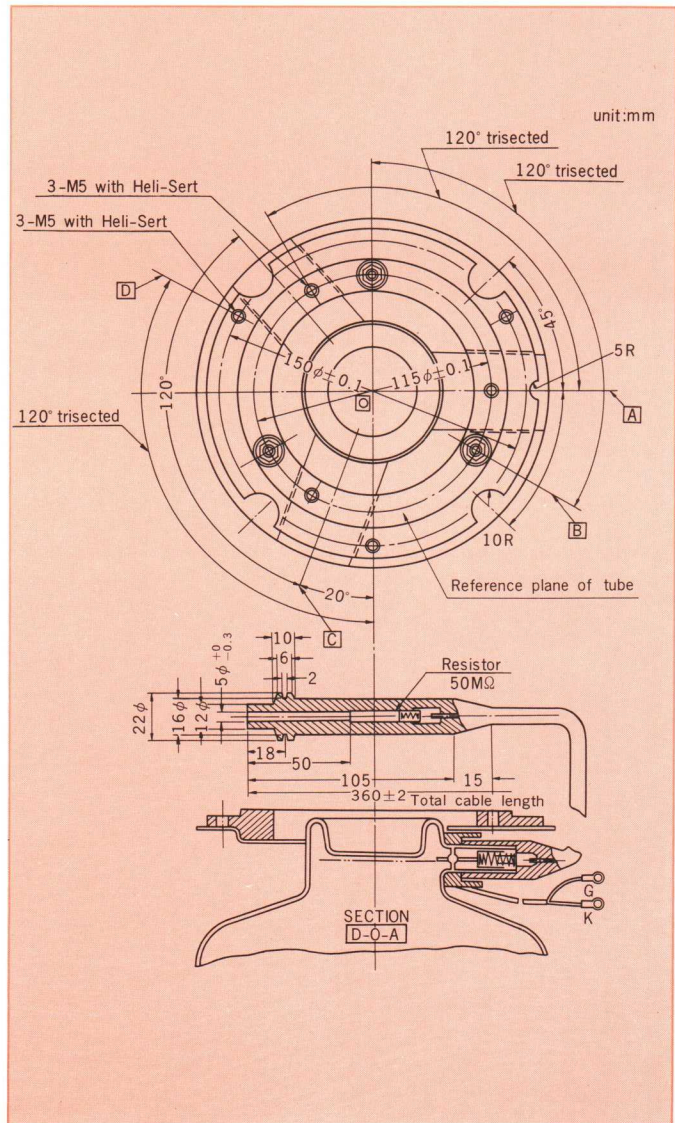
The output image of the tube is easily picked up with vidicon or image orthicon camera of X-ray television system. This system enables the dose on the operator completely zero and on the patient considerably small. The transmission of the image single and it's recording by means of V.T.R. are possible.

### Photography and cine camera

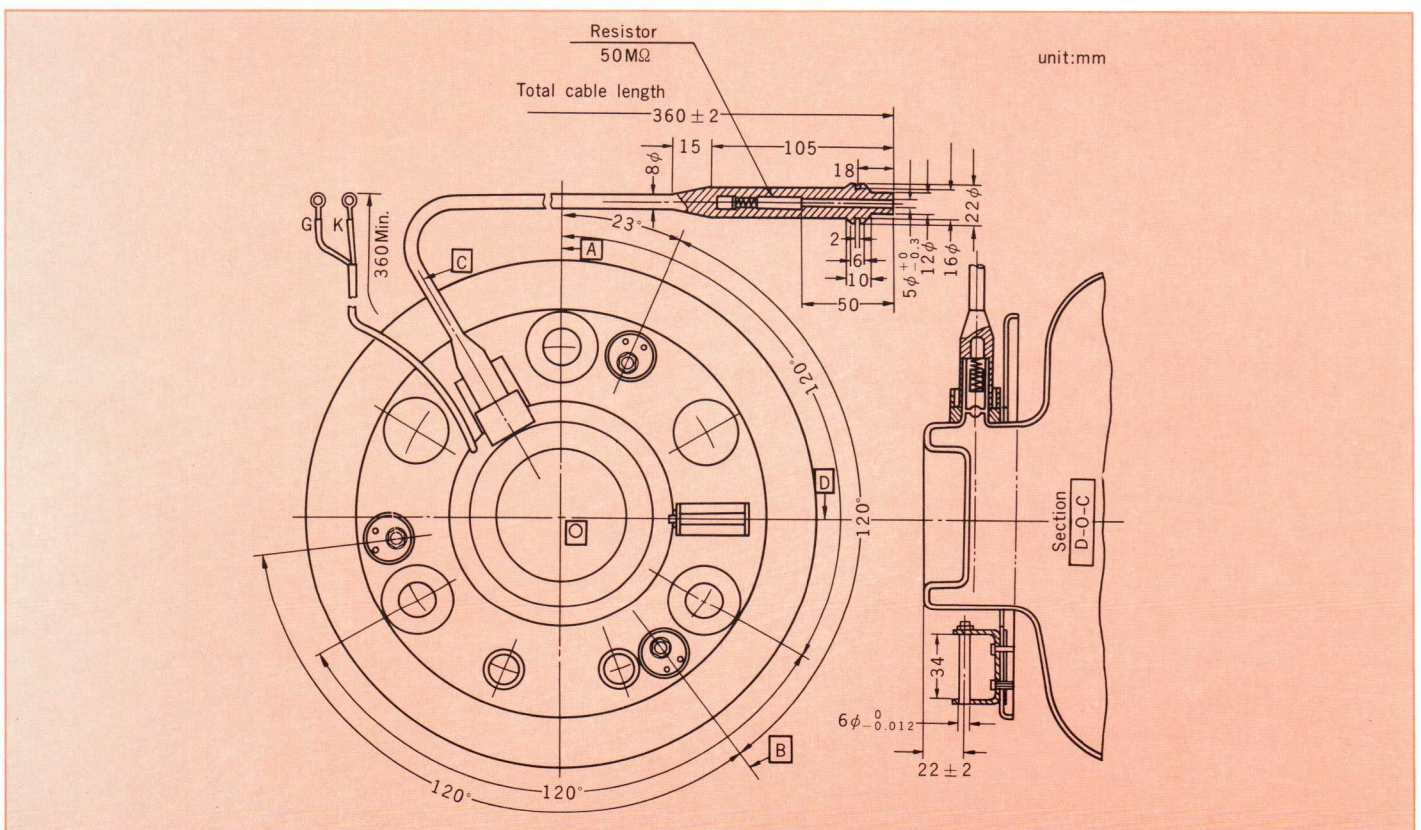
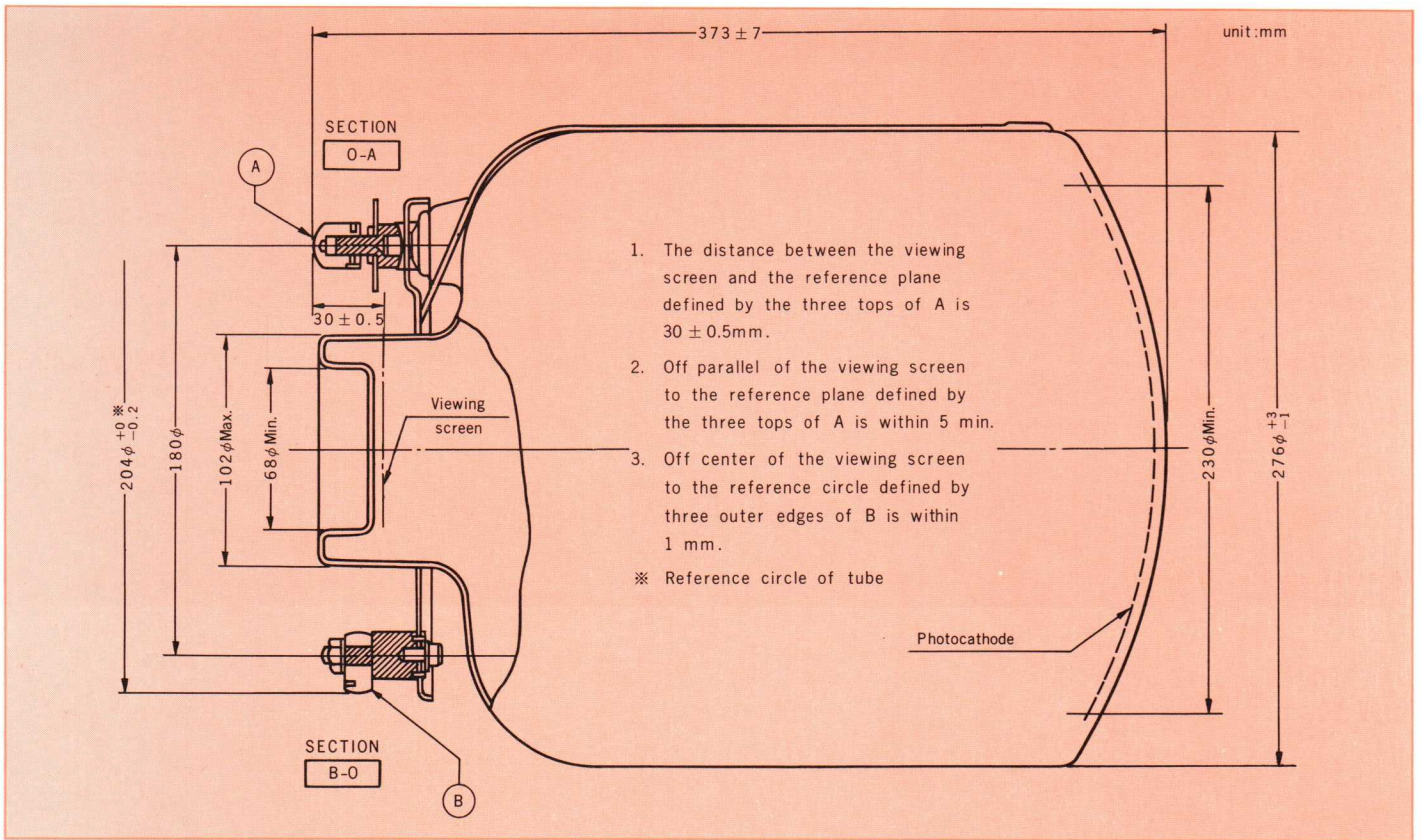
The photography is widely used for mass medical examination.

The output image of the tube is well photographed in magnified size with 70 mm (or the other size) spot camera.

The tube is satisfactory used for 16mm or 35mm cine camera, as the decay of fluorescence after switching off the X-ray beam is very short.



Outline of E5025C



# HOUSING FOR 6" VP-30201 & 9" VP-30301A X-RAY IMAGE INTENSIFIER TUBES



VP-30201 is Housing for Toshiba X-Ray image intensifier tube E5028A, and VP-30301A is for E5025C.

Pb shields, and protect the tubes from undesirable stray magnetic field by their high-permeability metal shields.

These Housings shut out X-Ray leakage by their

## INSTALLATIONS (see attached drawings)

### How to fix the Housing to the X-ray table

#### VP-30201

Support the housing with the screw A on the terminal box of the housing

#### VP-30301A

Support the housing with the fixing hole A in the terminal box, and fix the input side with the hole B of the input ring.

### Optical positions (Example: When Toshiba image intensifier tube are used)

The distance between the viewing screen of tube and the reference plane of housing .....  
 Off parallel of viewing screen to the reference plane of housing .....  
 Off center of the viewing screen to the reference circle of housing .....

#### VP-30201

25 ± 0.5 mm

Max. 5 min

Max. 0.7 mm

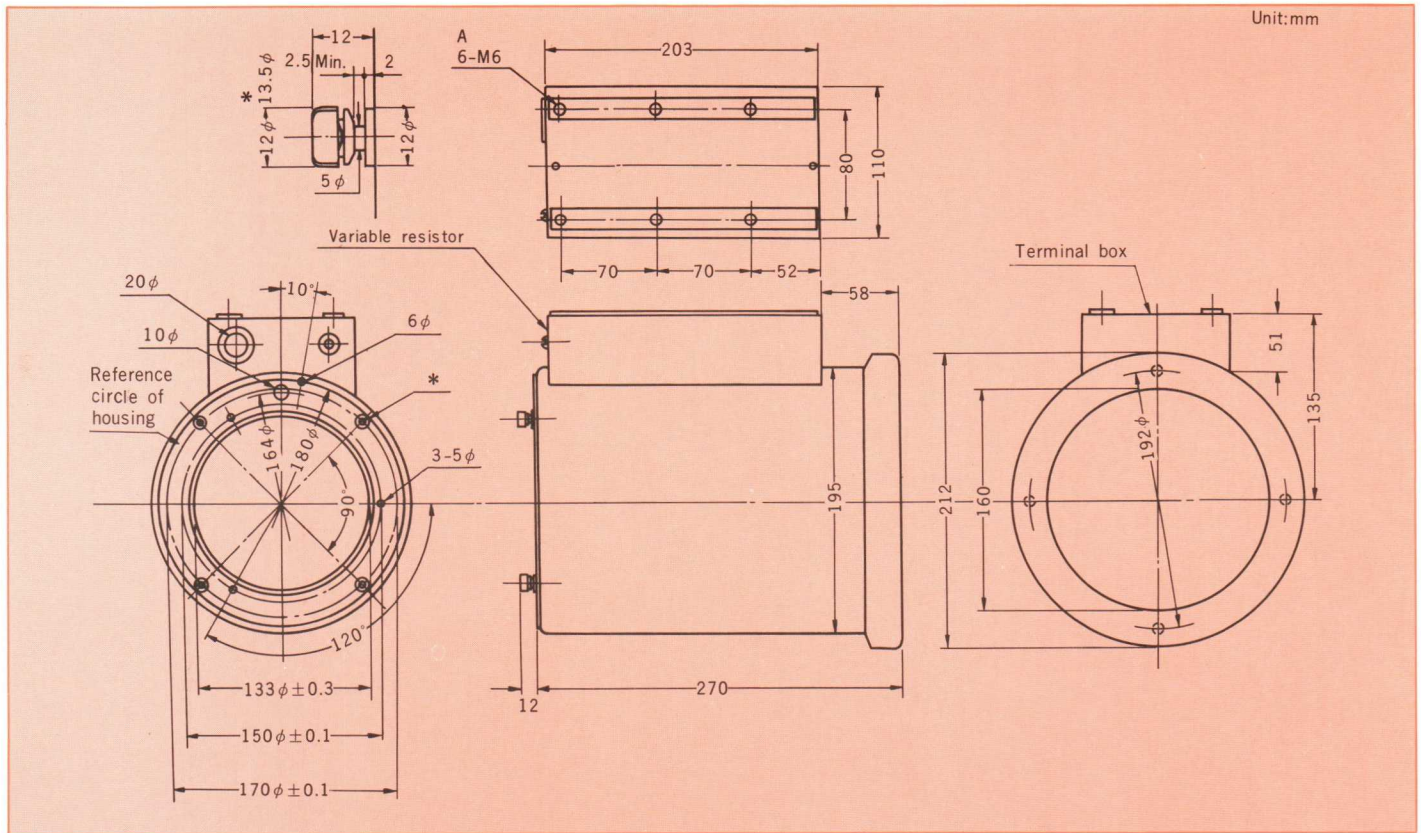
#### VP-30301A

43 ± 0.5 mm

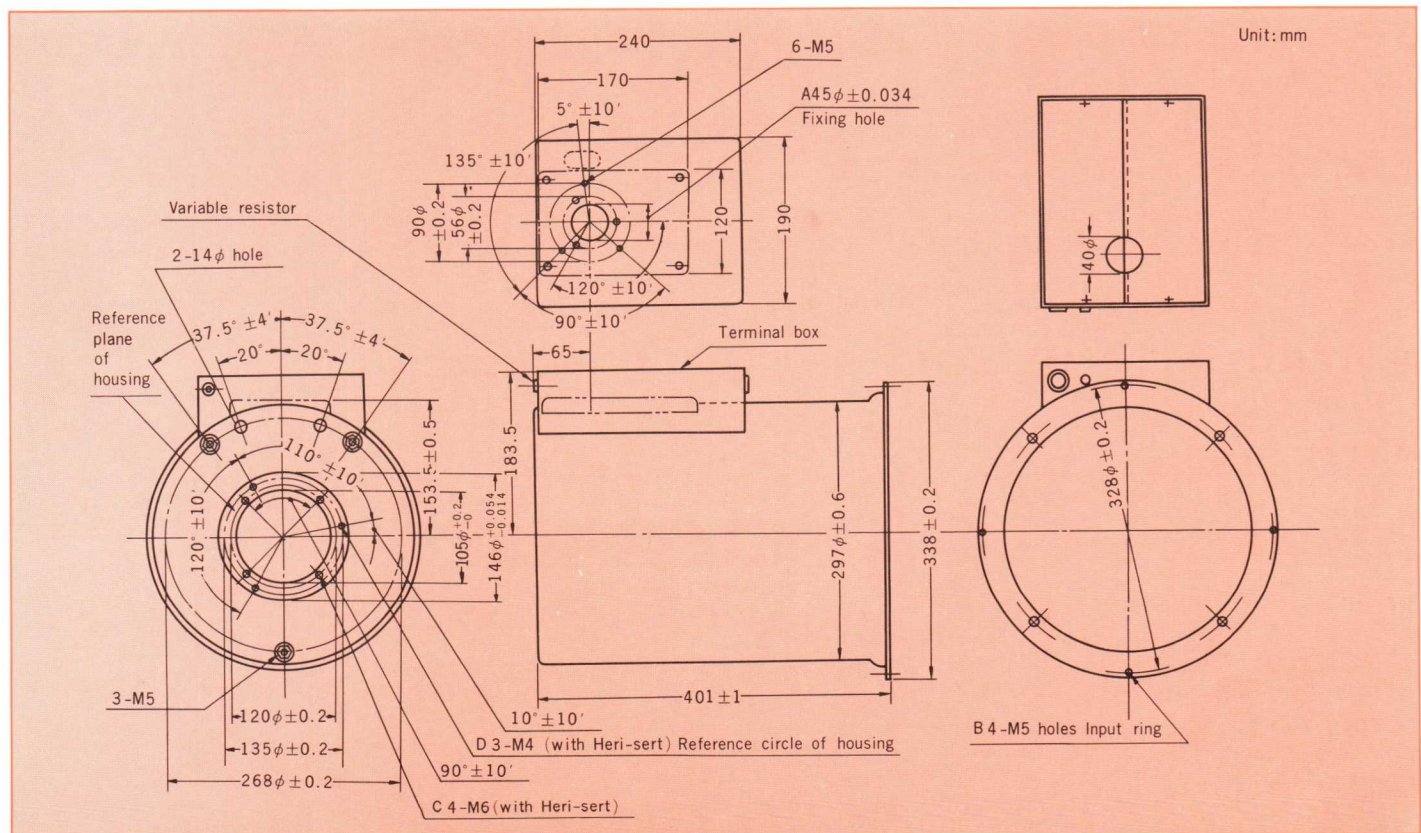
Max. 5 min

Max. 1.0 mm

■ Outline of VP-30201



■ Outline of VP-30301A





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