

ROTANODE™  
E7823FX CE 0197

**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 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.



**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 ..... 1.2  
Small Focus ..... 0.6

Nominal Anode Input Power (at 0.1s):

	50 Hz	60 Hz	180 HZ
Large Focus .....	46 kW	51 kW	85 kW
Small Focus .....	16 kW	18 kW	31 kW

Nominal Radiographic Anode Input Power (IEC60613:2010):

	50 Hz	60 Hz	180 HZ
Large Focus .....	38 kW	41 kW	68 kW
Small Focus .....	15 kW	16 kW	31 kW

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

Stator: XS-RB

		Starting		Running	
		180	60	180	60
Driven Frequency	[Hz]	180	60	180	60
Input Power	[W]	3500	1520	90	80
Voltage <sup>3) 5)</sup>	[V]	490	300	165	160
Current <sup>4)</sup>	[A]	9.0	7.6	1.3	1.1
Min. Speed Up <sup>7)</sup>	[s]	2.0	1.0	-	-
Capacitor	[ $\mu$ F]	6	30	6	30
Min. Braking <sup>2) 7)</sup>		2.5 s / 300 V (DC)			

Note 1) This table 0 is an example of recommendable ratings which are measured with the AID starter model RC103. If you drive the tube with different conditions, please check with Toshiba X-ray tube engineering.

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 and braking time are 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 .....	20.2 $\Omega$
Common-Auxiliary Winding .....	38.0 $\Omega$
Resistance between Housing and Low Voltage Terminals .....	Minimum 2 M $\Omega$
Normal Operating Range of the Housing Temperature .....	16 ~ 75 °C
Thermal Switch .....	Normally Closed
Open .....	75 ~ 85 °C
Close .....	45 ~ 65 °C
Mode of Operation .....	Intermittent

**Mechanical:**

Dimensions .....	See dimensional outline
Overall Length .....	463 mm
Maximum Diameter .....	172 mm
Target:	
Anode Angle .....	14 degrees
Diameter .....	100 mm
Construction .....	Rhenium-Tungsten faced Molybdenum
Filtration:	
Permanent Filtration .....	0.8 mm Al / 75 kV IEC60522:1999
Available Additional Filter combination (0.4 - 1.5 mm) .....	Maximum 2.3 mm Al / 75 kV
Radiation Protection (In accordance with IEC60601-1-3:2008):	
Leakage Technique Factor .....	150 kV, 1.3 mA
X-ray Coverage .....	354 × 354 mm at SID 710 mm
Weight (Approx.) .....	20 kg
High Voltage Receptacle .....	To meet the requirements of IEC60526 Corrigendum1:2010
Cooling Method .....	Natural or forced air
Tube Housing Model Number .....	XH-157

## **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) .....	See rating charts
Large Focus .....	1000 mA
Small Focus .....	440 mA

### Maximum Filament Current:

Large Focus (1.2) .....	5.5 A
Small Focus (0.6) .....	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) .....	7.0 ~ 9.4 V

Filament Frequency Limits ..... 0 ~ 25 kHz

Continuous Anode Input Power (IEC60613:2010) ..... 300 W (420 HU/s)

(Fluoroscopic, repeated radiographic or mixed exposure)

### Thermal Characteristics:

Anode Heat Content .....	285 kJ (400 kHU)
Maximum Anode Heat Dissipation .....	1180 W (1670 HU/s)
X-ray Tube Assembly Heat Content .....	950 kJ (1339 kHU)

Nominal Continuous Input Power (IEC60613:2010):

Without Air-circulator .....	200 W (16 kHU/min)
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## 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 %

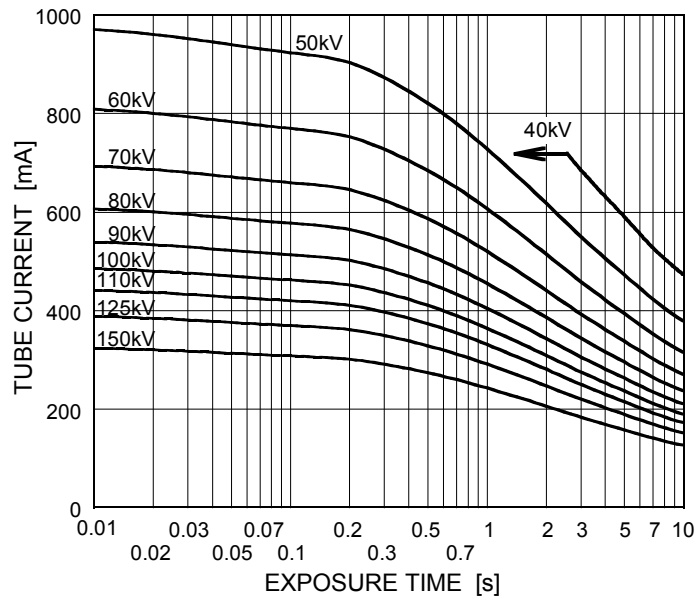
(No condensation)

Atmospheric Pressure ..... 50 ~ 106 kPa

## Maximum Rating Charts (Absolute Maximum Rating Charts)

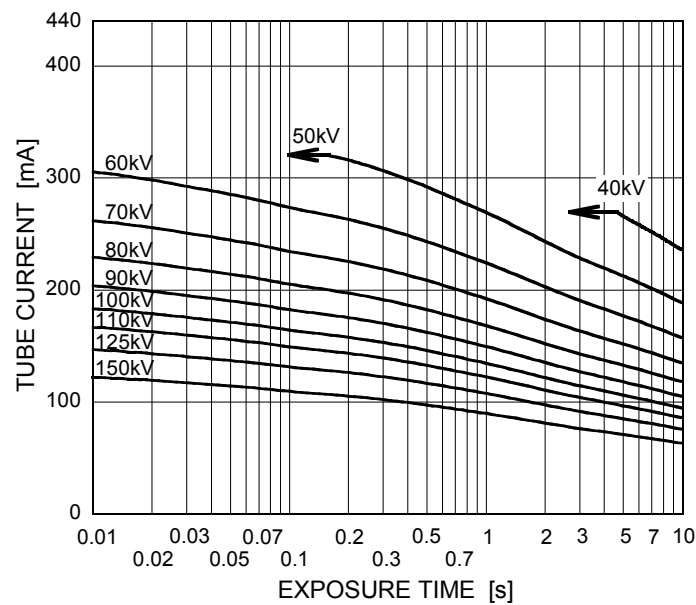
Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 50 Hz

Nominal Focal Spot Value: 1.2 ■



Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □

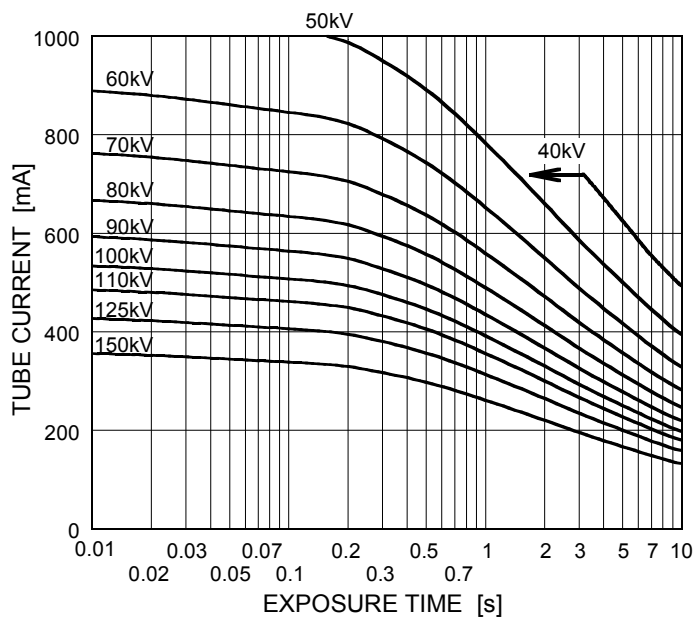


Refer to IEC60613:2010

## Maximum Rating Charts (Absolute Maximum Rating Charts)

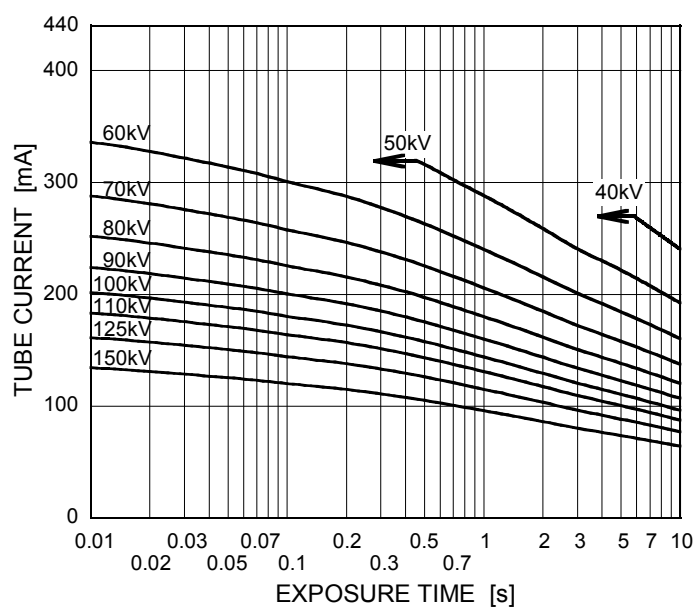
Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 60 Hz

Nominal Focal Spot Value: 1.2 ■



Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □

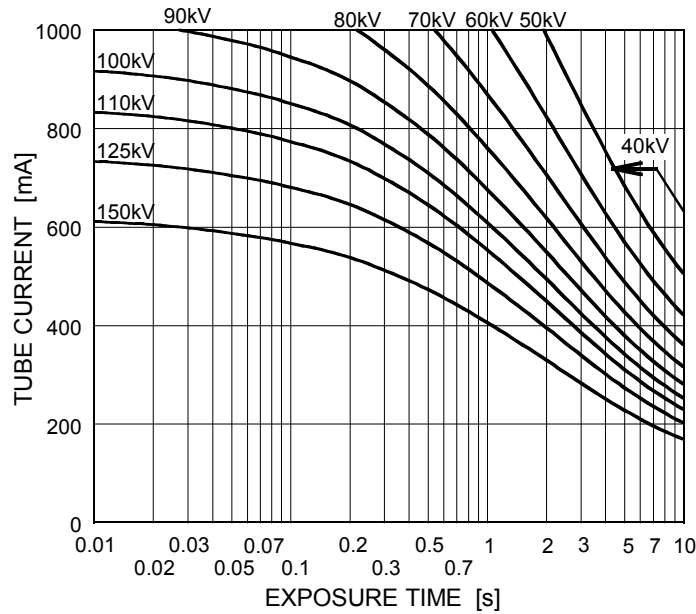


Refer to IEC60613:2010

## Maximum Rating Charts (Absolute Maximum Rating Charts)

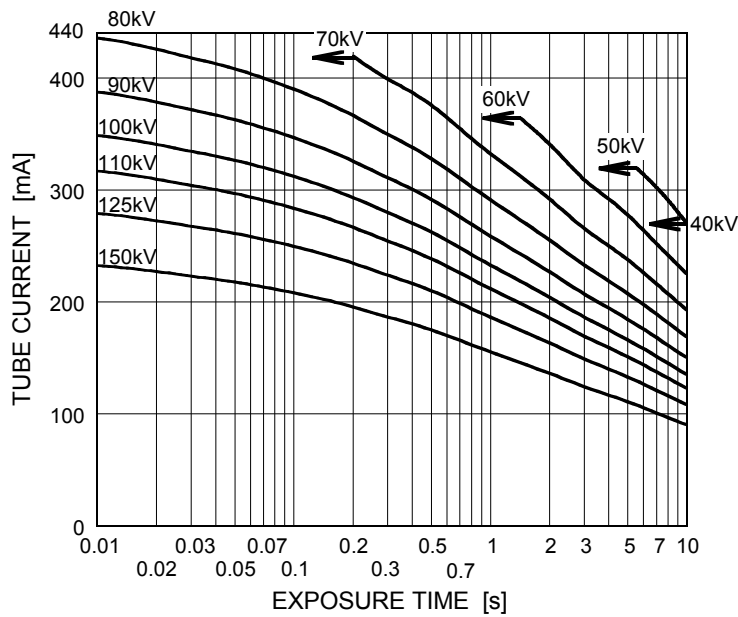
Conditions: Tube Voltage  
Constant Potential High-Voltage Generator  
Stator Power Frequency 180 Hz

Nominal Focal Spot Value: 1.2 ■



Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □



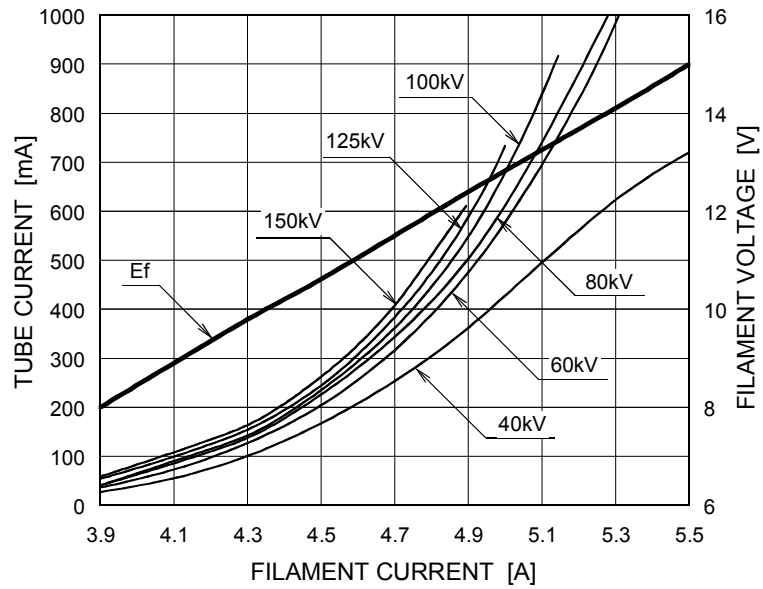
Refer to IEC60613:2010



## Emission & Filament Characteristics

Constant Potential High-Voltage Generator

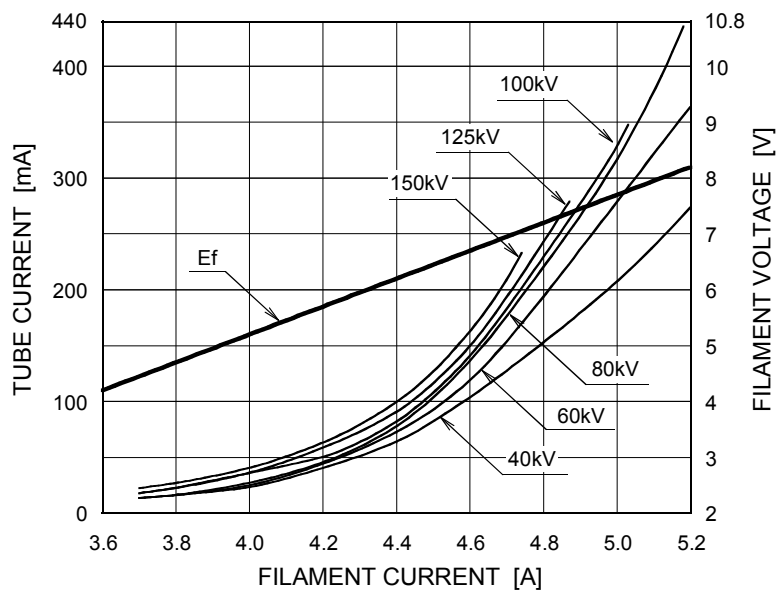
Nominal Focal Spot Value: 1.2 ■



Note1) For Reference Only

Note2) Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □

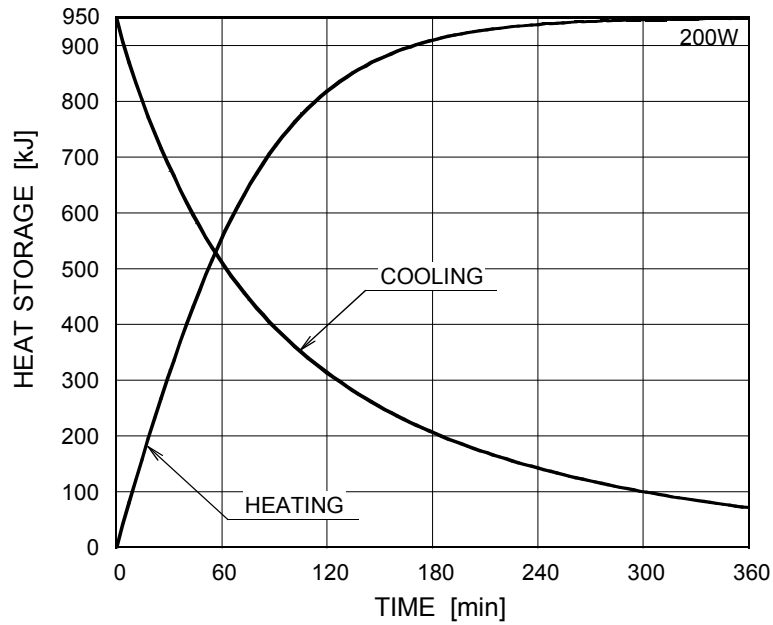


Note1) For Reference Only

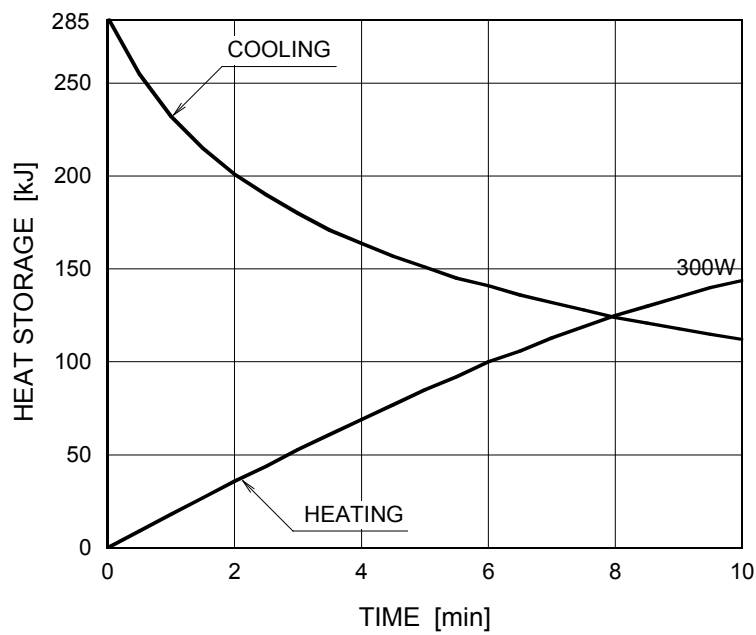
Note2) Refer to IEC60613:2010

## Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



Anode Heating / Cooling Curve

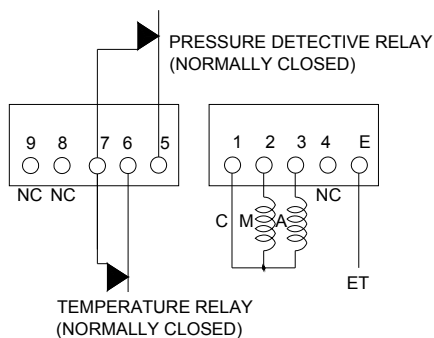


The heating curves are showing example of average input power to anode in operation.

## Dimensional Outline

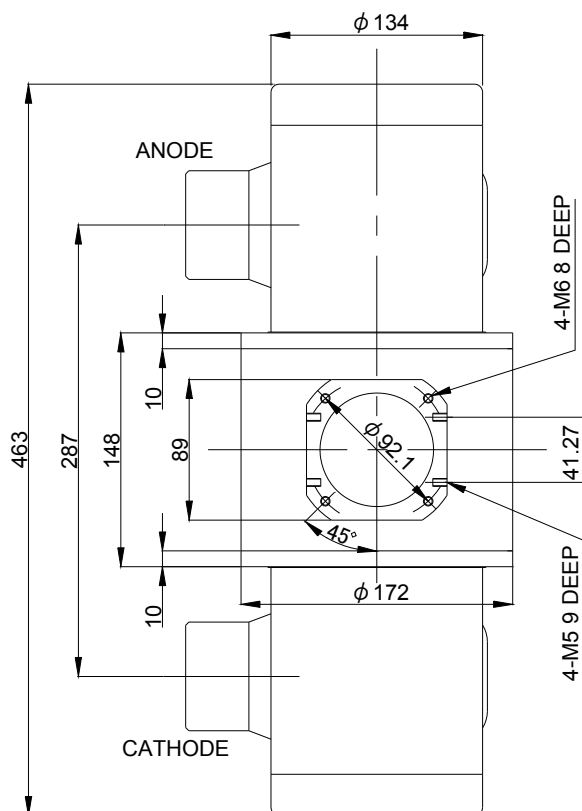
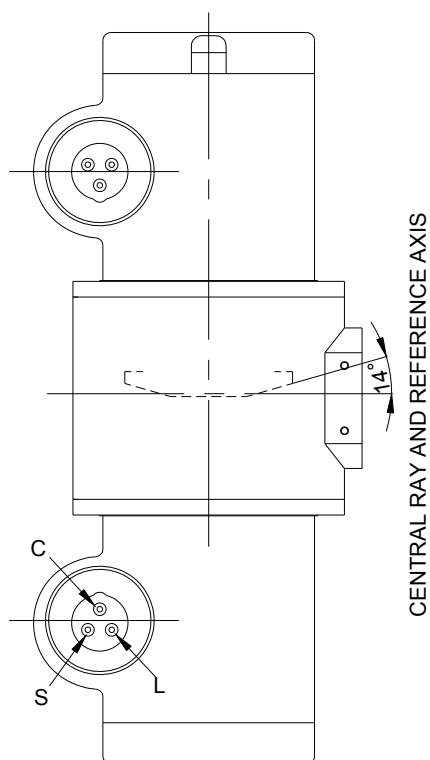
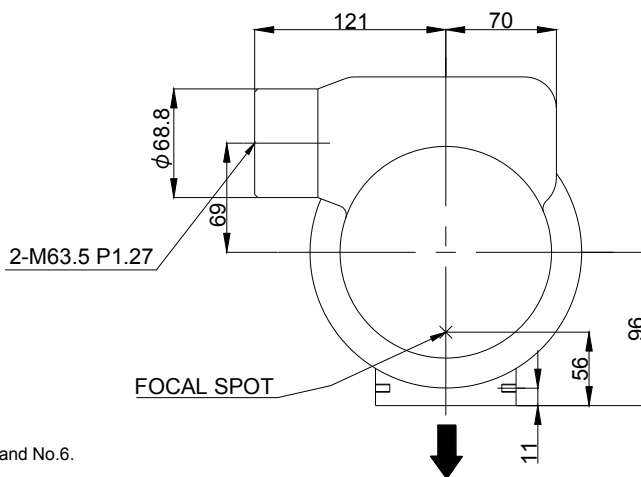
Unit: mm

### TERMINAL CONNECTIONS

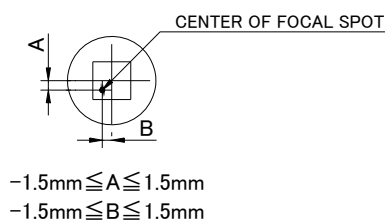


**Note**

- 1) Make an input-power protection circuit with the terminals No.5 and No.6.
- 2) Do not connect terminal No.1 and No.5 or 6 in series circuit.



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



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