


## ROTANODE™

E7252X  
E7252FX  0197  
E7252GX

### Rotating Anode X-ray Tube Assembly

- ◆ High speed rotating anode X-ray tube assembly for high energy radiographic and cine-fluoroscopic operations.
- ◆ The heavy anode is constructed with specially processed rhenium-tungsten faced molybdenum target which is 74 mm diameter and has an improved coating to increase thermal emissivity.
- ◆ These tubes have foci 1.2 and 0.6, and are available for a maximum tube voltage 150 kV.
- ◆ Accommodated with IEC60526 type high-voltage cable receptacles.



### General Data

**IEC Classification (IEC60601-1:2005+A1:2012) ..... Class I ME EQUIPMENT**

#### Electrical:

Circuit:

High Voltage Generator ..... Constant Potential High-voltage Generator  
Grounding ..... Center-grounded

Nominal X-ray Tube Voltage:

Radiographic ..... 150 kV  
Fluoroscopic ..... 125 kV

Nominal Focal Spot Value:

Large Focus ..... 1.2  
Small Focus ..... 0.6

Nominal Anode Input Power (at 0.1s) :

	180 Hz	60 Hz	50 Hz
Large Focus .....	75 kW	44.6 kW	40.6 kW
Small Focus .....	27 kW	16 kW	14.2 kW

Nominal Radiographic Anode Input Power:

	180 Hz	60 Hz	50 Hz
Large Focus .....	70 kW	40 kW	37 kW
Small Focus .....	27 kW	16 kW	14.2 kW

★The information contained herein is presented only as a guide for the application of our products. No responsibility is assumed by Toshiba Electron Tubes & Devices Co., Ltd. (TETD) for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TETD or others.

★The information contained herein may be changed without prior notice. It is therefore, advisable to contact to TETD before processing with the design of equipment incorporating this product.

Motor Ratings:<sup>1)</sup>

Stator: XS-AL

	Starting		Running	
	180 <sup>2)</sup>	60	180 <sup>2)</sup>	60
Driven Frequency [Hz]	180 <sup>2)</sup>	60	180 <sup>2)</sup>	60
Input Power [W]	1100	910	83	83
Voltage <sup>4) 6)</sup> [V]	220	130	60	40
Current <sup>5)</sup> [A]	5.7	7.8	1.6	2.3
Min. Speed Up <sup>2) 8)</sup> [s]	1.2	0.8	-	-
Capacitor [ $\mu$ F]	6	44	6	44
Min. Braking <sup>3) 8)</sup> [s]	3 / 90 V (DC)			

Stator Resistance:

Common - Main Winding ..... 9.4  $\Omega$   
 Common - Auxiliary Winding ..... 28.3  $\Omega$

Stator: XS-RA

	Starting		Running	
	180 <sup>2)</sup>	50/60	180 <sup>2)</sup>	50/60
Driven Frequency [Hz]	180 <sup>2)</sup>	50/60	180 <sup>2)</sup>	50/60
Input Power [W]	2300	1450	300	80
Voltage <sup>4) 6)</sup> [V]	460	240	130	58
Current <sup>5)</sup> [A]	5.4	6.5	2.0	1.5
Min. Speed Up <sup>2) 8)</sup> [s]	1.0	0.6	-	-
Capacitor [ $\mu$ F]	3	24	3	24
Min. Braking <sup>3) 8)</sup> [s]	1.5 / 90 V (DC)			

Stator Resistance:

Common - Main Winding ..... 27.5  $\Omega$   
 Common - Auxiliary Winding ..... 58.0  $\Omega$

Note 1) To be obtained with AID starter Model 60/180.

2) The speed up time from normal speed to high speed is 2/3 times of the specified speed up time from 0 to high speed, which is described on motor rating table.

3) To be applied for high speed rotation.

4) Applied voltage between common and main terminal.

5) Common current.

6) The every applied voltage must be never exceeded 110% of the above specification.

7) No more than two high speed starts per minute are permissible.

8) The speed-up time is allowed up to 110% of the above specification.

Anode Speed:

180 Hz ..... Minimum 9700 min<sup>-1</sup>  
 60 Hz ..... Minimum 3200 min<sup>-1</sup>  
 50 Hz ..... Minimum 2700 min<sup>-1</sup>

Resistance between Housing and Low Voltage Terminals ..... Minimum 2 M $\Omega$

Normal Operating Range of the Housing Temperature ..... 16 ~ 75 °C

Mode of Operation ..... Intermittent

**Mechanical:**

Dimensions .....	See dimensional outline
Overall Length .....	476 mm
Maximum Diameter .....	152.4 mm
Target:	
Anode Angle .....	12 degrees
Diameter .....	74 mm
Construction .....	Rhenium-Tungsten faced Molybdenum
Filtration:	
Permanent Filtration .....	0.9 mm Al / 75 kV IEC60522:1999
Available Additional Filter combination (0.4 - 1.5 mm) .....	Maximum 2.4 mm Al / 75 kV
Radiation Protection (In accordance with IEC60601-1-3:2008):	
Leakage Technique Factor .....	150 kV, 3.4 mA
X-ray Coverage .....	430 × 430 mm at SID 1000 mm
Weight (Approx.) .....	18 kg
High Voltage Receptacle .....	To meet the requirements of IEC60526 Corrigendum1:2010
Cooling Method .....	Natural or Forced air
Tube Housing Model Number:	
E7252X .....	XH-106V
E7252FX .....	XH-181
E7252GX .....	XH-180

## **Absolute Maximum and Minimum Ratings** (At any time, these values must not be exceeded.)

**Maximum X-ray Tube Voltage:**

Radiographic .....	150 kV
Fluoroscopic .....	125 kV
Between Anode (or Cathode) and Ground .....	75 kV
Minimum X-ray Tube Voltage .....	40 kV
Maximum X-ray Tube Current .....	See rating charts
Large Focus .....	1000 mA
Small Focus .....	400 mA

**Maximum Filament Current:**

Large Focus .....	5.5 A
Small Focus .....	5.2 A

**Filament Voltage:**

Large Focus (At maximum filament current 5.5 A) .....	12.7 ~ 17.1 V
Small Focus (At maximum filament current 5.2 A) .....	6.3 ~ 8.5 V
Filament Frequency Limits .....	0 ~ 25 kHz
Continuous Anode Input Power .....	120 W (169 HU/s)
(Fluoroscopic, Radiographic or mixed exposure)	

**Thermal Characteristics:**

Anode Heat Content .....	210 kJ (300 kHU)
Maximum Anode Heat Dissipation .....	475 W (667 HU/s)
X-ray Tube Assembly Heat Content .....	900 kJ (1250 kHU)
Nominal Continuous Input Power:	
Without Air-circulator .....	200 W (16 kHU/min)

## Environmental Limits

### Operating Limits:

Temperature .....	10 ~ 40 °C
Humidity .....	30 ~ 85 %
	(No condensation)
Atmospheric Pressure .....	70 ~ 106 kPa

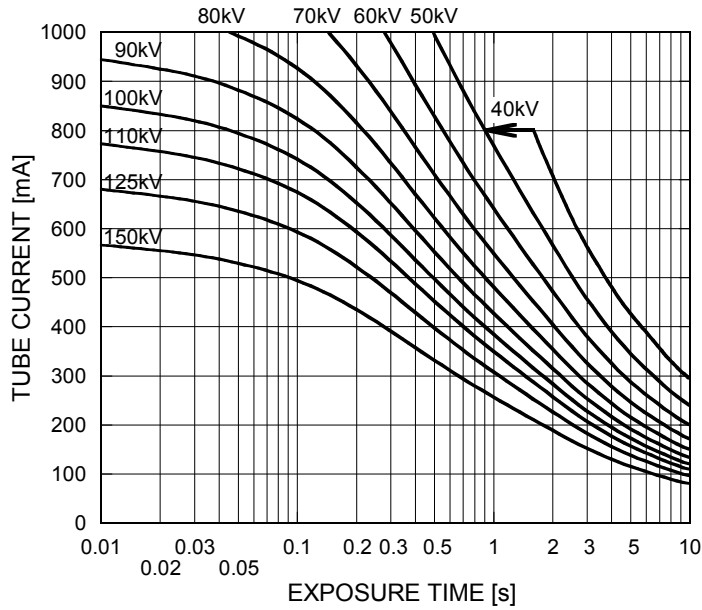
### Shipping and Storage Limits:

Temperature .....	-20 ~ 70 °C
Humidity .....	20 ~ 90 %
	(No condensation)
Atmospheric Pressure .....	50 ~ 106 kPa

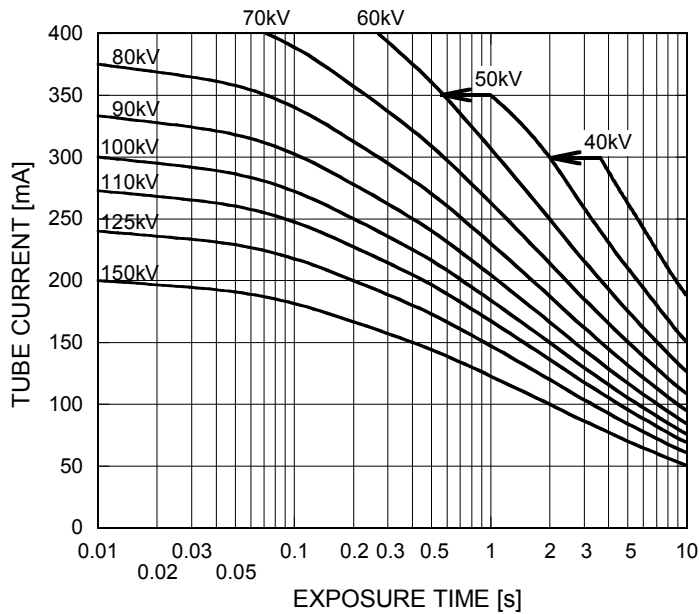
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 180Hz

Nominal Focal Spot Value: 1.2 ■



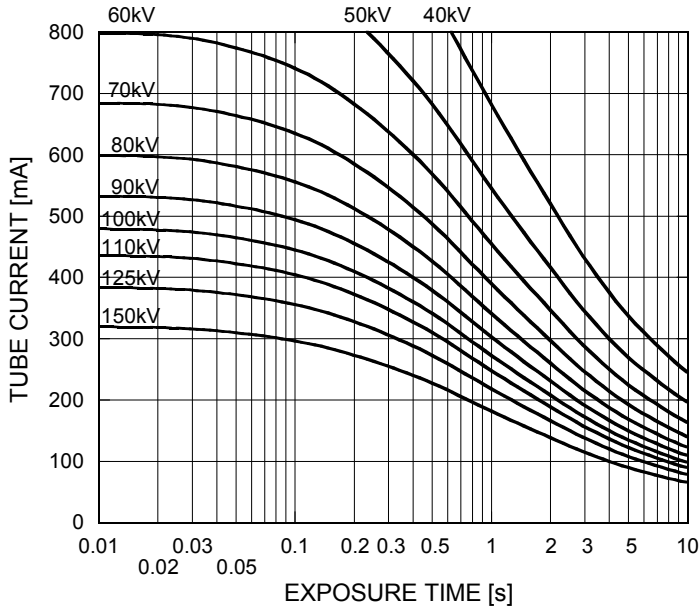
Nominal Focal Spot Value: 0.6 □



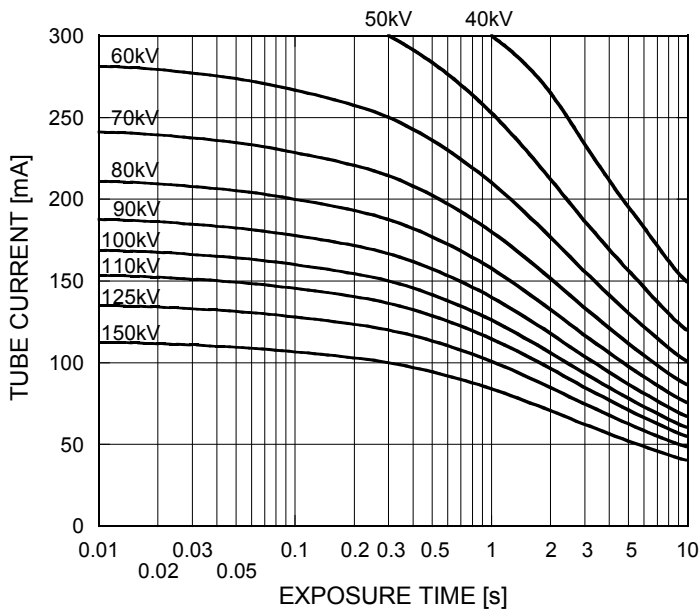
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 60Hz

Nominal Focal Spot Value: 1.2 ■



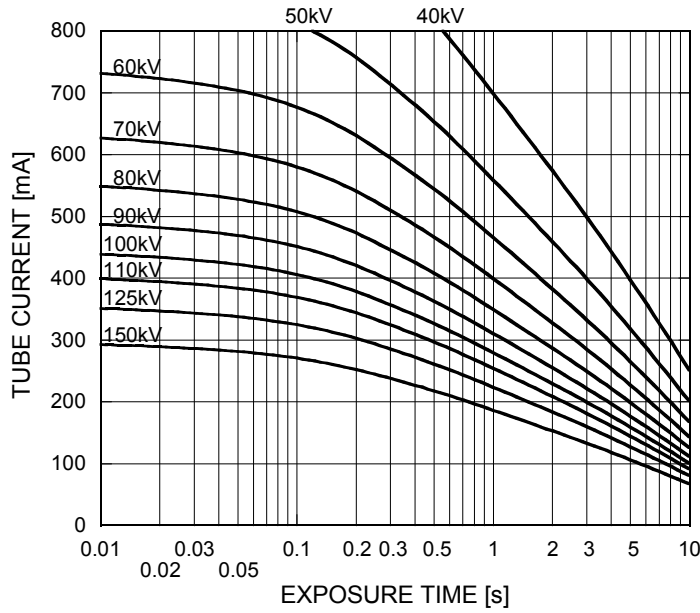
Nominal Focal Spot Value: 0.6 □



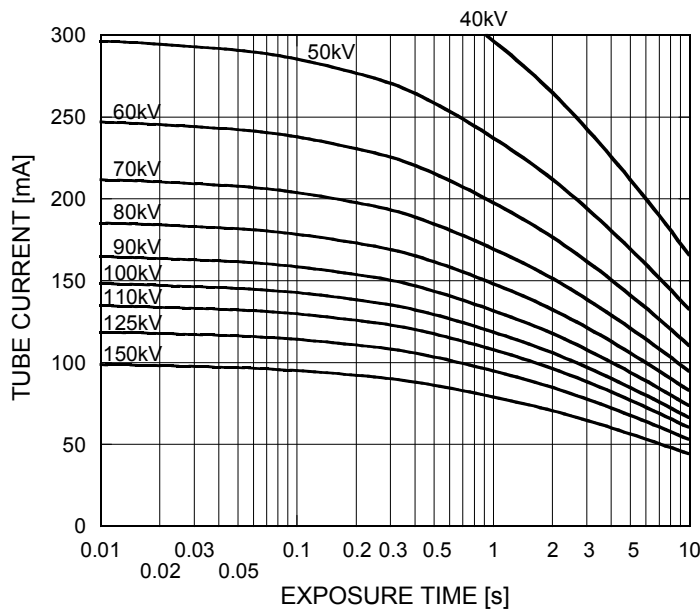
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 50 Hz

Nominal Focal Spot Value: 1.2 ■



Nominal Focal Spot Value: 0.6 □

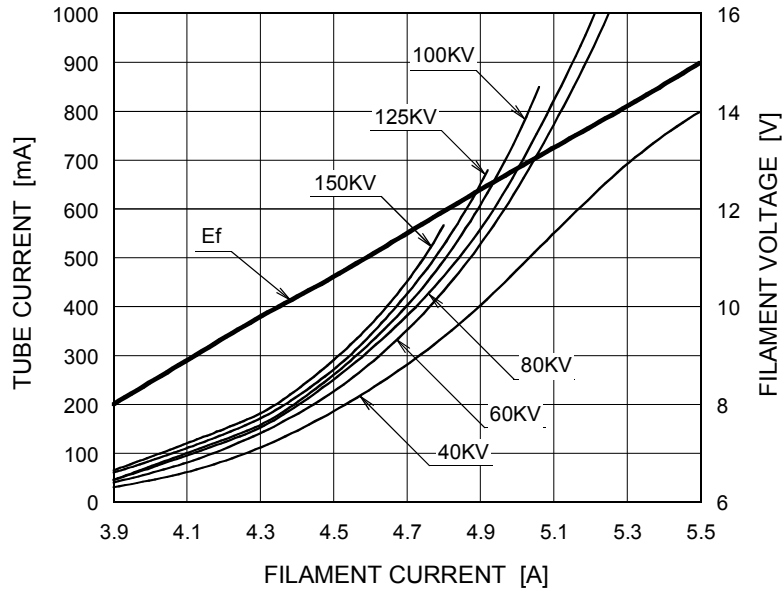




## Emission & Filament Characteristics

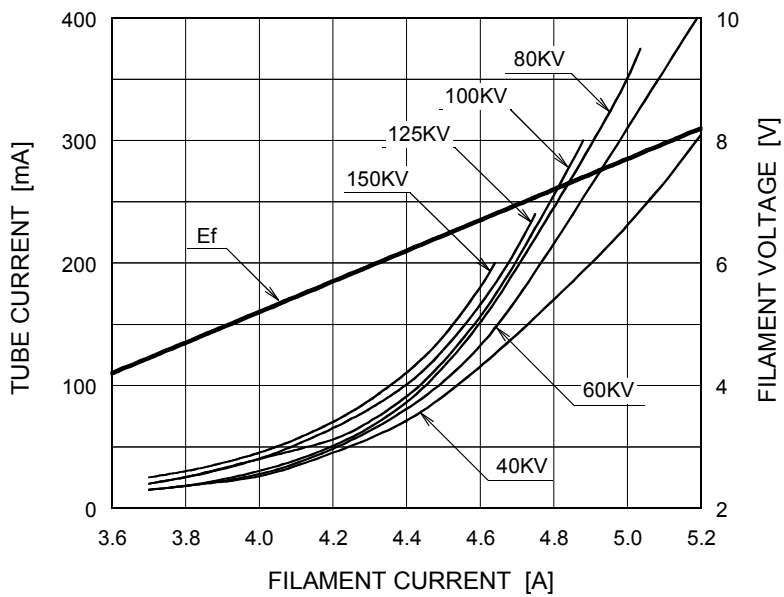
Constant Potential High-Voltage Generator

Nominal Focal Spot Value: 1.2 ■



For Reference Only

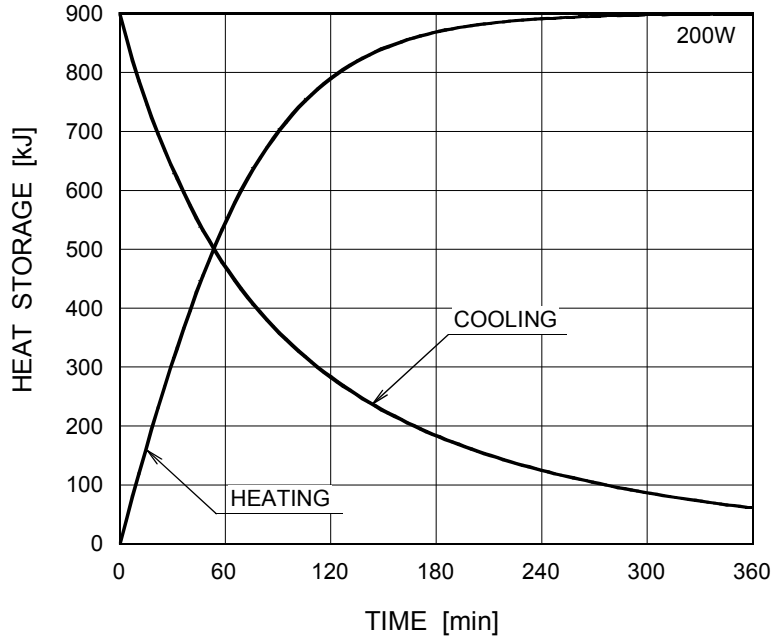
Nominal Focal Spot Value: 0.6 □



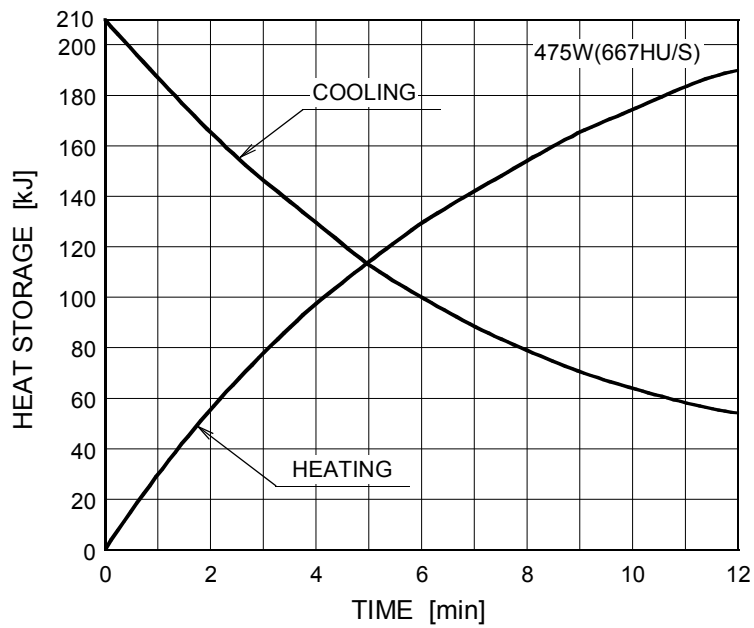
For Reference Only

## Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



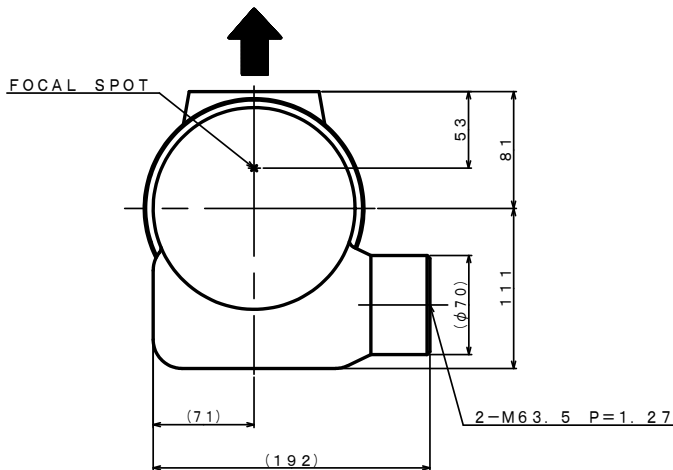
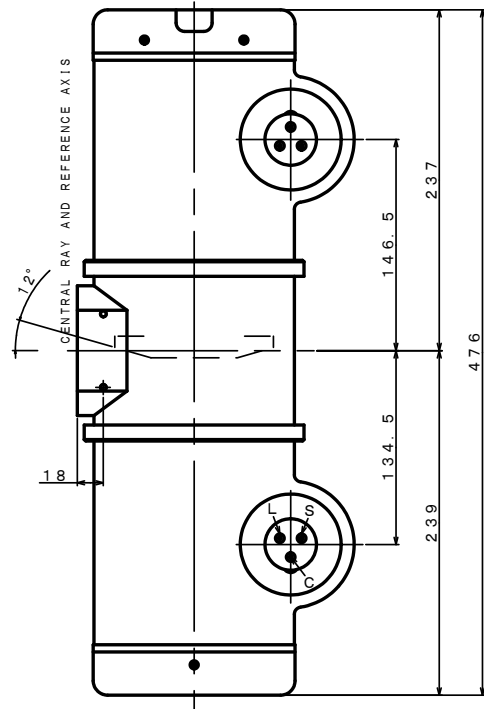
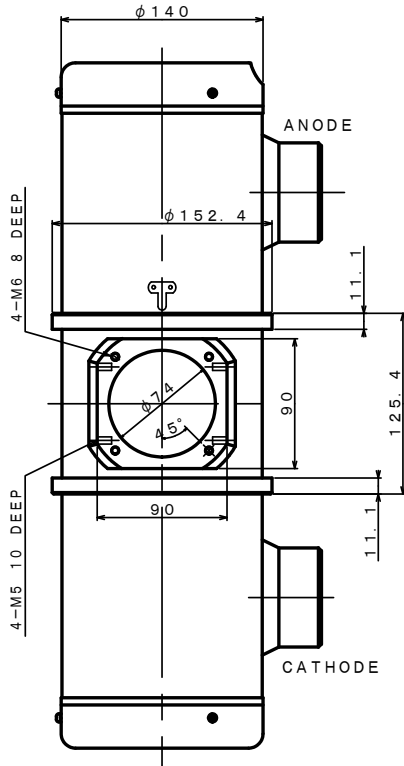
Anode Heating / Cooling Curve



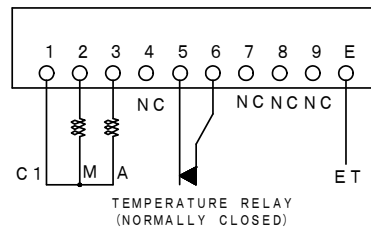
The heating curves are showing examples of average input power to the anode in operation.

### Dimensional Outline of E7252X

Unit mm



#### TERMINAL CONNECTIONS



Note) Do not connect terminal No. 1 and No. 5 or No. 6 in series circuit.

#### EXPLANATION OF SYMBOLS

CATHODE TERMINAL

C : COMMON

L : LARGE FOCUS

S : SMALL FOCUS

#### TERMINAL CONNECTIONS

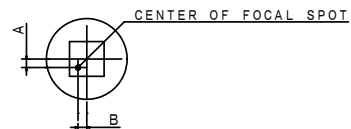
C1 : COMMON

M : MAIN WINDING OF THE STATOR

A : AUX. WINDING OF THE STATOR

NC : NON-CONNECTION

ET : EARTH TERMINAL

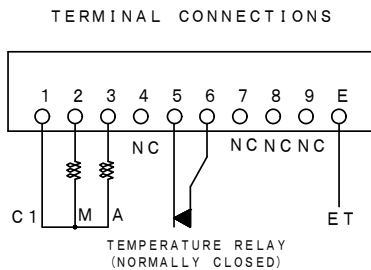
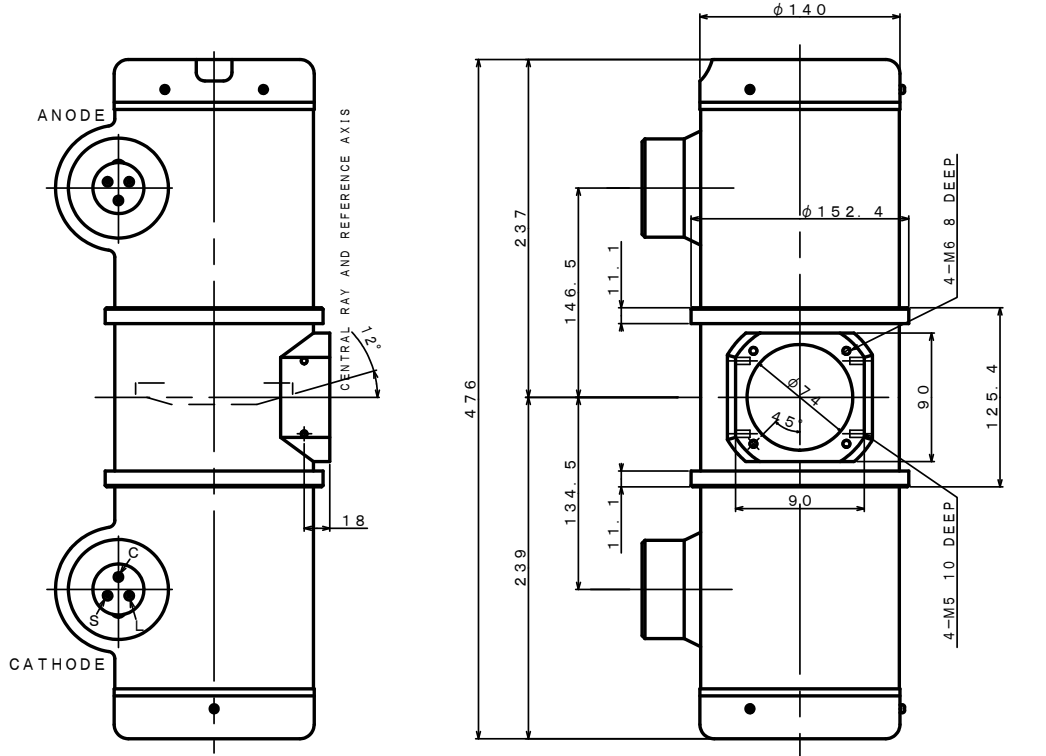


-1.5mm ≤ A ≤ 1.5mm  
-1.5mm ≤ B ≤ 1.5mm

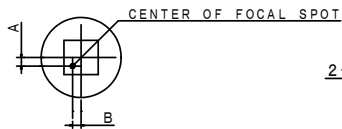
▲ : CENTRAL X-RAY  
ANODE & CATHODE TERMINAL  
: IEC60526 TYPE

### Dimensional Outline of E7252FX

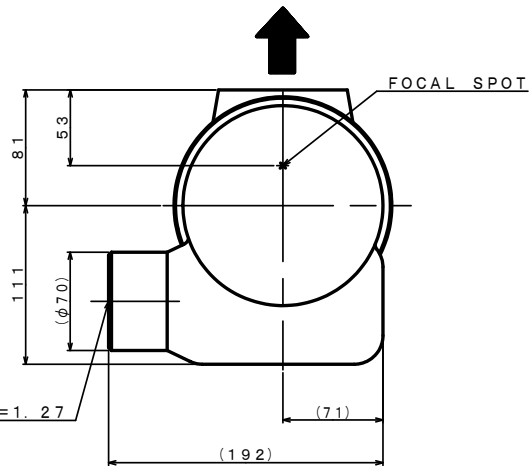
Unit mm



Note) Do not connect terminal No. 1 and No. 5 or No. 6 in series circuit.



-1.5mm ≤ A ≤ 1.5mm  
-1.5mm ≤ B ≤ 1.5mm



EXPLANATION OF SYMBOLS

- CATHODE TERMINAL
- C : COMMON
- L : LARGE FOCUS
- S : SMALL FOCUS

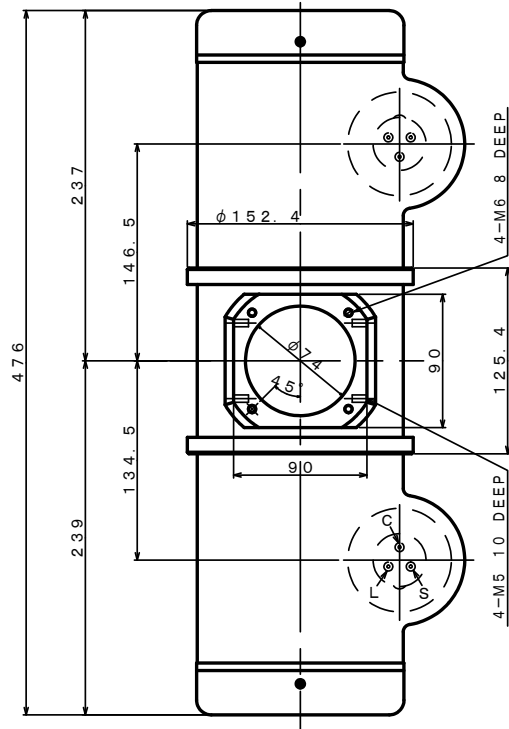
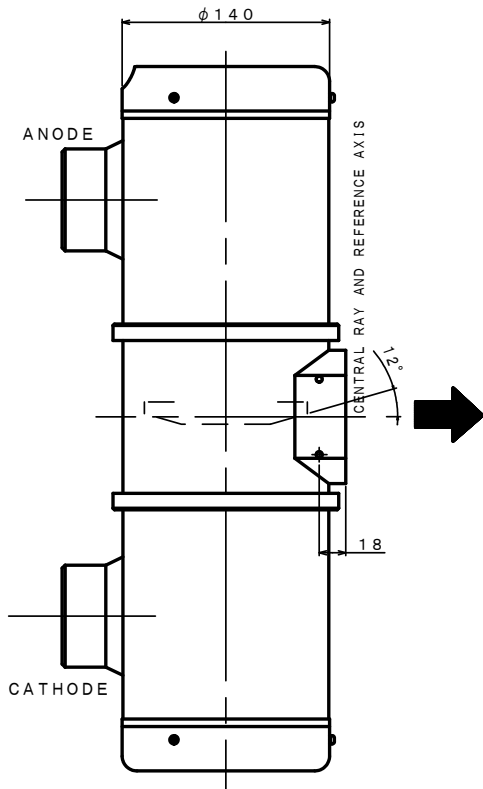
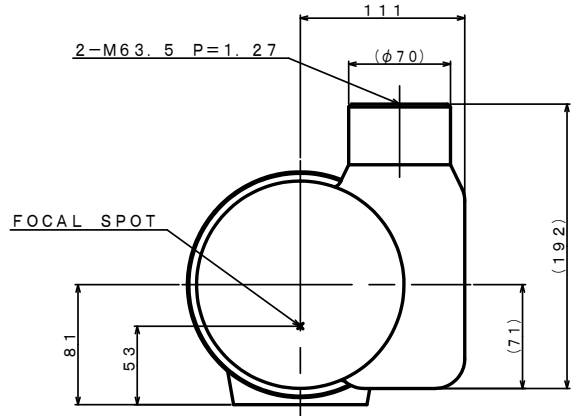
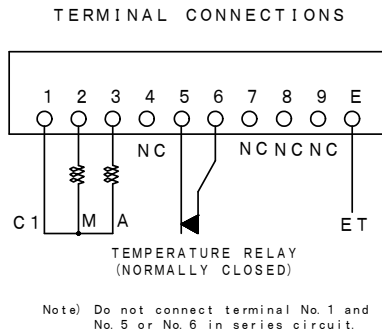
TERMINAL CONNECTIONS

- C1: COMMON
- M : MAIN WINDING OF THE STATOR
- A : AUX. WINDING OF THE STATOR
- NC: NON-CONNECTION
- ET: EARTH TERMINAL

- ↑: CENTRAL X-RAY
- ANODE & CATHODE TERMINAL : IEC60526 TYPE

## Dimensional Outline of E7252GX

Unit mm



### EXPLANATION OF SYMBOLS

CATHODE TERMINAL

C : COMMON

L : LARGE FOCUS

S : SMALL FOCUS

### TERMINAL CONNECTIONS

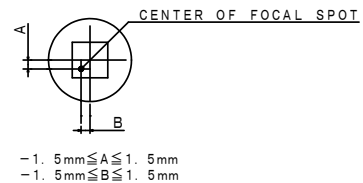
C1 : COMMON

M : MAIN WINDING OF THE STATOR

A : AUX. WINDING OF THE STATOR

NC : NON-CONNECTION

ET : EARTH TERMINAL



↑ : CENTRAL X-RAY  
ANODE & CATHODE TERMINAL  
: IEC60526 TYPE

---

 **TOSHIBA ELECTRON TUBES & DEVICES CO.,LTD.**

**Marketing Engineering Group, Sales Department**

1385,Shimoishigami,Otawara-shi,Tochigi 324-8550,Japan

Tel: +81-287-26-6666 Fax: +81-287-26-6060

<http://www.toshiba-tetd.co.jp/>

·The head office of Toshiba Electron Tubes & Devices Co., Ltd. has been certified to meet all the requirements of Environmental Management System ISO14001.  
·Toshiba Electron Tubes & Devices Co., Ltd. has been certified to meet all the requirements of Quality Management Systems ISO9001 and ISO13485.  
Product scope is referred to the following URL. <http://www.toshiba-tetd.co.jp/tetd/eng/company/quality.htm>.