

**ROTANODE™  
XRR-6653X**

**Rotating Anode X-ray Tube Assembly**

- ◆ High speed rotating anode X-ray tube assembly for high energy radiographic operations.
- ◆ For the purpose of general diagnostic X-ray procedures.
- ◆ This tube has foci 0.8 and 0.3, and is available for a maximum tube voltage 150 kV.
- ◆ The anode disk is constructed with specially processed rhenium-tungsten-faced molybdenum target of 100 mm diameter.



**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

Nominal Focal Spot Value:

Large Focus ..... 0.8  
 Small Focus ..... 0.3

Nominal Anode Input Power (at 0.1s) ..... See rating charts

	180 Hz	60 Hz	50 Hz
Large Focus	52 kW	30 kW	29 kW
Small Focus	12 kW	6.5 kW	6.1 kW

Nominal Radiographic Anode Input Power:

	180 Hz	60 Hz	50 Hz
Large Focus	52 kW	30 kW	29 kW
Small Focus	12 kW	6.5 kW	6.1 kW

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Motor Ratings:

Stator: XS-AG

		Starting		Running	
Driven Frequency	[Hz]	180	60	180	50/60
Input Power	[W]	3710	800	200	90
Voltage <sup>3) 5)</sup>	[V]	420	190	80	48
Current <sup>4)</sup>	[A]	9.6	10.2	3.0	2.2
Min. Speed Up <sup>1) 7)</sup>	[s]	1.2	0.8	-	-
Capacitor	[μF]	6	44	6	44
Min. Braking <sup>2) 7)</sup>	[s]	2.0 (DC 100V)			

- 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) 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:

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 Operation	Intermittent

**Mechanical:**

Dimensions	See dimensional outline
Overall Length	445 mm
Maximum Diameter	166 mm
Target:	
Anode Angle	12 degrees
Diameter	100 mm
Construction	Rhenium-Tungsten faced Molybdenum
Permanent Filtration	1.5 mm Al / 75 kV IEC60522:1999
Radiation Protection (In accordance with IEC60601-1-3:2008):	
Leakage Technique Factor	150 kV, 2 mA
X-ray Coverage	430 × 430 mm at SID 1000 mm
Weight	Approx. 20 kg
High Voltage Receptacle	To meet the requirements of IEC60526 Corrigendum1:2010
Cooling Method	Natural or Forced Air
Housing Model Number	XH-1031

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

Maximum X-ray Tube Voltage:	
Radiographic .....	150 kV
Between Anode (or Cathode) and Ground .....	75 kV
Minimum X-ray Tube Voltage .....	40 kV
Maximum X-ray Tube Current:	
Large Focus .....	700 mA
Small Focus .....	150 mA
Maximum Filament Current:	
Large Focus .....	5.5 A
Small Focus .....	5.0 A
Filament Voltage:	
Large Focus (At maximum filament current 5.5 A) .....	11.6 ~ 14.8 V
Small Focus (At maximum filament current 5.0 A) .....	4.6 ~ 5.8 V
Filament Frequency Limits .....	0 ~ 25 kHz
Continuous Anode Input Power .....	500 W (700 HU/s)
(Fluoroscopic, Radiographic or mixed exposure)	
Thermal Characteristics:	
Anode Heat Content .....	420 kJ (600 kHU)
Maximum Anode Heat Dissipation .....	1670 W (2300 HU/s)
X-ray Tube Assembly Heat Content .....	1480 kJ (2000 kHU)
Nominal Continuous Input Power:	
Without Air-circulator .....	222 W (18 kHU/min)

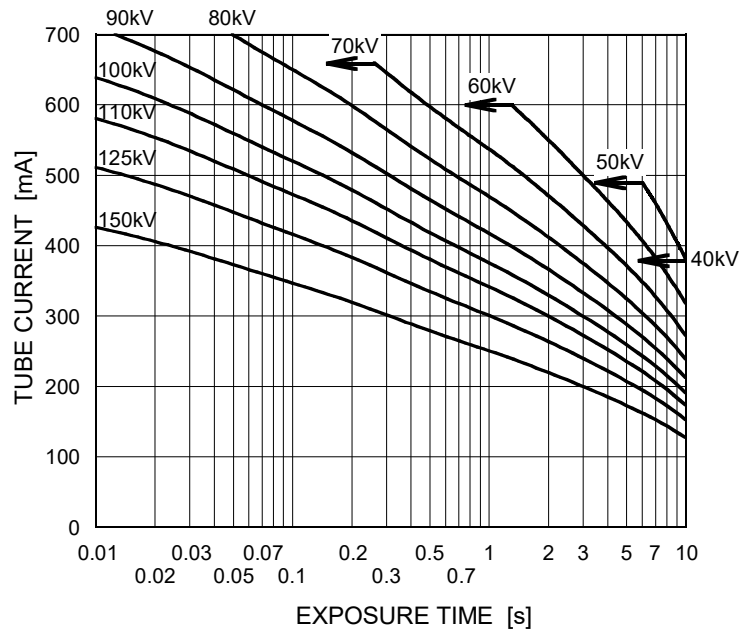
## Environmental Limits

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

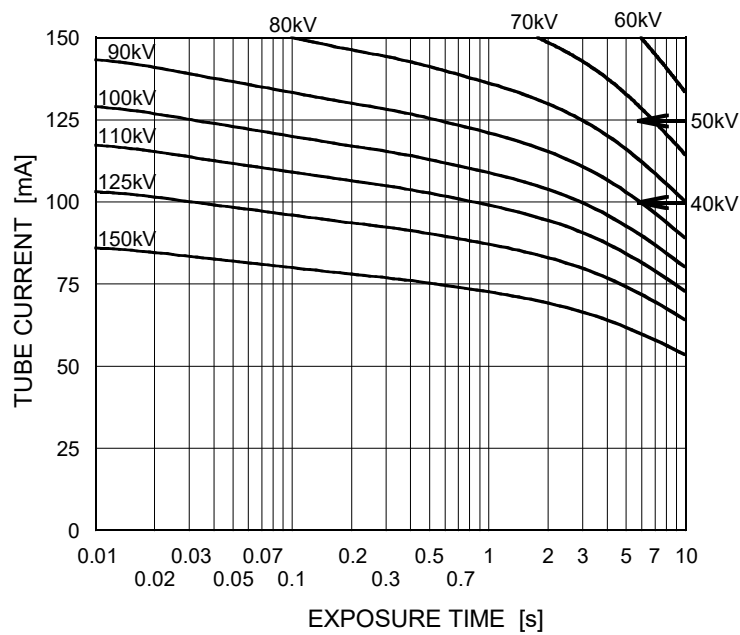
## Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 0.8 ■



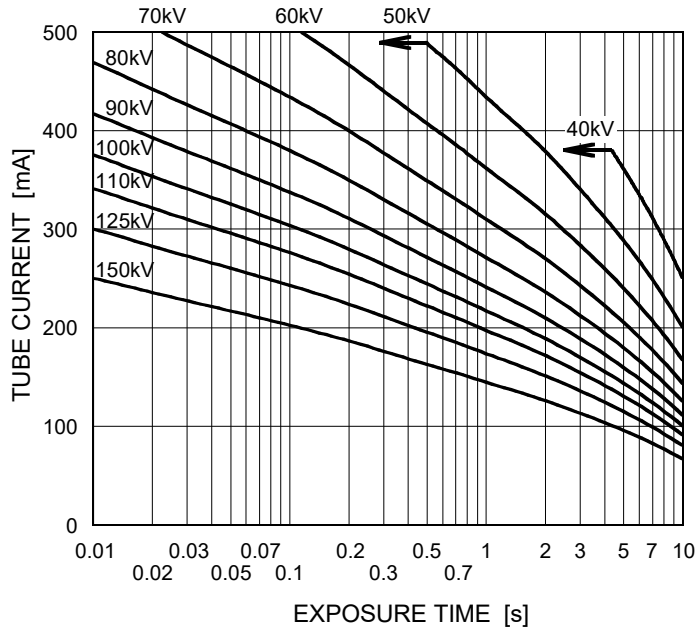
Nominal Focal Spot Value: 0.3 □



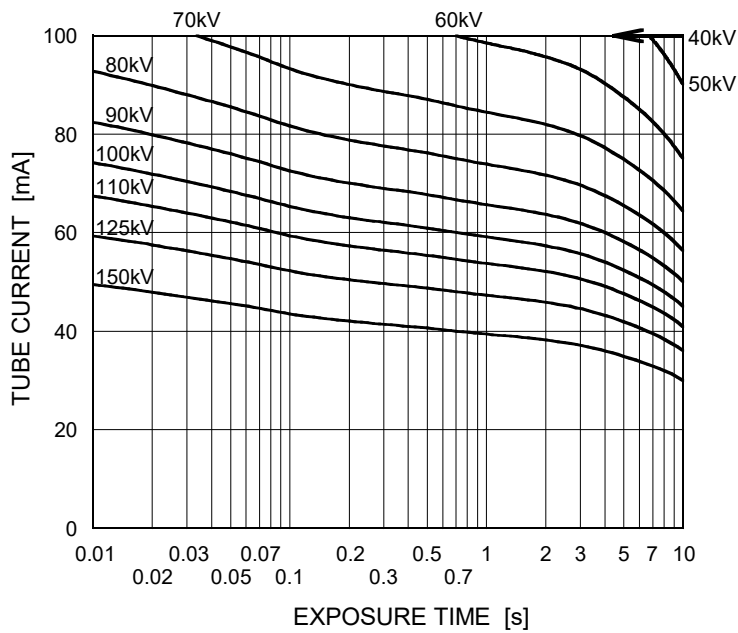
## Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 0.8 ■



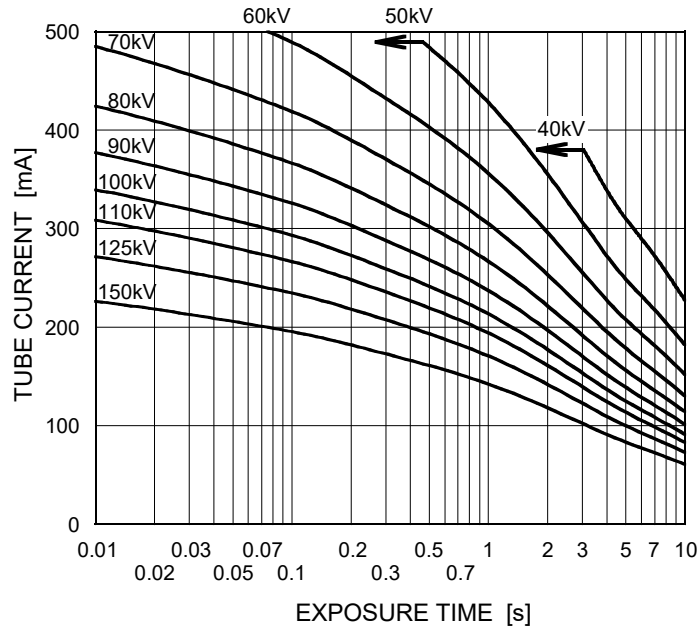
Nominal Focal Spot Value: 0.3 □



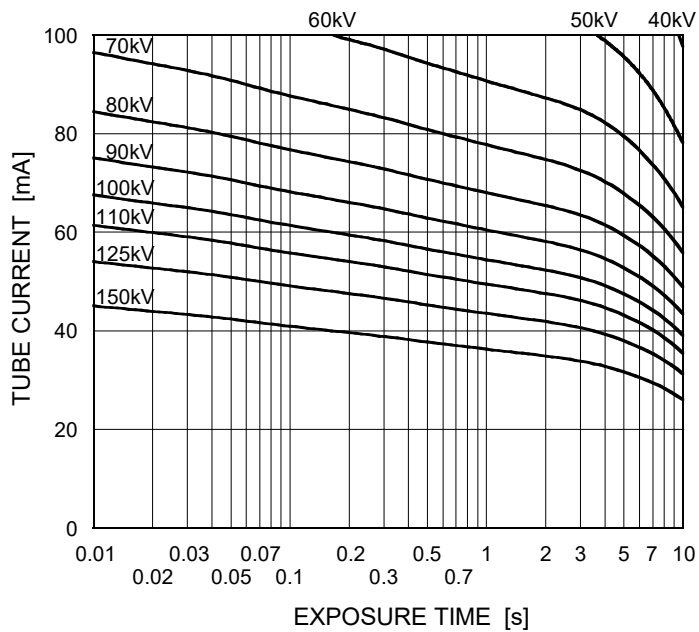
## Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 0.8 ■



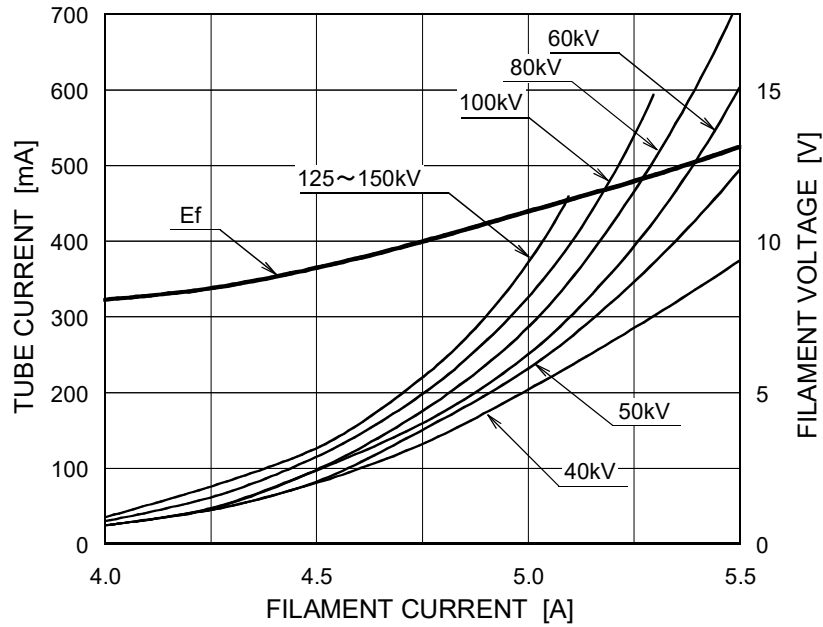
Nominal Focal Spot Value: 0.3 □



## Emission & Filament Characteristics

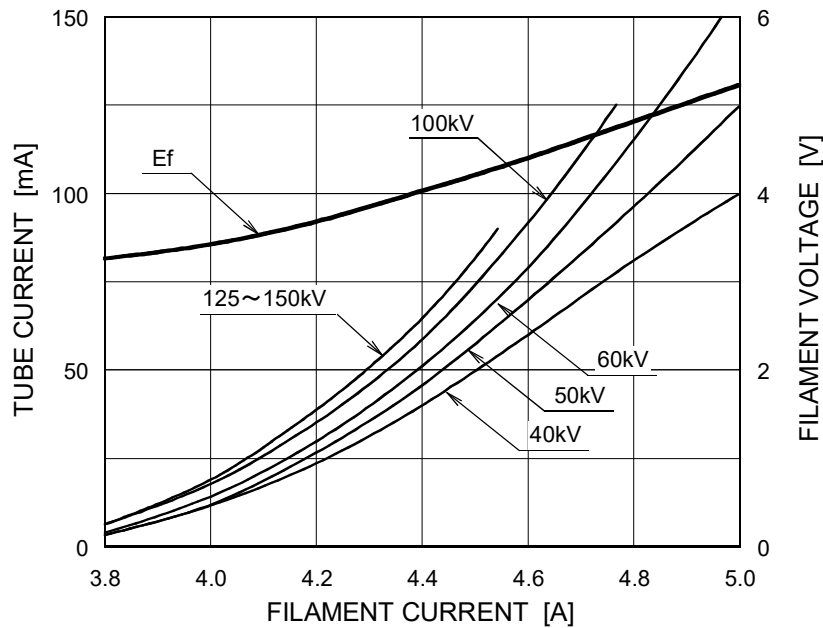
Constant potential high-voltage generator

Nominal Focal Spot Value: 0.8 ■



For Reference Only

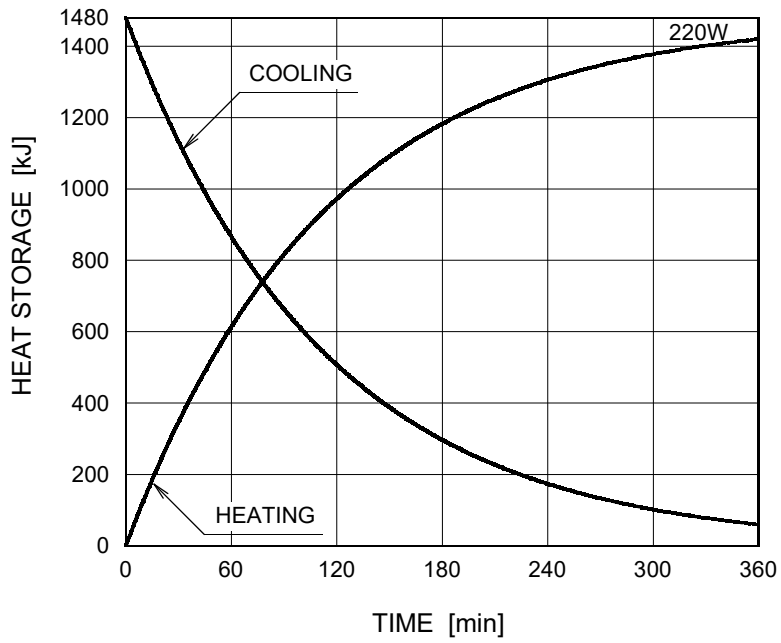
Nominal Focal Spot Value: 0.3 □



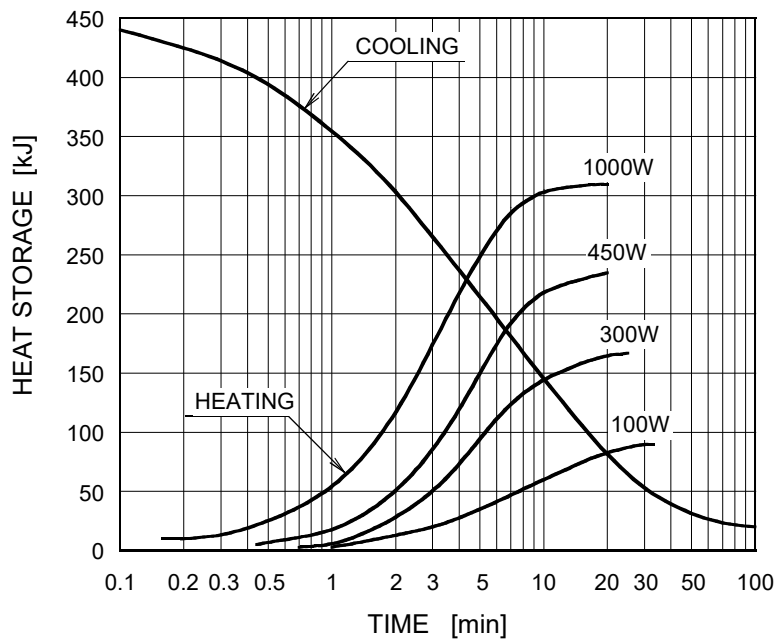
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## Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



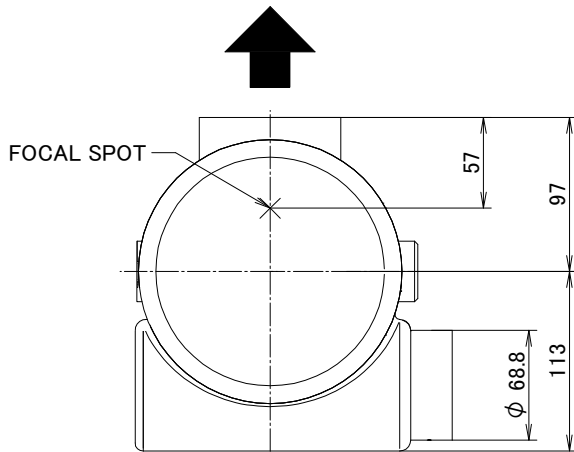
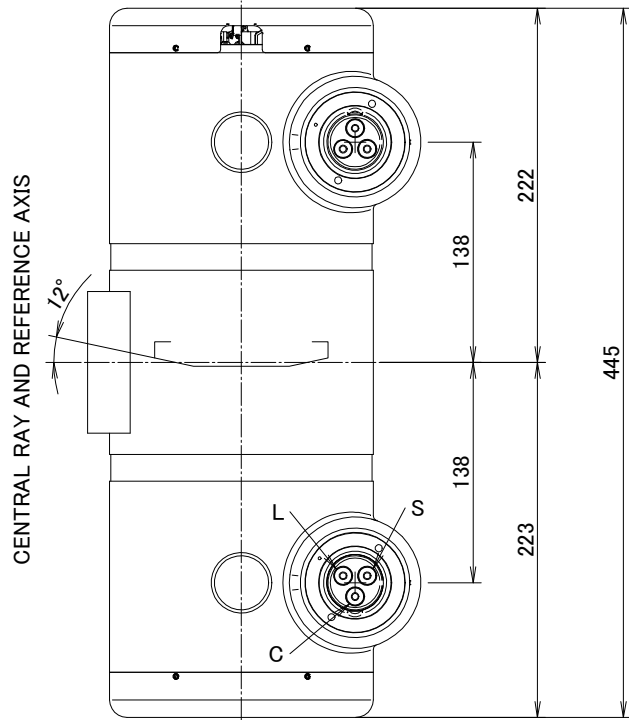
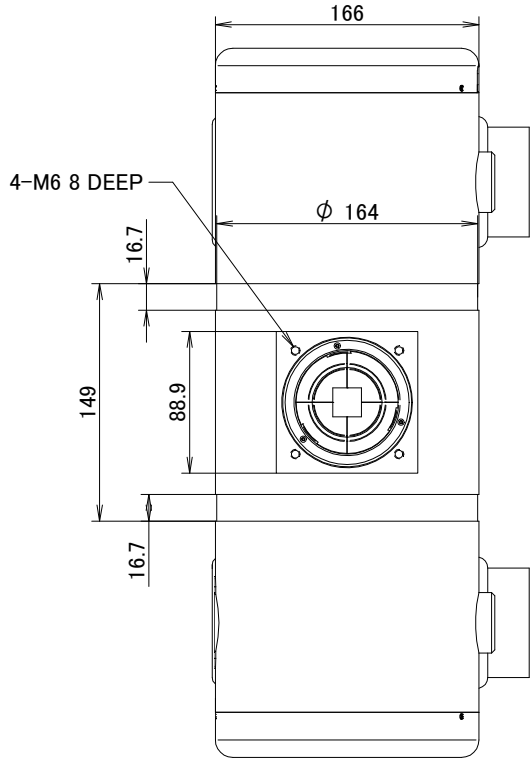
Anode Heating / Cooling Curve



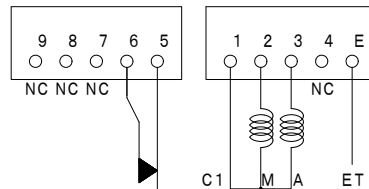


### Dimensional Outline

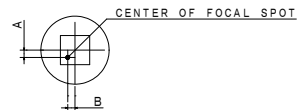
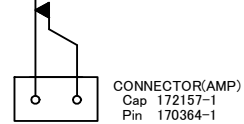
Unit: mm



#### TERMINAL CONNECTIONS



TR TEMPERATURE RELAY  
OPERATION TEMPERATURE  
Open at 70 (±3)°C or more  
DIFFERENTIAL 10°C



-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

##### TR : TEMPERATURE RELAY

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

