

**ROTANODE™  
XRR-3331X**

**Rotating Anode X-ray Tube Assembly**

- ◆ This X-ray tube assembly is a part of medical X-ray diagnostic equipment applied for high energy X-ray radiography and fluoroscopy.
- ◆ 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.
- ◆ This tube has foci 1.2 and 0.6, and is available for a maximum tube voltage 150 kV.
- ◆ Accommodated with IEC60526 type high-voltage cable receptacles.
- ◆ This X-ray tube assembly is used for medical diagnosis.



**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 .....	78 kW	54 kW	50 kW
Small Focus .....	32 kW	22 kW	20 kW

Nominal Radiographic Anode Input Power:

	180 Hz	60 Hz	50 Hz
Large Focus .....	70 kW	46 kW	42 kW
Small Focus .....	27 kW	17 kW	16 kW

★The information contained herein is presented only as a guide for the application of our products. No responsibility is assumed by Canon Electron Tubes & Devices Co., Ltd. (CETD) 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 CETD or others.  
 ★The information contained herein may be changed without prior notice. It is therefore, advisable to contact to CETD before processing with the design of equipment incorporating this product.

Motor Ratings:

Stator: XS-AL

		Starting		Running	
Driven Frequency	[Hz]	180 <sup>2)</sup>	50/60	180 <sup>2)</sup>	50/60
Input power	[W]	1100	910	83	83
Voltage <sup>3)</sup>	[V]	220	130	60	40
Current	[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)</sup>	[s]	3 / 90 V (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 rating table.

2) To be applied for high speed rotation.

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

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

5) 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>

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 Operating	Intermittent

**Mechanical:**

Dimensions	See dimensional outline
Overall Length	479 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.)	16 kg
High Voltage Receptacle	To meet requirements of IEC60526 Corrigendum1:2010
Cooling Method	Natural or forced air
Tube Housing Model Number	XH-121

## 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:	
Radiographic .....	40 kV
Fluoroscopic .....	50 kV
Maximum X-ray Tube Current:	
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) .....	10.9 ~ 16.6 V
Small Focus (At maximum filament current 5.2 A) .....	6.8 ~ 9.2 V
Filament Frequency Limits .....	0 ~ 25 kHz
Continuous Anode Input Power .....	142 W (200 HU/s)
(Fluoroscopic, Radiographic or mixed exposure)	
Thermal Characteristics:	
Anode Heat Content .....	210 kJ (300 kHU)
Maximum Anode Heat Dissipation .....	870 W (1226 HU/s)
X-ray Tube Assembly Heat Content .....	900 kJ (1250 kHU)
Nominal Continuous Input Power:	
Without Air-circulator .....	180 W (15 kHU/min)

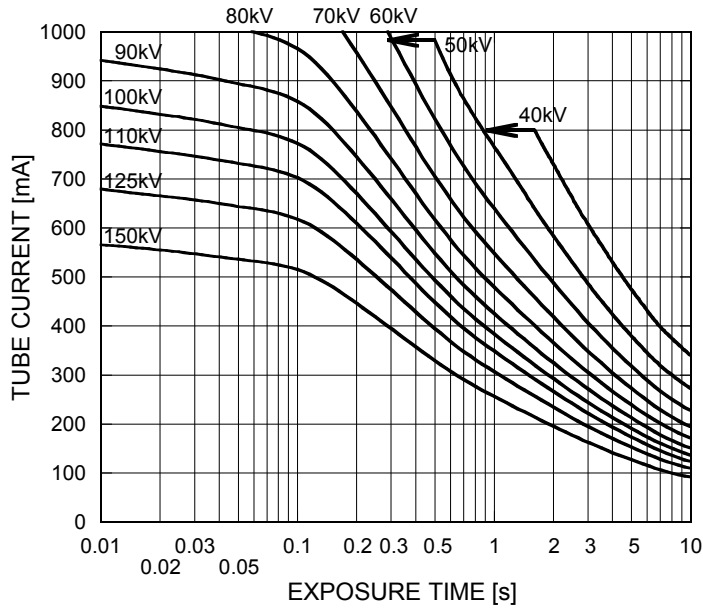
## Environmental Limits

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

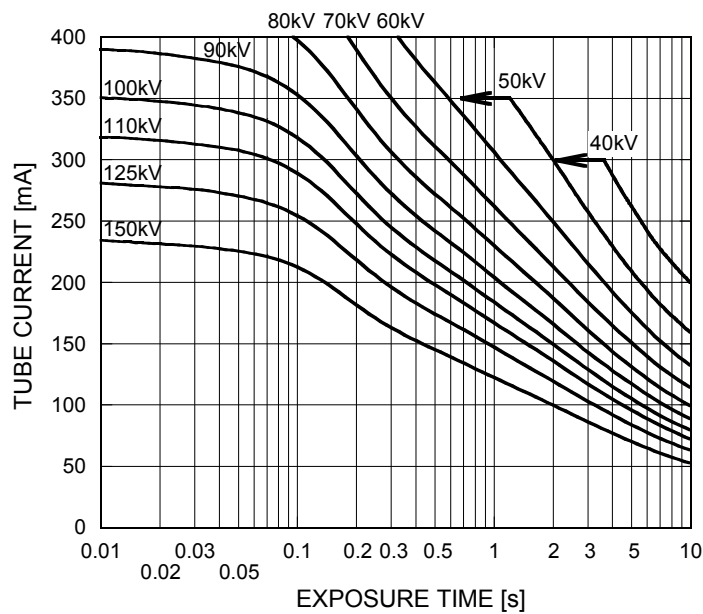
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant potential high-voltage generator  
Stator Power Frequency 180Hz

Nominal Focal Spot Value: 1.2 ■



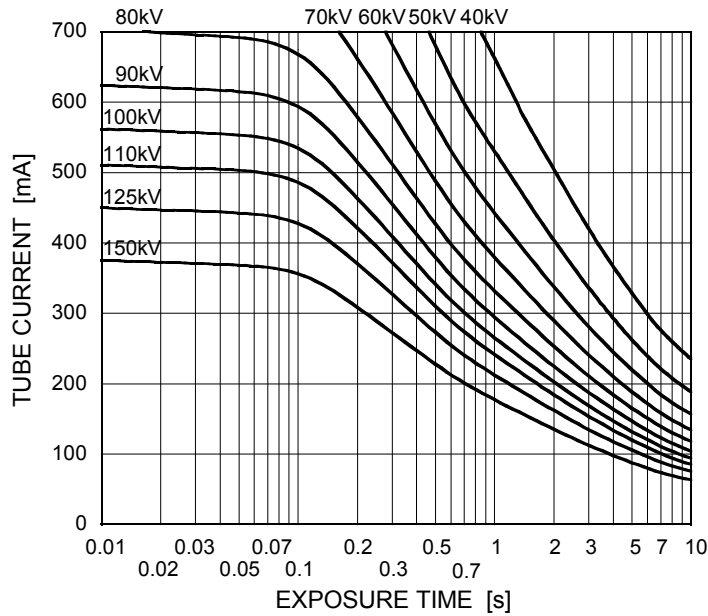
Nominal Focal Spot Value: 0.6 □



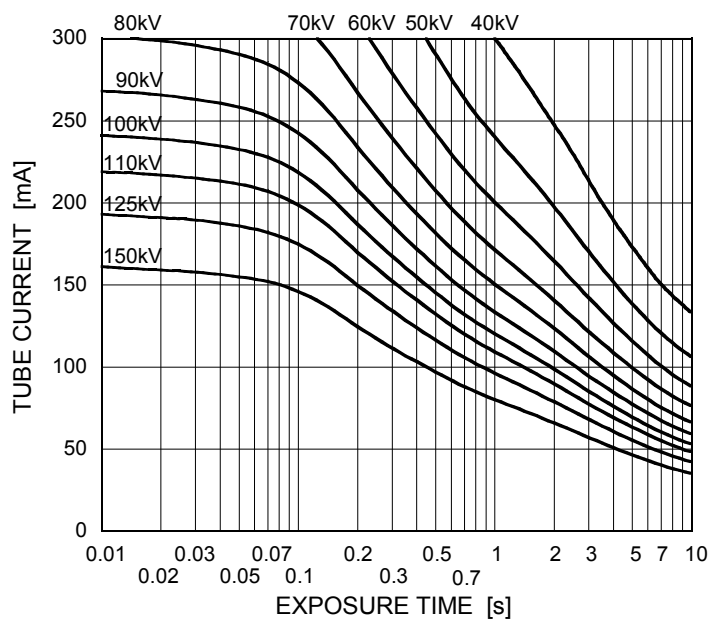
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant potential high-voltage generator  
Stator Power Frequency 60Hz

Nominal Focal Spot Value: 1.2 ■



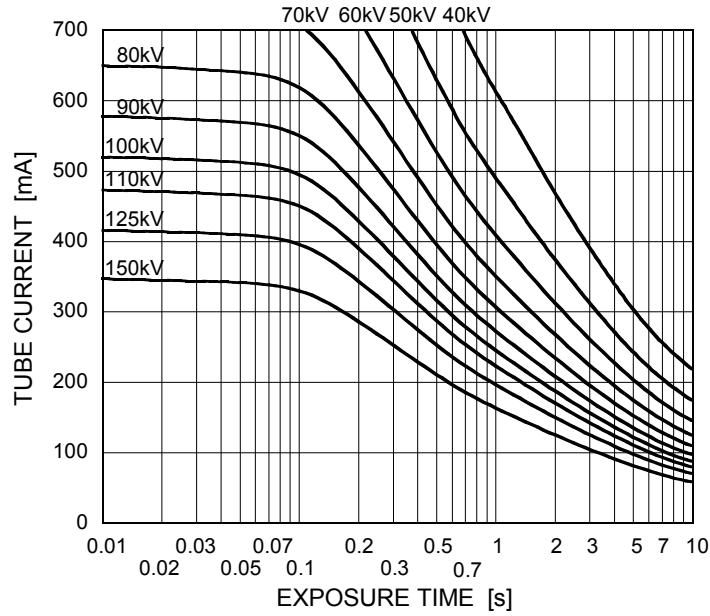
Nominal Focal Spot Value: 0.6 □



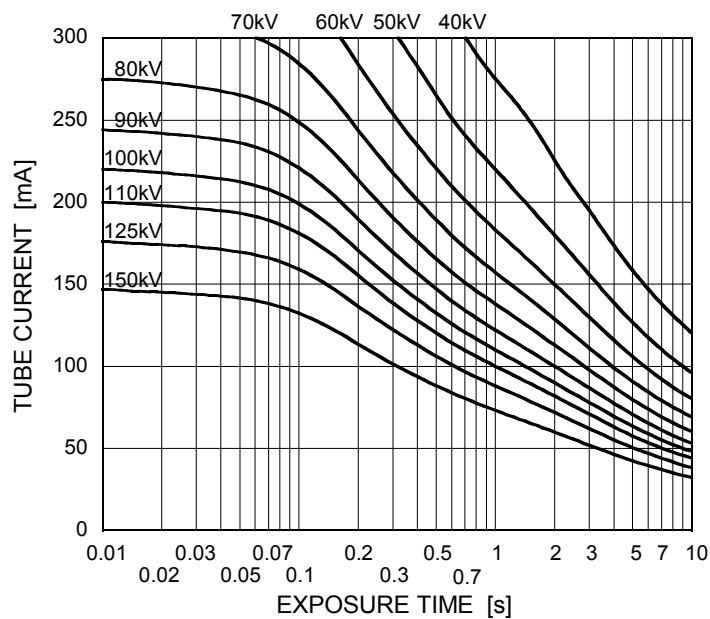
## Maximum Rating Charts (Absolute Maximum Rating Charts)

Conditions: Tube Voltage  
Constant potential high-voltage generator  
Stator Power Frequency 50Hz

Nominal Focal Spot Value: 1.2 ■



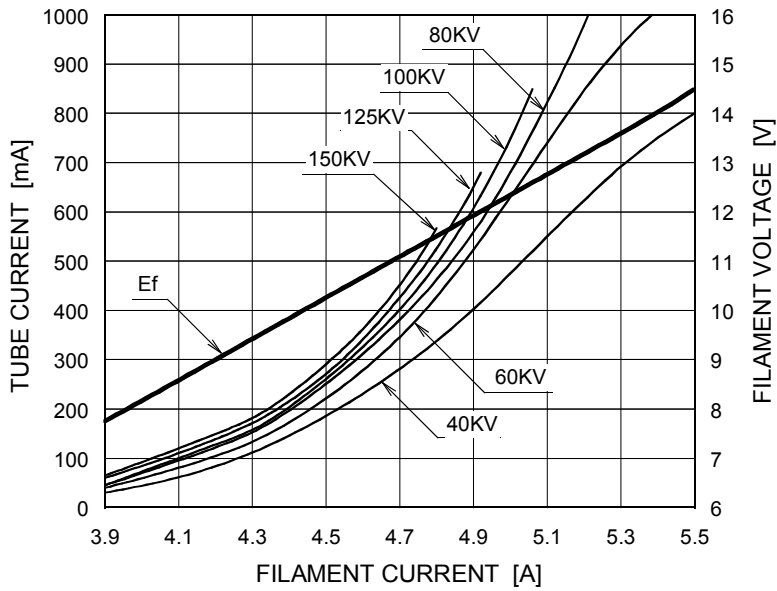
Nominal Focal Spot Value: 0.6 □



## Emission & Filament Characteristics

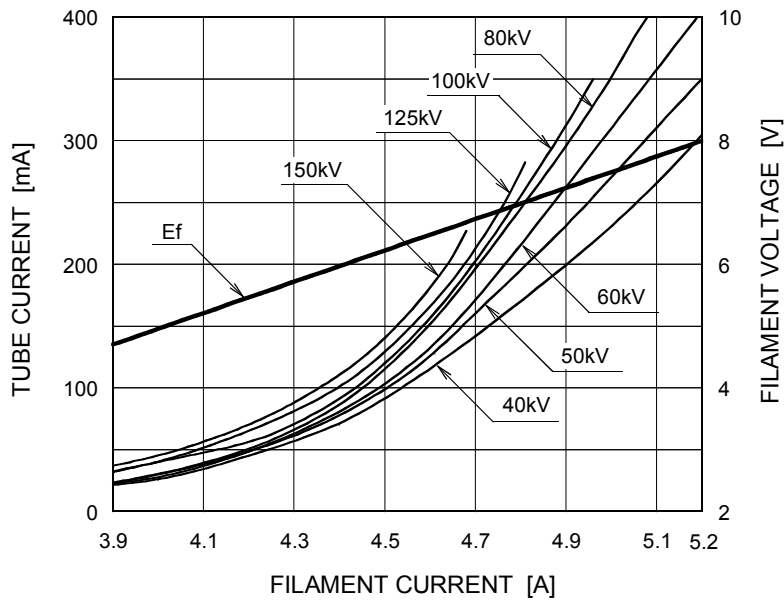
Constant potential high-voltage generator

Nominal Focal Spot Value: 1.2 ■



For Reference Only

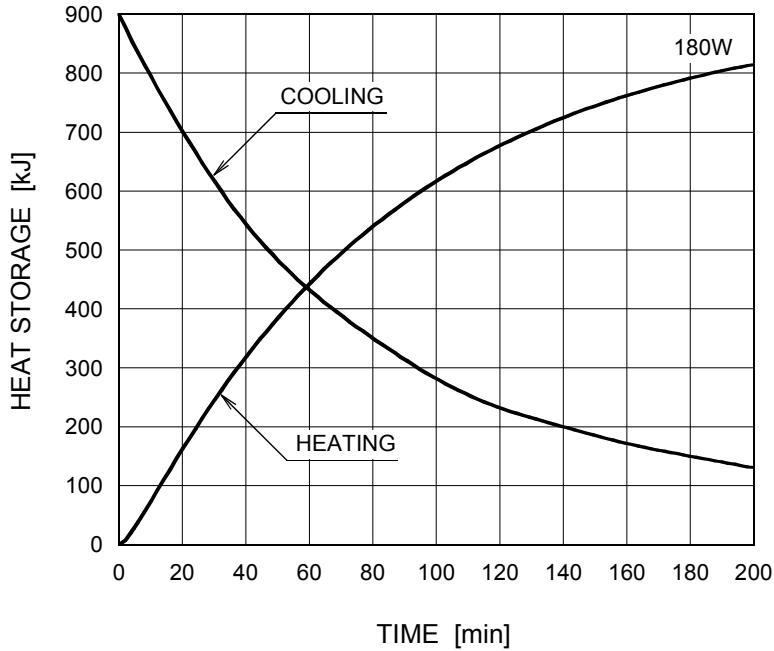
Nominal Focal Spot Value: 0.6 □



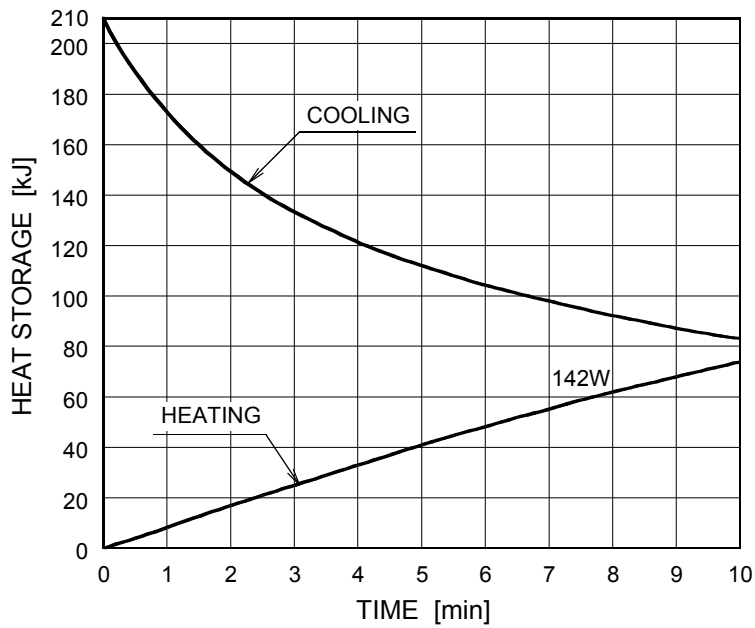
For Reference Only

## Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



Anode Heating / Cooling Curve

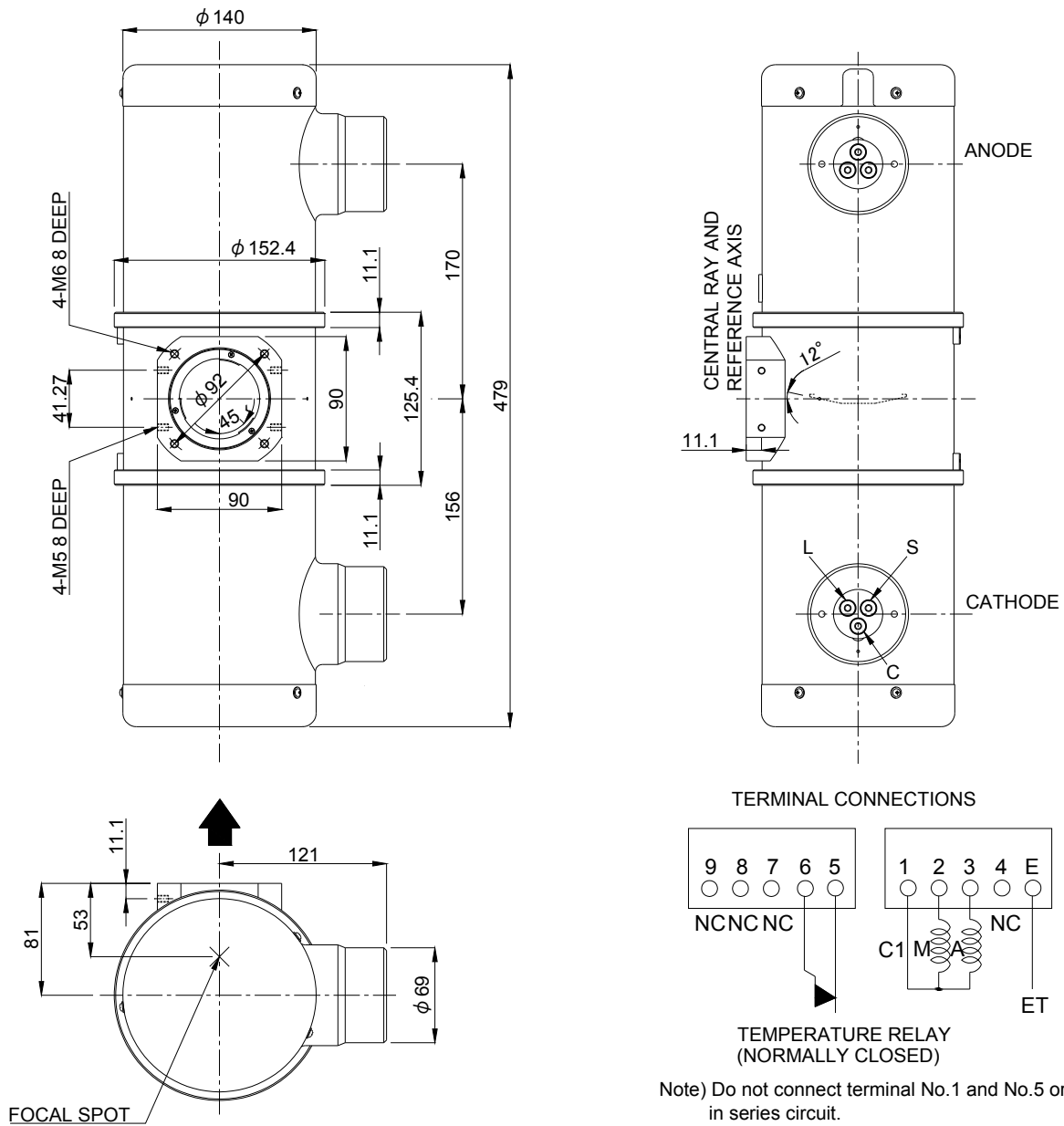


The heating curves are showing example of average input power to anode in operation.



### Dimensional Outline

Unit: mm

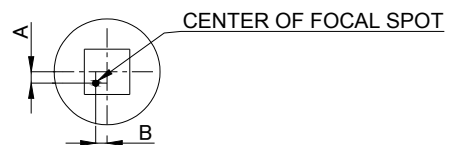


#### CATHODE TERMINAL

- 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



$$-1.5\text{mm} \leq A \leq 1.5\text{mm}$$

$$-1.5\text{mm} \leq B \leq 1.5\text{mm}$$

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



**CANON 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  
<https://etd.canon>

·The head office of Canon Electron Tubes & Devices Co., Ltd. has been certified to meet all the requirements of Environmental Management System ISO14001.  
·Canon 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. <https://etd.canon/eng/company/quality.htm>.