

ROTANODE™

E7254X
E7254FX
E7254GX



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 have an improved coating to increase thermal emissivity.
- ◆ These tubes have foci 1.2 and 0.6, and are available for a maximum tube voltage 150kV.
- ◆ 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	102 kW	60 kW	55 kW
Small Focus	40 kW	23 kW	21.5 kW

Nominal Radiographic Anode Input Power:

	180 Hz	60 Hz	50 Hz
Large Focus	82 kW	47 kW	43 kW
Small Focus	32 kW	18 kW	17 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:

Stator: XS-RB

		Starting		Running	
Driven Frequency	[Hz]	180	60	180	60
Input Power	[W]	3500	1520	90	80
Voltage ^{2) 4)}	[V]	490	300	165	160
Current ³⁾	[A]	9.0	7.6	1.3	1.1
Min. Speed Up ⁶⁾	[s]	2.0	1.0	-	-
Capacitor	[µF]	6	30	6	30
Min. Braking ^{2) 6)}	[s]	2.5 s / 300 V (DC)			

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

Anode Speed:

180 Hz	Minimum 9700 min ⁻¹
60 Hz	Minimum 3200 min ⁻¹
50 Hz	Minimum 2700 min ⁻¹

Stator Resistance:

Common-Main Winding	20.2 Ω
Common-Auxiliary Winding	38.0 Ω
Resistance between Housing and Low Voltage Terminals	Minimum 2 MΩ
Normal Operating Range of the Housing Temperature	16 ~ 75 °C
Thermal Switch	Normally Closed
Open	75 ~ 85 °C
Closed	45 ~ 65 °C
Mode of Operation	Intermittent

Mechanical:

Dimensions	See dimensional outline
Overall Length	463 mm
Maximum Diameter	172 mm
Target:	
Anode Angle	12 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, 5 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
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:	
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	500 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)	7.0 ~ 9.4 V
Filament Frequency Limits	0 ~ 25 kHz
Continuous Anode Input Power	300 W (423 HU/s)
(Fluoroscopic, Radiographic or mixed exposure)	
Thermal Characteristics:	
Anode Heat Content	285 kJ (400 kHU)
Maximum Anode Heat Dissipation	1180 W (1664 HU/s)
X-ray Tube Assembly Heat Content	950 kJ (1339 kHU)
Nominal Continuous Input Power:	
Without Air-circulator	200 W (16 kHU/min)

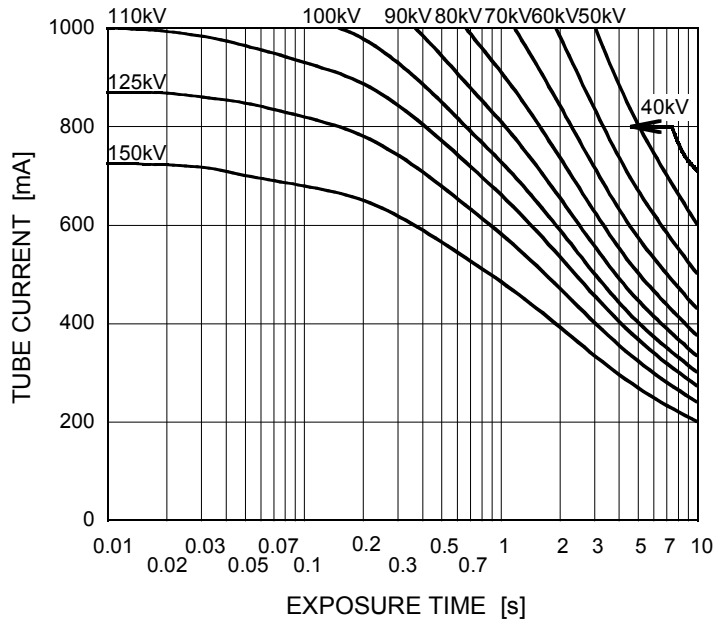
Environmental Limits

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

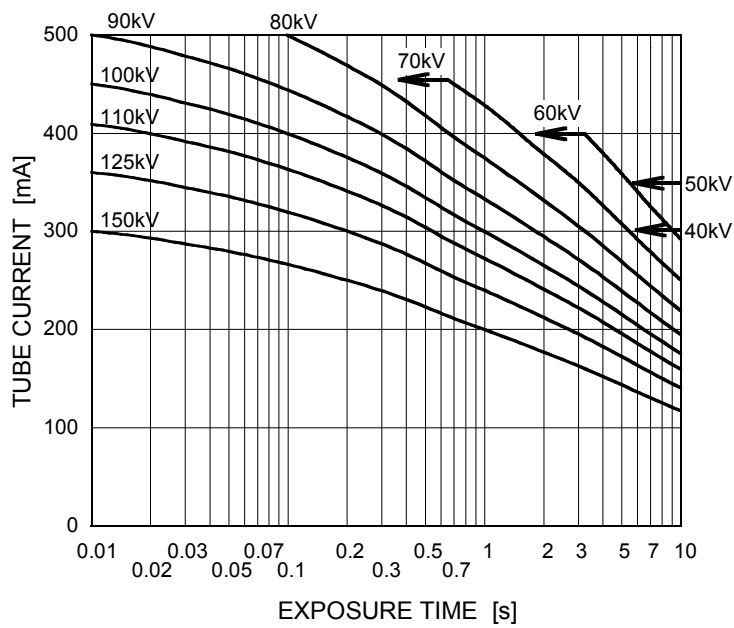
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



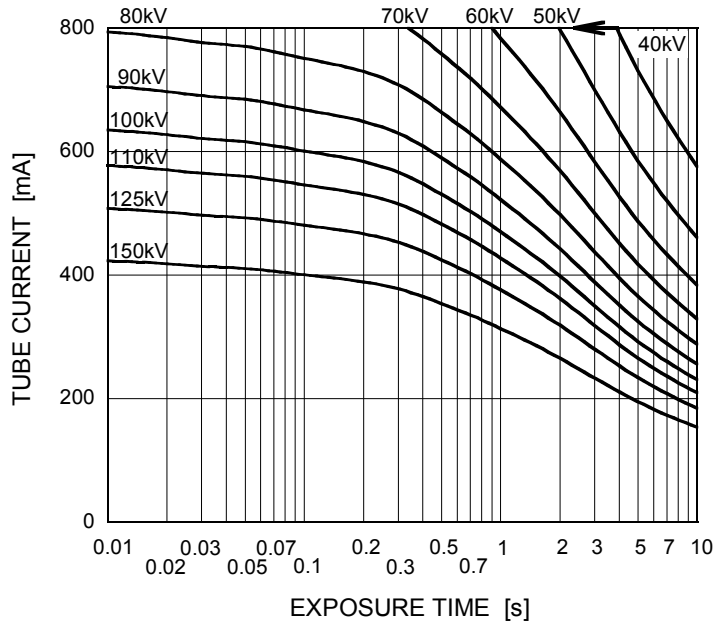
Nominal Focal Spot Value: 0.6 □



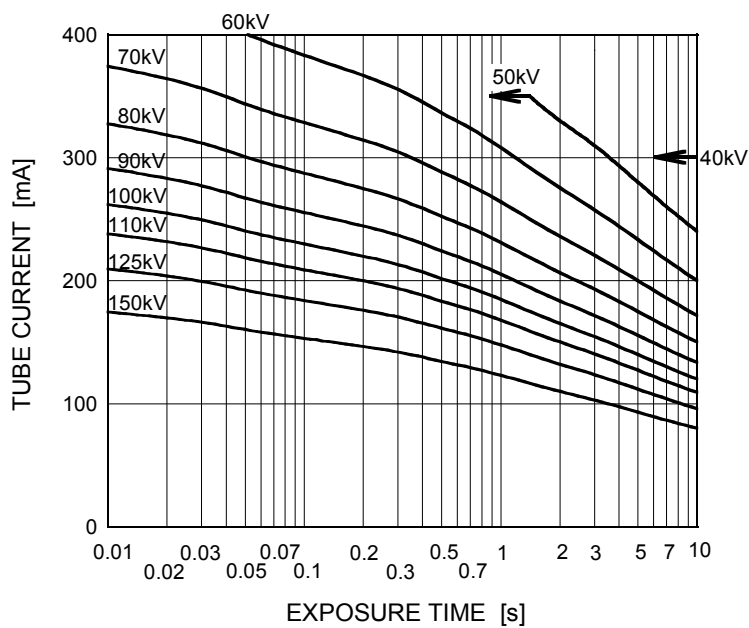
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



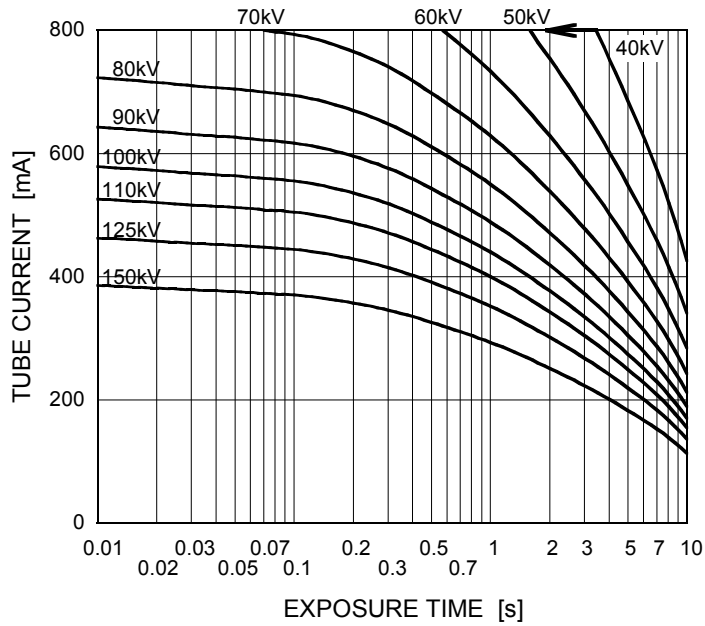
Nominal Focal Spot Value: 0.6 □



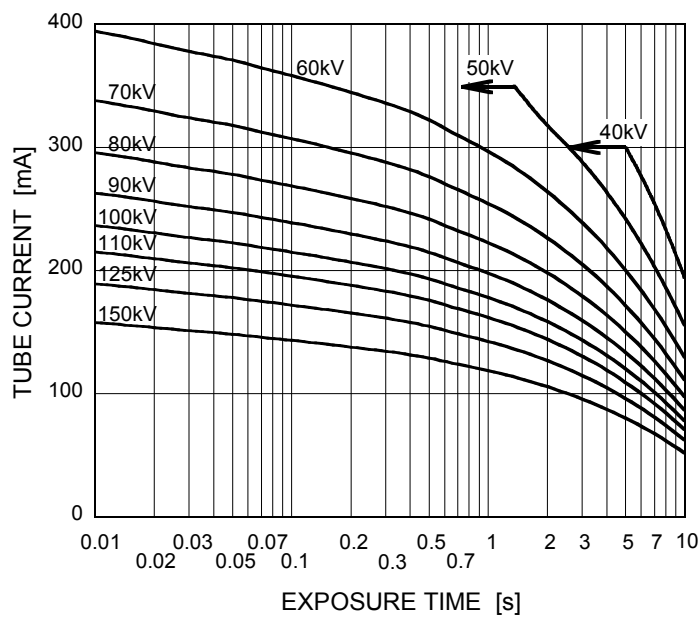
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



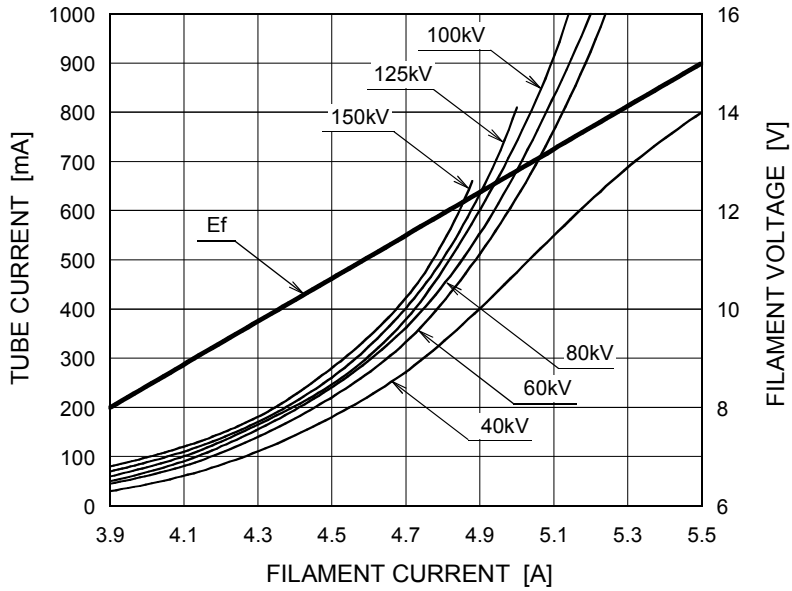
Nominal Focal Spot Value: 0.6 □



Emission & Filament Characteristics

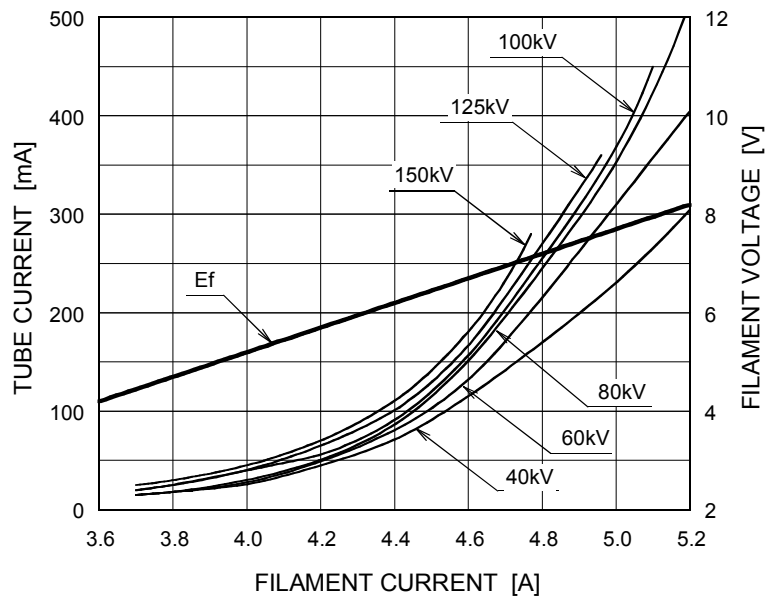
Constant Potential High-Voltage Generator

Nominal Focal Spot Value: 1.2 ■



For Reference Only

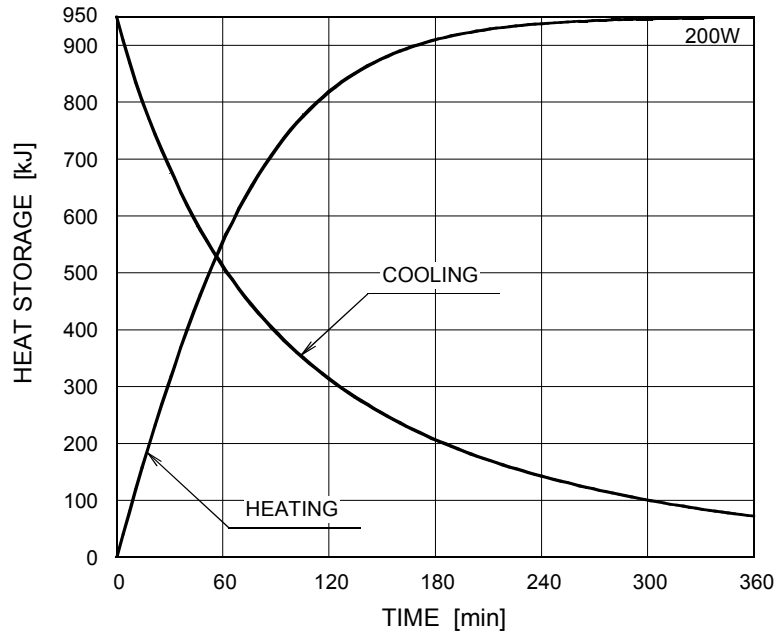
Nominal Focal Spot Value: 0.6 □



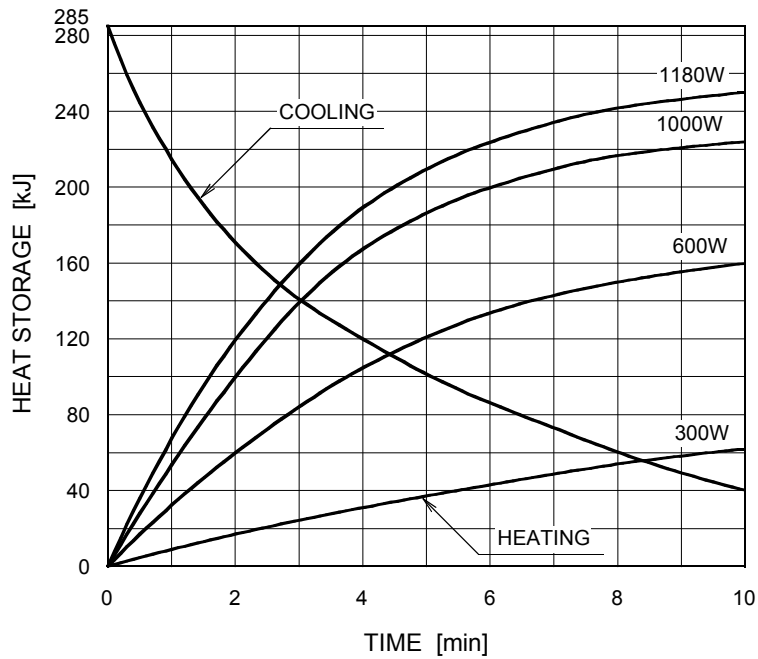
For Reference Only

Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



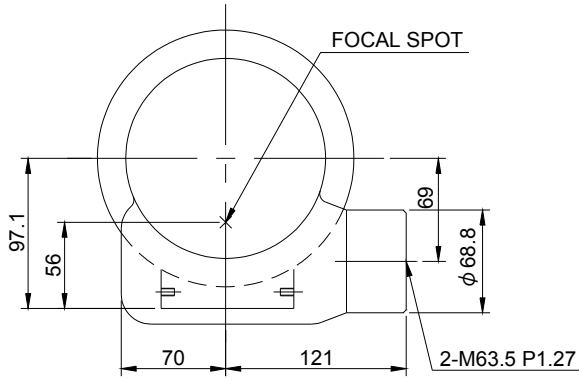
Anode Heating / Cooling Curve



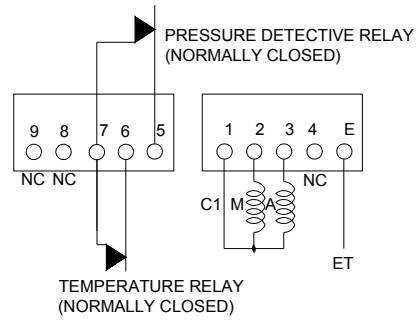
The heating curves are showing examples of average input power to the anode in operation.

Dimensional Outline of E7254X

Unit mm

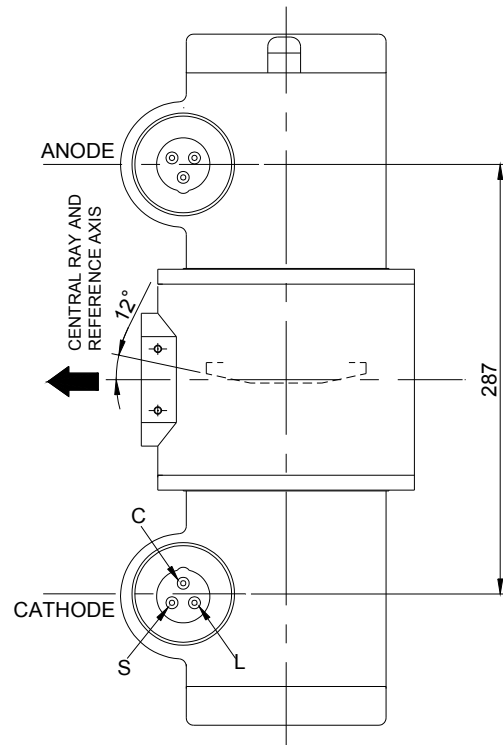
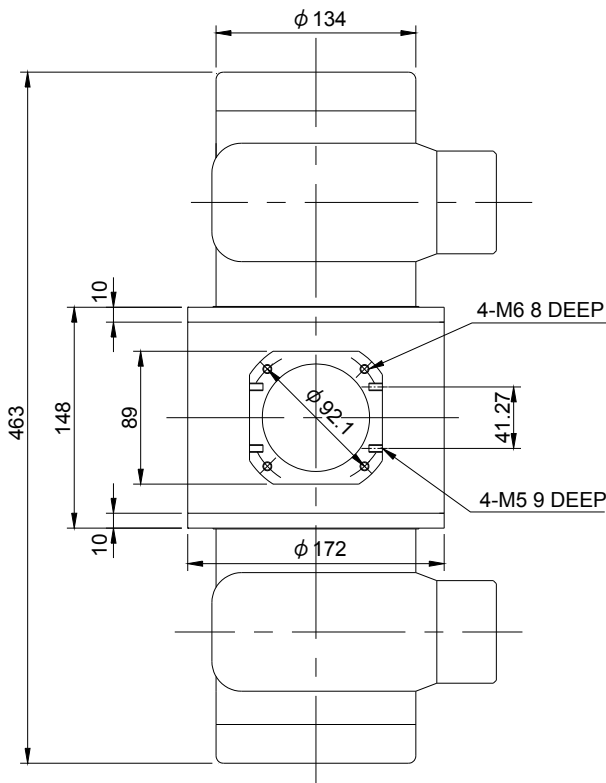


TERMINAL CONNECTIONS



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.



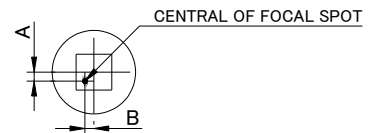
EXPLANATION OF SYMBOLS

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



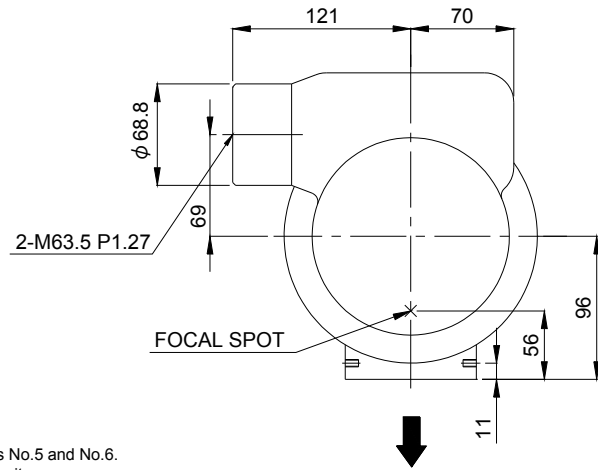
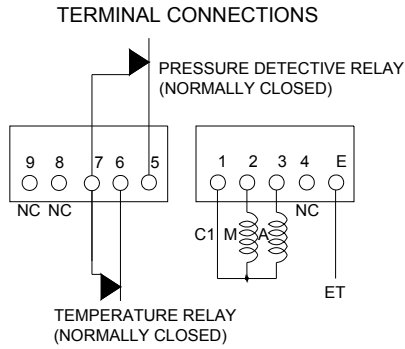
$$-1.5\text{mm} \leq A \leq 1.5\text{mm}$$

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

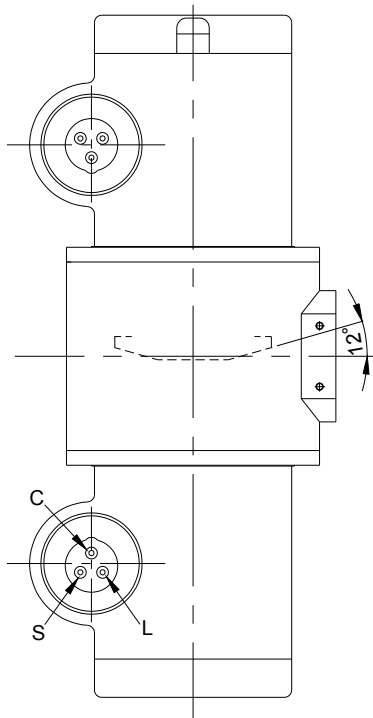
- ▲ : CENTRAL X-RAY ANODE & CATHODE TERMINAL : IEC60526 TYPE

Dimensional Outline of E7254FX

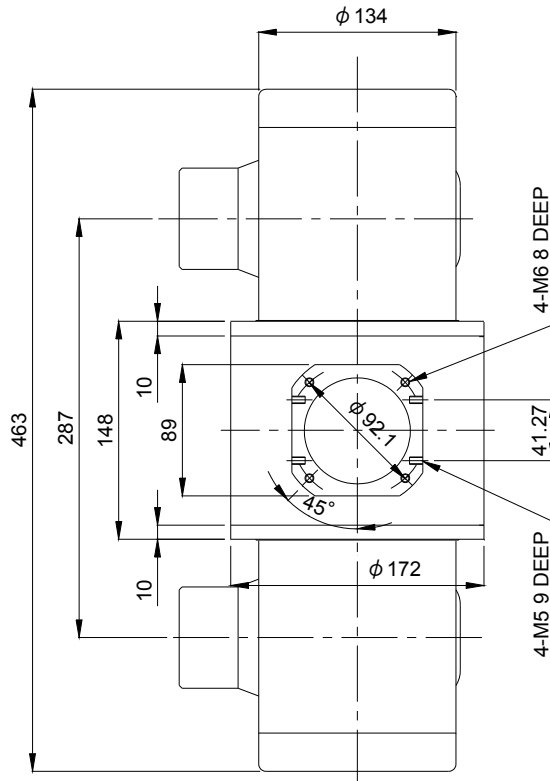
Unit mm



- 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.



CENTRAL RAY AND REFERENCE AXIS



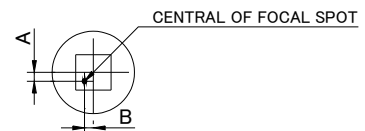
EXPLANATION OF SYMBOLS

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

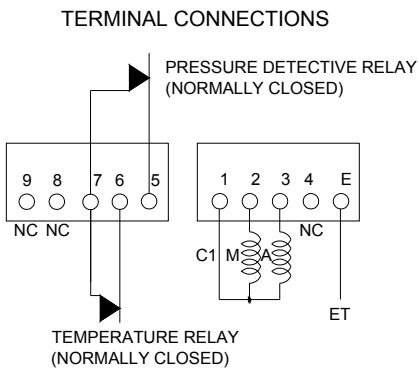


- 1.5mm ≤ A ≤ 1.5mm
- 1.5mm ≤ B ≤ 1.5mm

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

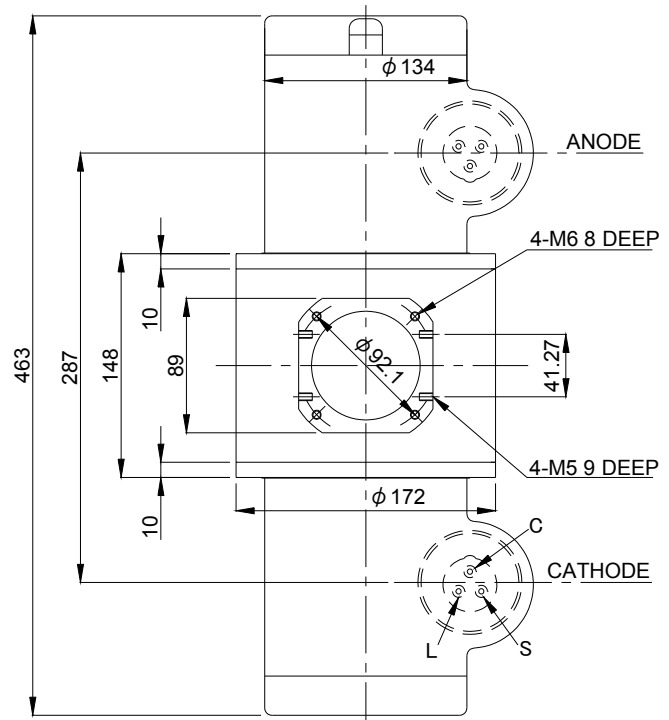
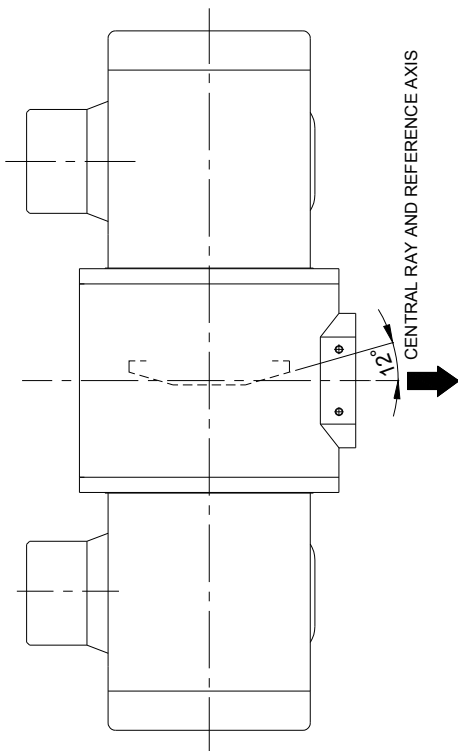
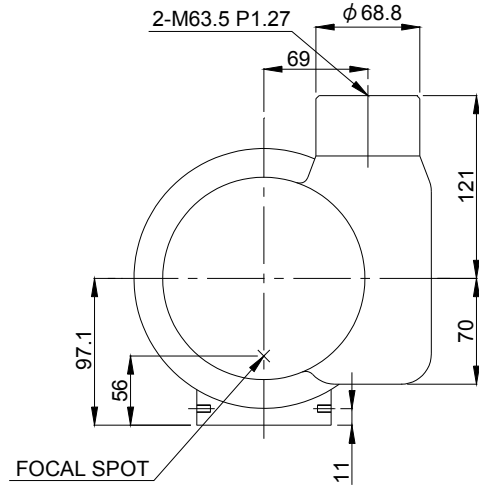
Dimensional Outline of E7254GX

Unit mm



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.



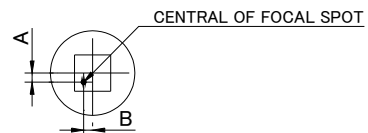
EXPLANATION OF SYMBOLS

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



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

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

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



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>.