

ROTANODE™  
E7813X  
E7813GX



**Rotating Anode X-ray Tube Assembly**

- ◆ Rotating anode X-ray tube for the purpose of general diagnostic X-ray procedures.
- ◆ Specially processed tungsten faced molybdenum target of 74 mm diameter.
- ◆ These tubes have foci 2.0 and 1.0, 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) ..... Class I ME EQUIPMENT**

**Electrical:**

Circuit:

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

Nominal X-ray Tube Voltage (IEC60613:2010):

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

Nominal Focal Spot Value (IEC60336:2005):

Large Focus ..... 2.0  
Small Focus ..... 1.0

Nominal Anode Input Power (at 0.1s):

	50 Hz	60 Hz	180 Hz
Large Focus	42.8 kW	46 kW	80 kW
Small Focus	19 kW	21.2 kW	35 kW

Nominal Radiographic Anode Input Power (IEC60613:2010)

	50 Hz	60 Hz	180 Hz
Large Focus	42.8 kW	46 kW	80 kW
Small Focus	19 kW	21 kW	35 kW

★The information contained herein is presented only as a guide for the applications 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 TETD before proceeding with the design of equipment incorporating this product.

Motor Ratings:

Stator: XS-AL

		Starting		Running	
Driven Frequency	[Hz]	180	60	180	60
Input Power	[W]	1100	910	83	83
Voltage <sup>3) 5)</sup>	[V]	220	130	60	40
Current <sup>4)</sup>	[A]	5.7	7.8	1.6	2.3
Min. Speed Up <sup>1) 5)</sup>	[s]	1.2	0.8	-	-
Capacitor	[µF]	6	44	6	44
Min. Braking <sup>2) 7)</sup>	[s]	3 / 90V (DC)			

- Note 1) 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 table.  
 2) To be applied for high speed rotation.  
 3) Applied voltage between common and main terminal.  
 4) Common current.  
 5) The every applied voltage must be never exceeded 110% of the above specification.  
 6) No more than two high speed starts per minute are permissible.  
 7) The speed-up time is allowed up to 110% of the above specification.

Anode Speed:

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

Stator Resistance:

Common-Main Winding	9.4 Ω
Common-Auxiliary Winding	28.3 Ω
Resistance between Housing and Low Voltage Terminals	Minimum 2 MΩ
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	16 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	354 × 354 mm at SID 750 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:	
E7813X	XH-106V
E7813GX	XH-180

## Absolute Maximum and Minimum Ratings

(At any time, these values must not be exceeded.)

Maximum X-ray Tube Voltage (IEC60613:2010):	
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 (IEC60613:2010) .....	
Large Focus .....	See rating charts
Small Focus .....	1000 mA
Small Focus .....	600 mA
Maximum Filament Current:	
Large Focus .....	5.2 A
Small Focus .....	5.2 A
Filament Voltage:	
Large Focus (At maximum filament current 5.2 A) .....	7.3 ~ 9.9 V
Small Focus (At maximum filament current 5.2 A) .....	5.6 ~ 7.6 V
Filament Frequency Limits .....	0 ~ 25 kHz
Continuous Anode Input Power (IEC60613:2010) .....	142 W (200 HU/s)
(Fluoroscopic, repeated 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 (IEC60613:2010):	
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

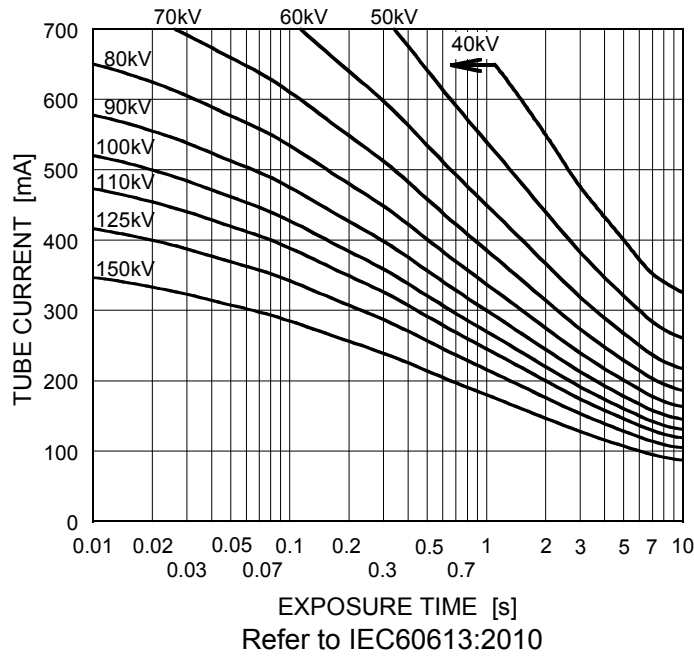
### Shipping and Storage Limits:

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

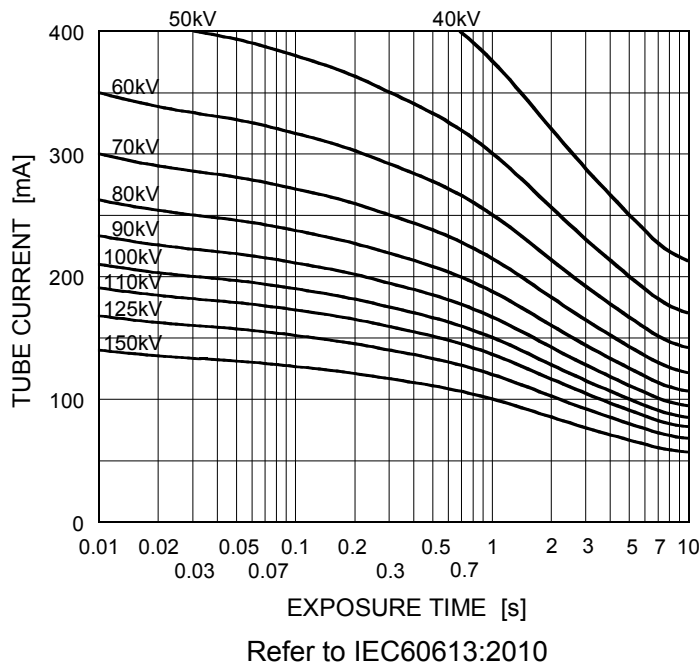
## Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 2.0 ■



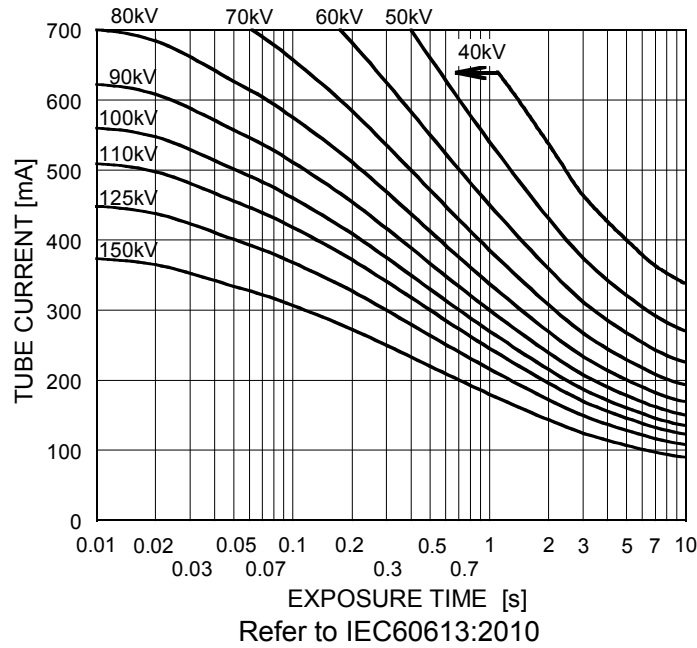
Nominal Focal Spot Value: 1.0 □



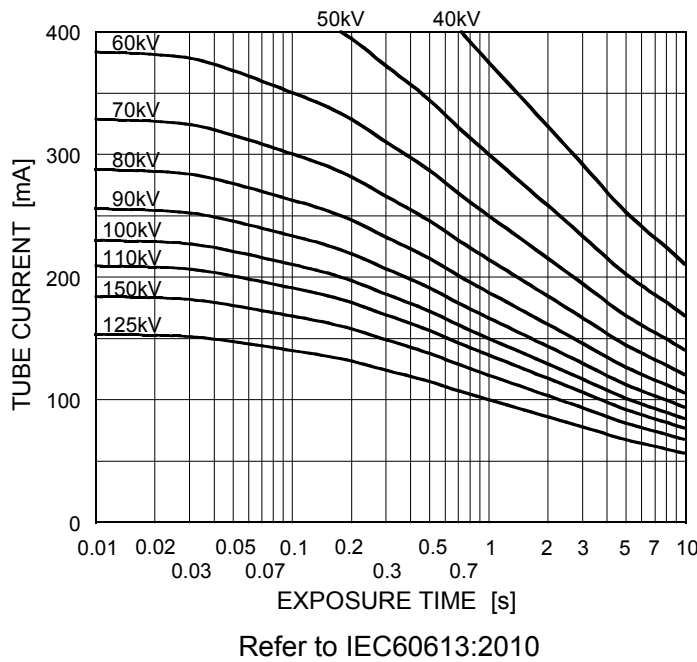
## Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 2.0 ■

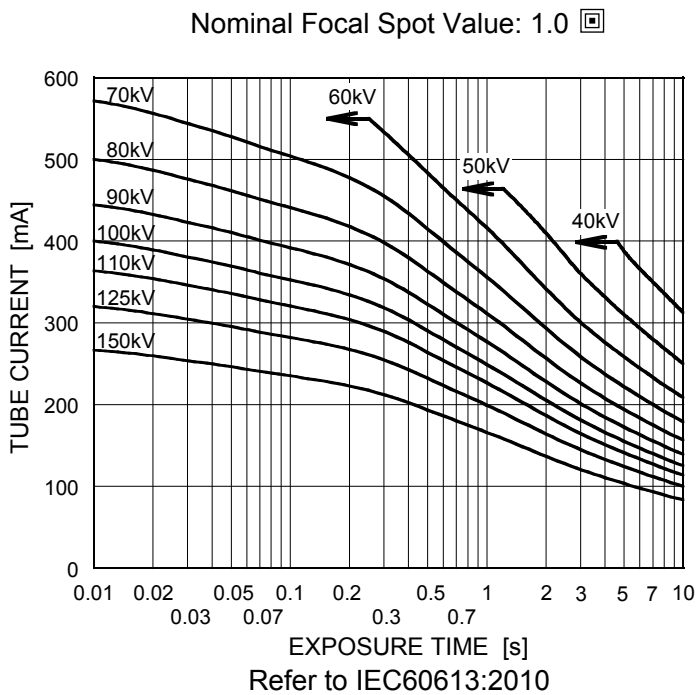
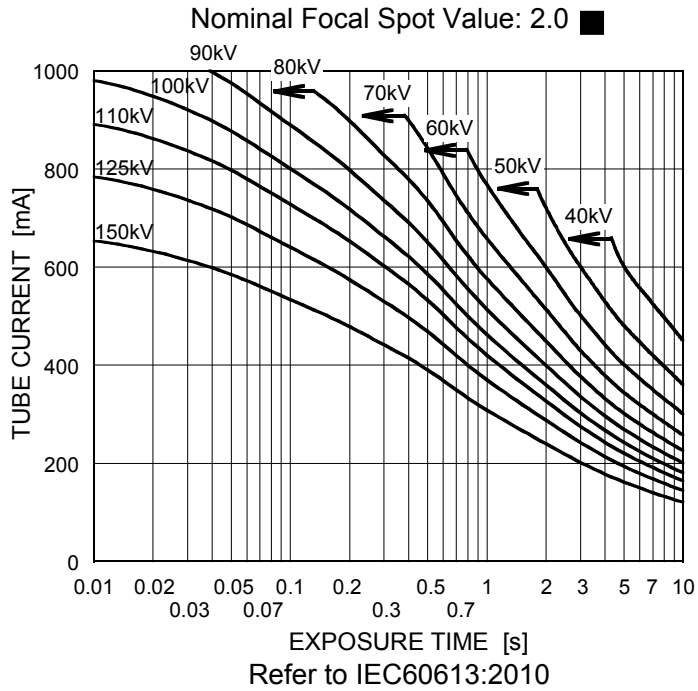


Nominal Focal Spot Value: 1.0 □



## Maximum Rating Charts (Absolute Maximum Rating Charts)

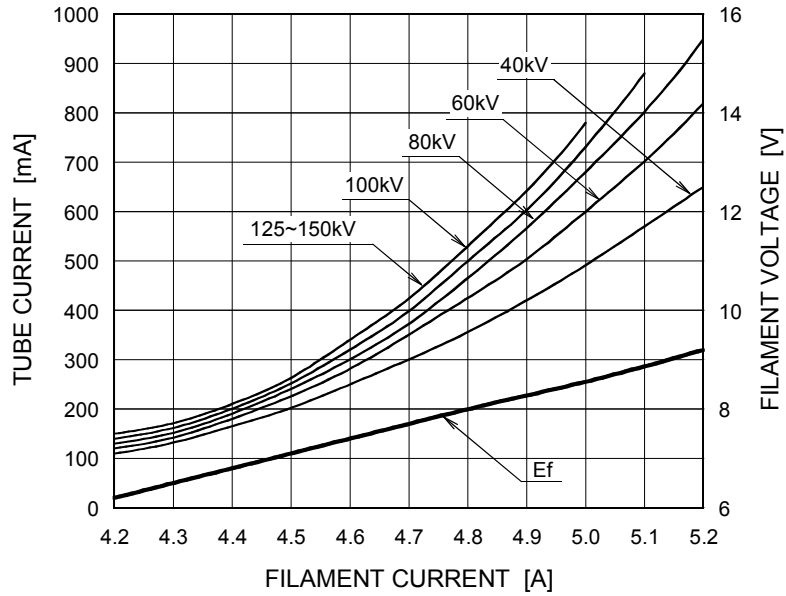
Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 180Hz



## Emission & Filament Characteristics

Constant Potential High-Voltage Generator

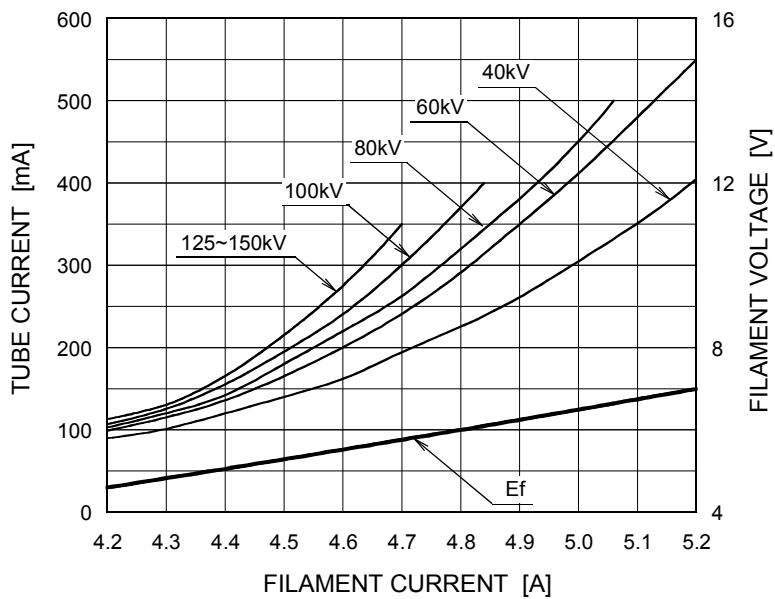
Nominal Focal Spot Value: 2.0 ■



Note1) For Reference Only

Note2) Refer to IEC60613:2010

Nominal Focal Spot Value: 1.0 □



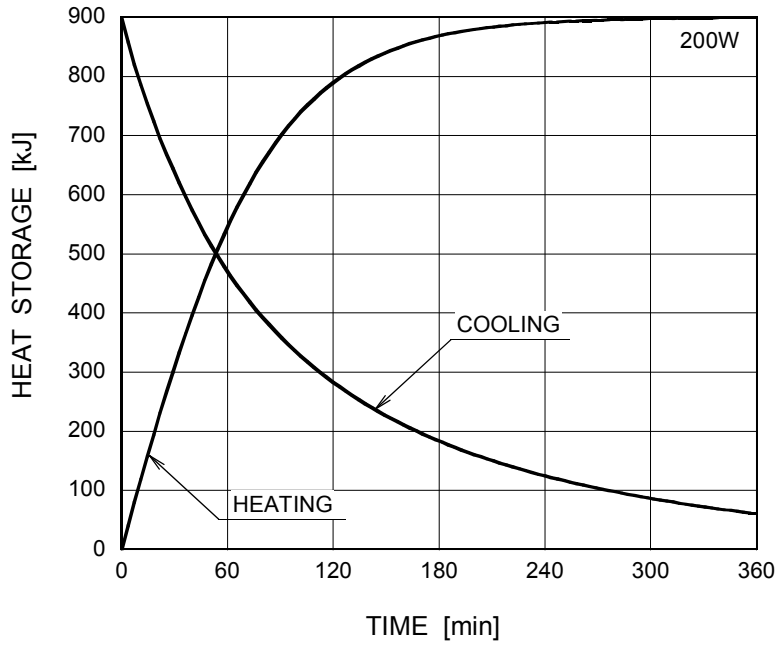
Note1) For Reference Only

Note2) Refer to IEC60613:2010

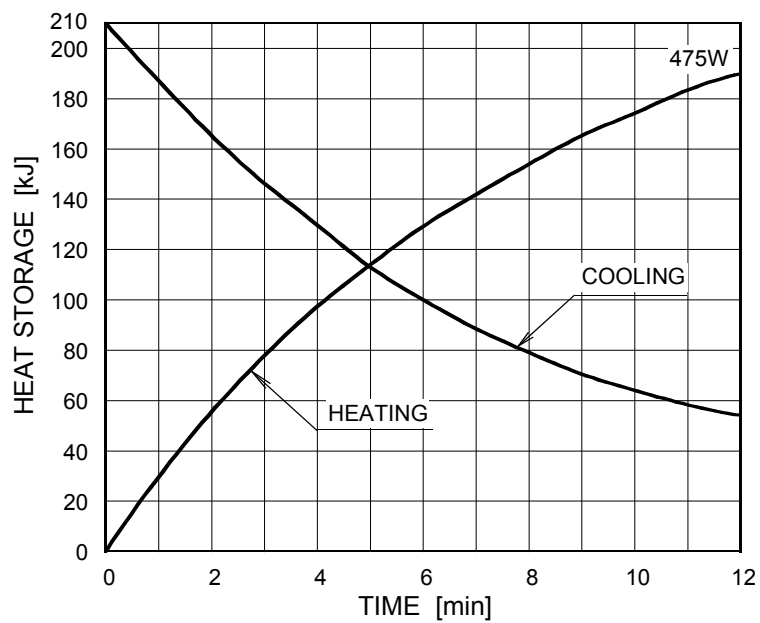


## Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



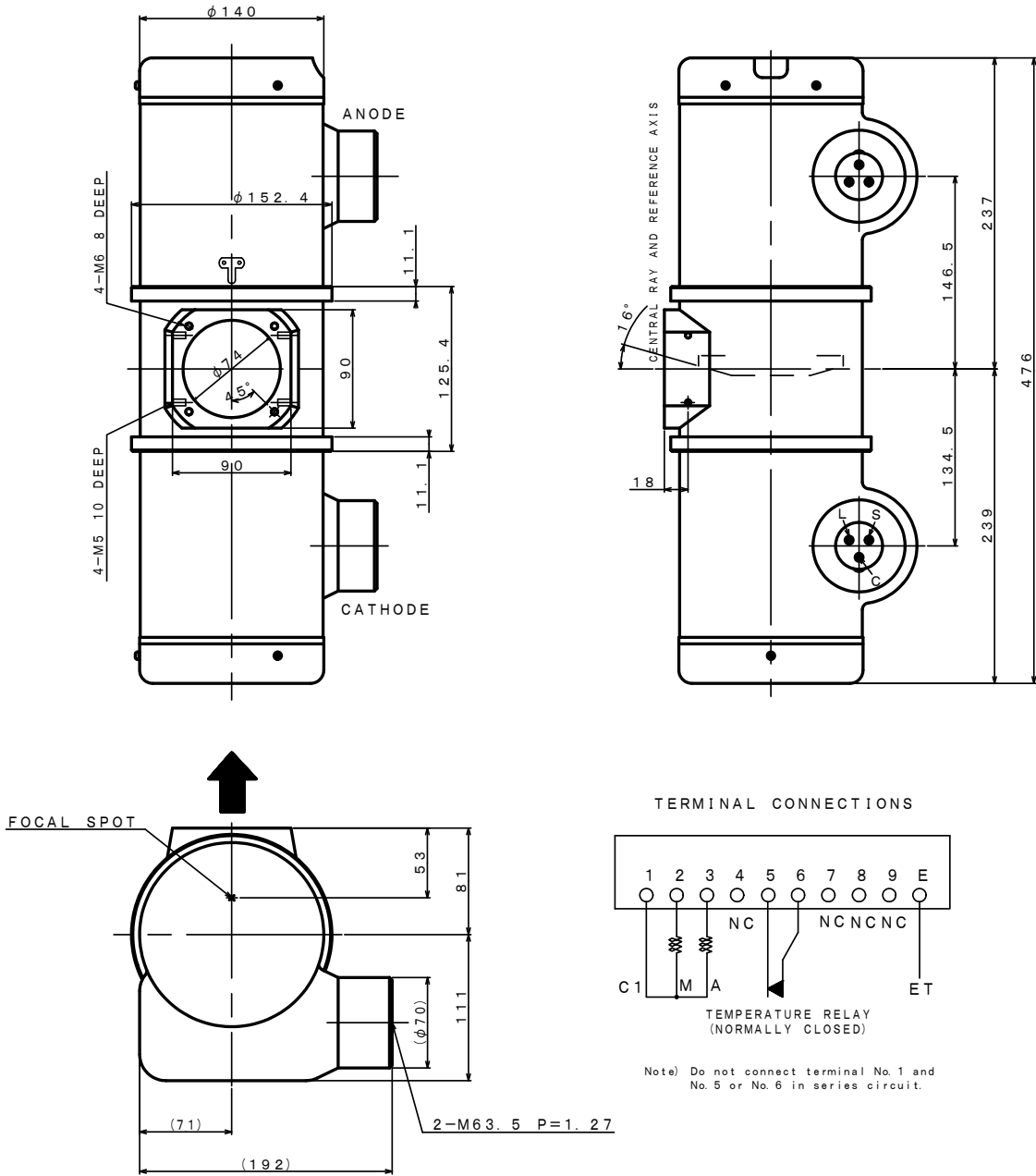
Anode Heating / Cooling Curve



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

### Dimensional Outline of E7813X

Unit: mm



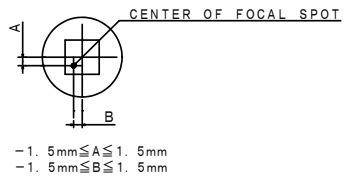
**EXPLANATION OF SYMBOLS**

**CATHODE TERMINAL**

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

**TERMINAL CONNECTIONS**

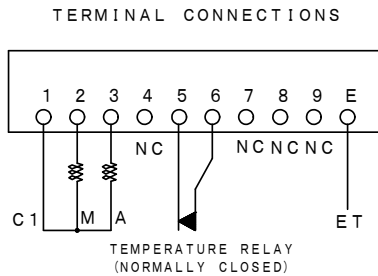
- C1 : COMMON
- M : MAIN WINDING OF THE STATOR
- A : AUX. WINDING OF THE STATOR
- NC : NON-CONNECTION
- ET : EARTH TERMINAL



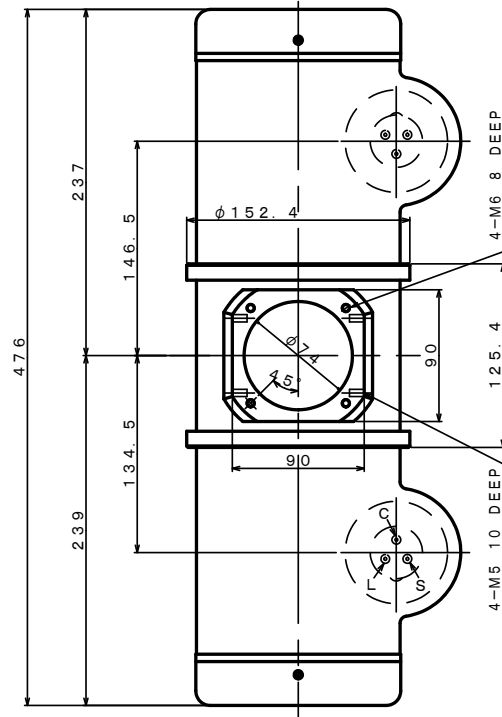
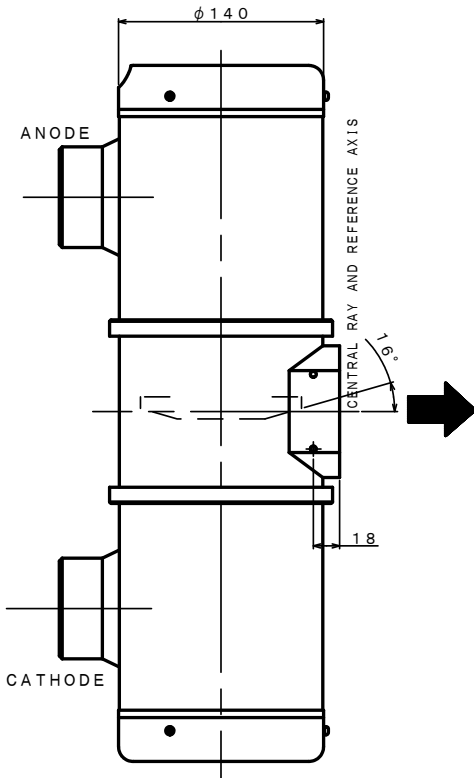
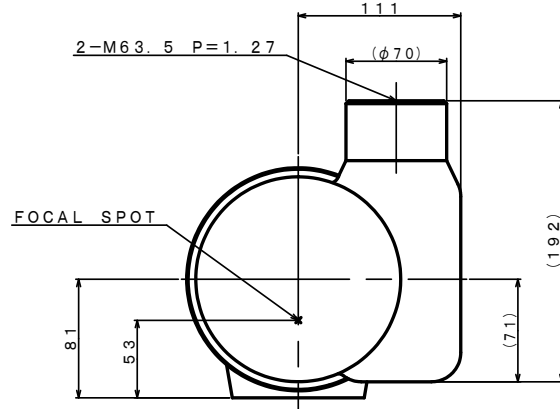
▲ : CENTRAL X-RAY ANODE & CATHODE TERMINAL : IEC60526 TYPE

## Dimensional Outline of E7813GX

Unit: mm



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



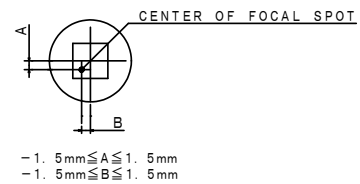
**EXPLANATION OF SYMBOLS**

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



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

## OVERSEAS SUBSIDIARIES AND AFFILIATES



### EU REPRESENTATIVE

· **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY  
PHONE +49 (211) 5296-107      FAX +49 (211) 5296-402

**For Sales & Technical Services, please contact the following representative:**

· **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY  
PHONE +49 (211) 5296-107      FAX +49 (211) 5296-402

· **TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC.**

2150 EAST LAKE COOK ROAD, SUITE 310  
BUFFALO GROVE, ILLINOIS 60089 USA  
PHONE +1 (847) 484-2400      FAX +1 (847) 541-7287

· **TOSHIBA ELECTRON DEVICES & MATERIALS (SHANGHAI) CO., LTD. (TEMS)**

RM1606, SH-PLAZA,  
No.336, XIZANG ROAD (MIDDLE), SHANGHAI, 200001, CHINA  
PHONE +86 (21) 6361-0077      FAX +86 (21) 6351-5760