

ROTANODE™
E7254X
E7254FX  0197
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) 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	180Hz
Large Focus	55 kW	60 kW	102 kW
Small Focus	21.5 kW	23 kW	40 kW

Nominal Radiographic Anode Input Power (IEC60613:2010):

	50 Hz	60 Hz	180Hz
Large Focus	44 kW	48 kW	82 kW
Small Focus	17 kW	18 kW	32 kW

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Motor Ratings ¹⁾:

Stator: XS-RB

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

Note: 1) This table 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 ⁻¹
60 Hz	Minimum 3200 min ⁻¹
180 Hz	Minimum 9700 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 (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	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 (IEC60613:2010).....	300 W (423 HU/s)
(Fluoroscopic, repeated 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 (IEC60613:2010):	
Without Air-circulator	200 W (16 kHU/min)

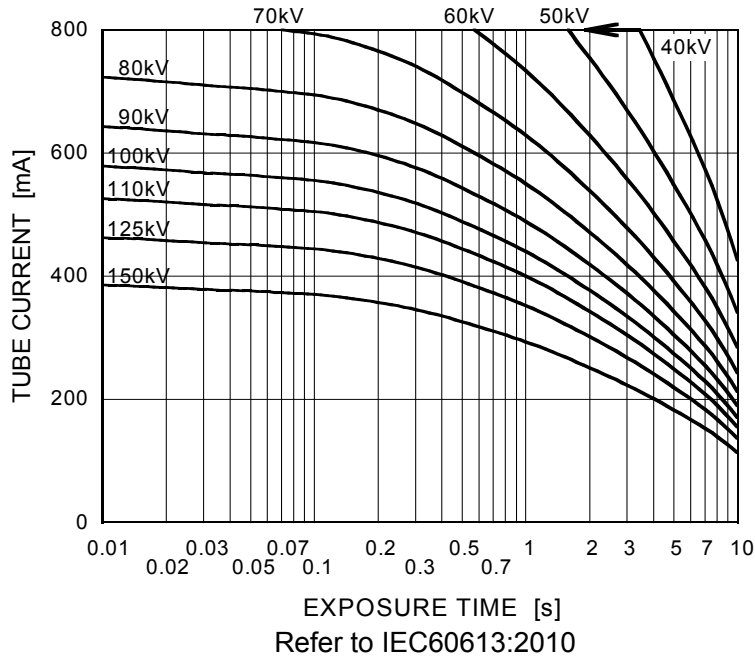
Environmental Limits

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

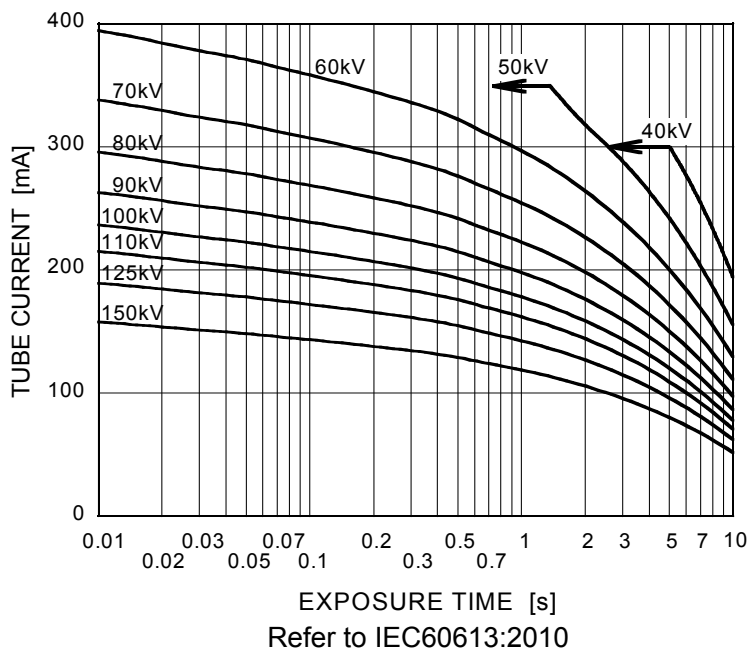
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



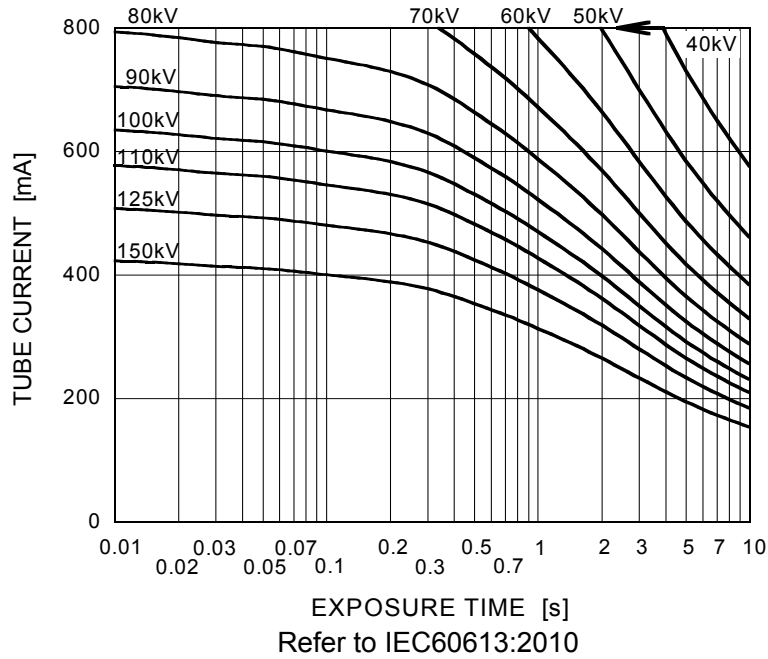
Nominal Focal Spot Value: 0.6 □



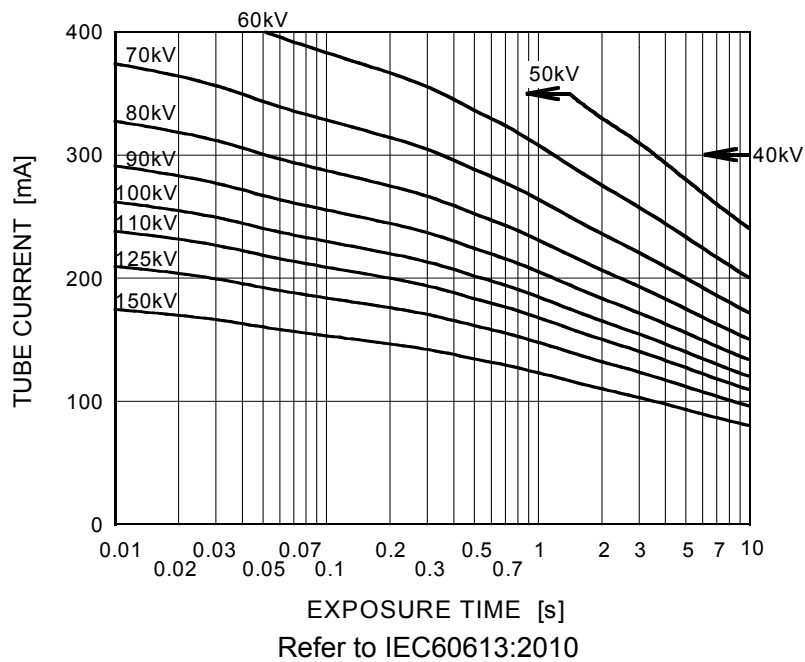
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



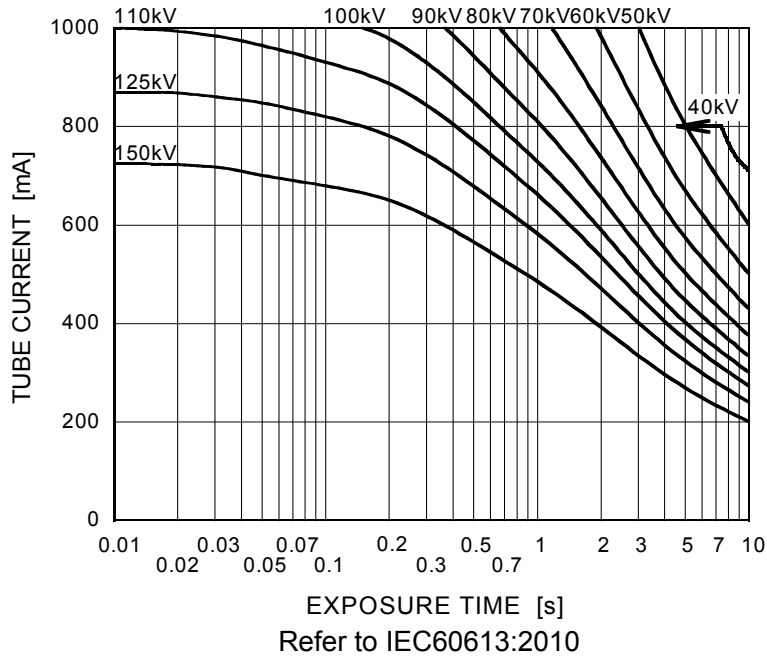
Nominal Focal Spot Value: 0.6 □



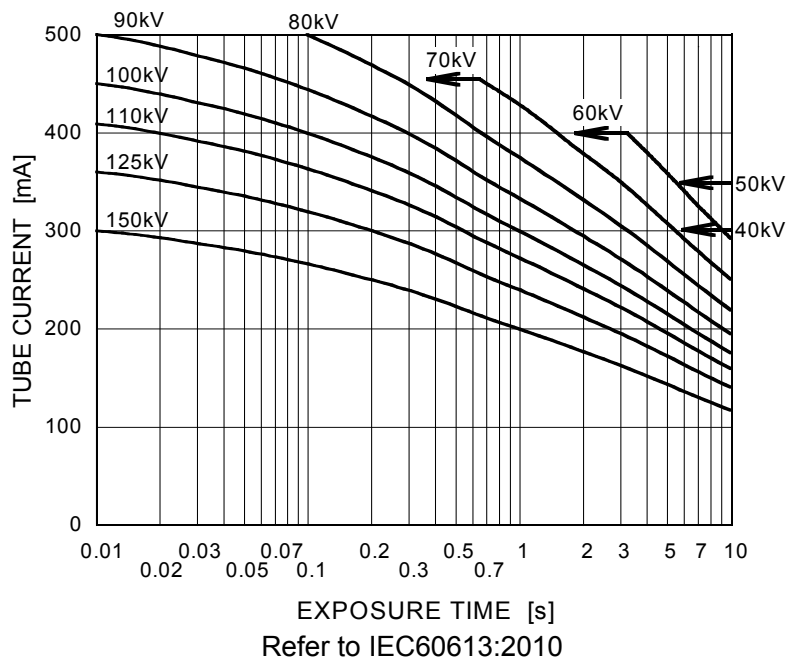
Maximum Rating Charts (Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.2 ■



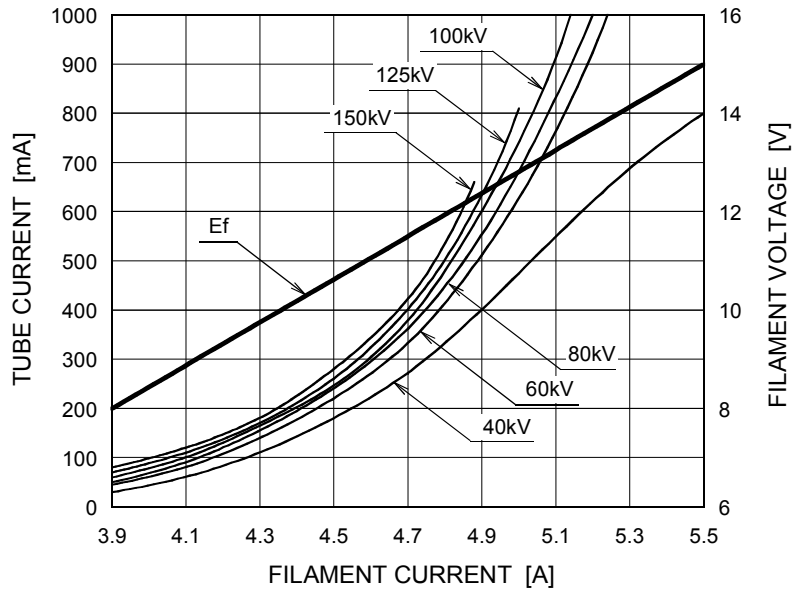
Nominal Focal Spot Value: 0.6 □



Emission & Filament Characteristics

Constant Potential High-Voltage Generator

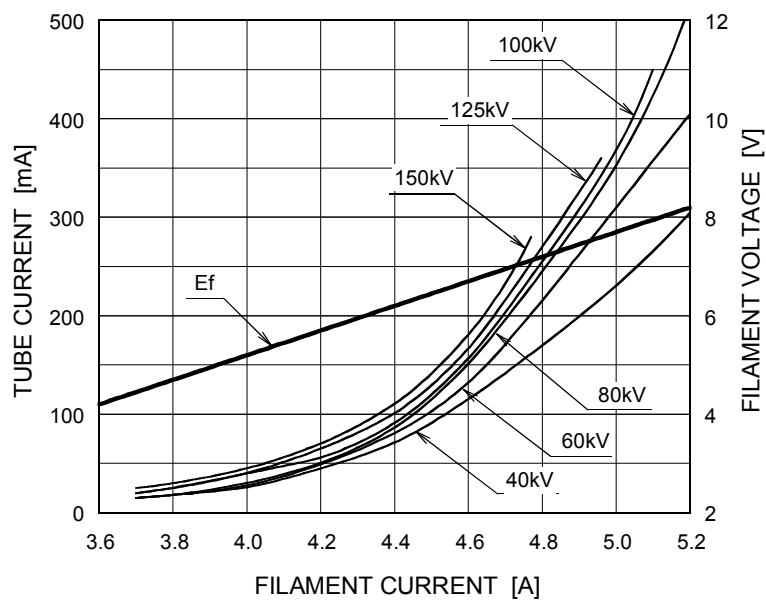
Nominal Focal Spot Value: 1.2 ■



Note1) For Reference Only

Note2) Refer to IEC60613:2010

Nominal Focal Spot Value: 0.6 □

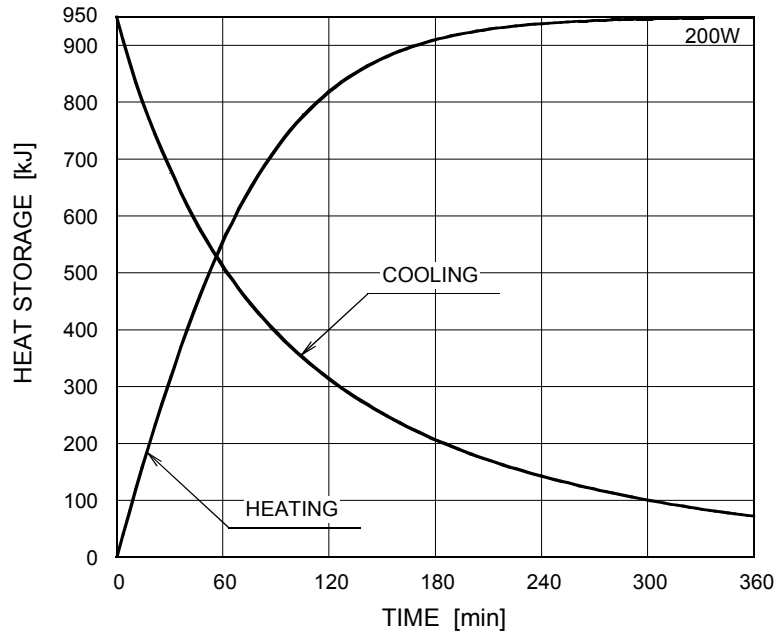


Note1) For Reference Only

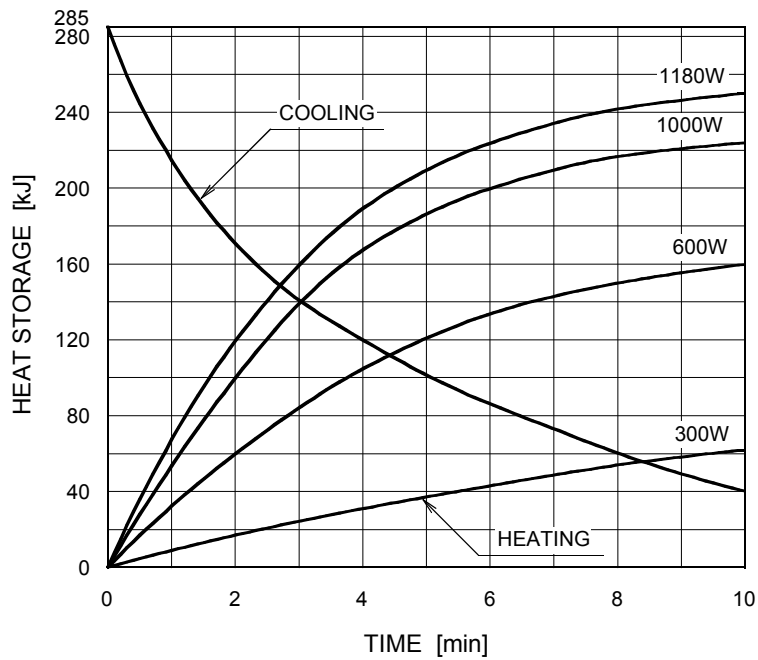
Note2) Refer to IEC60613:2010

Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



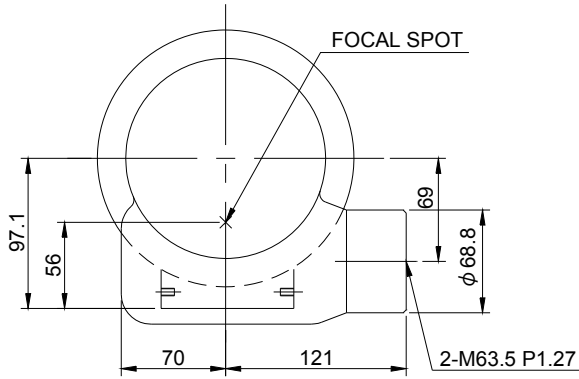
Anode Heating / Cooling Curve



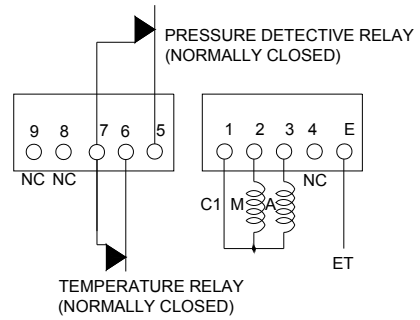
The heating curves are showing examples of average input power to the anode in operation.

Dimensional Outline of E7254X

Unit mm

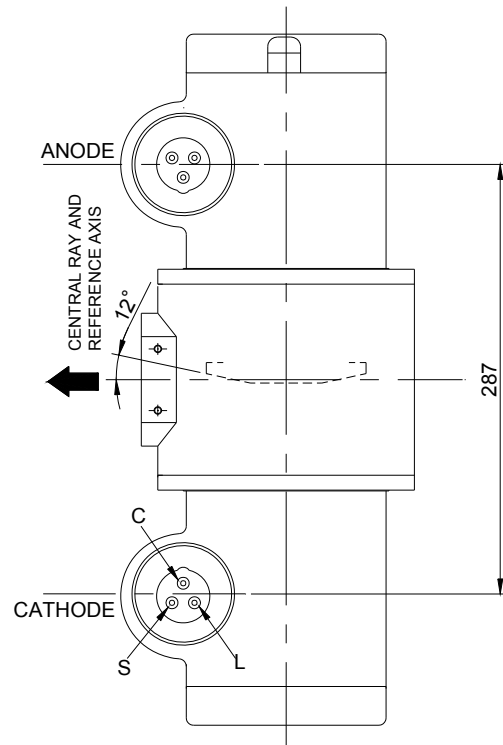
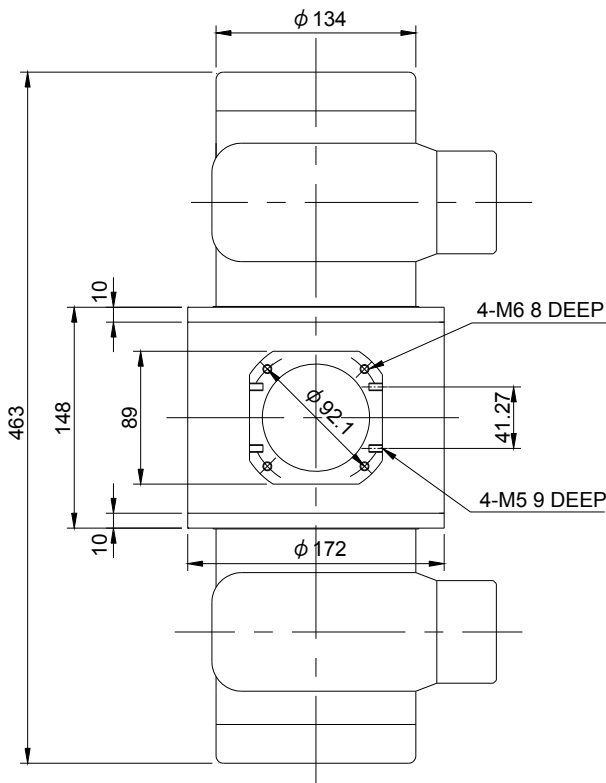


TERMINAL CONNECTIONS



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.



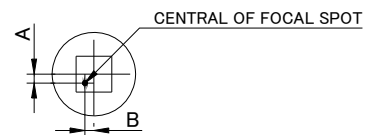
EXPLANATION OF SYMBOLS

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

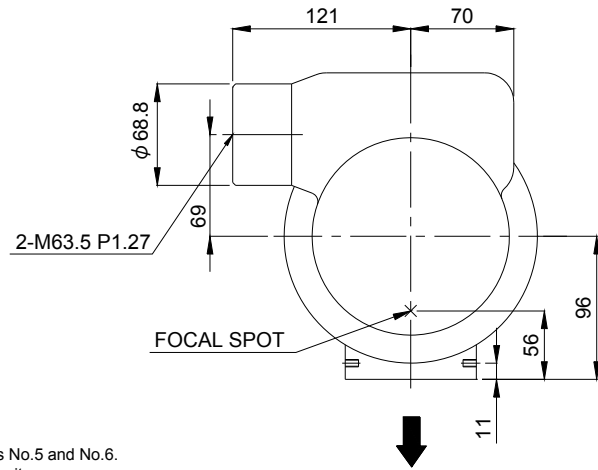
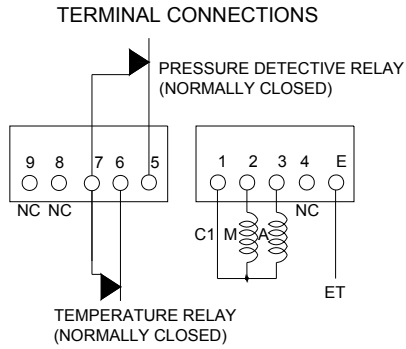


- 1.5mm ≤ A ≤ 1.5mm
- 1.5mm ≤ B ≤ 1.5mm

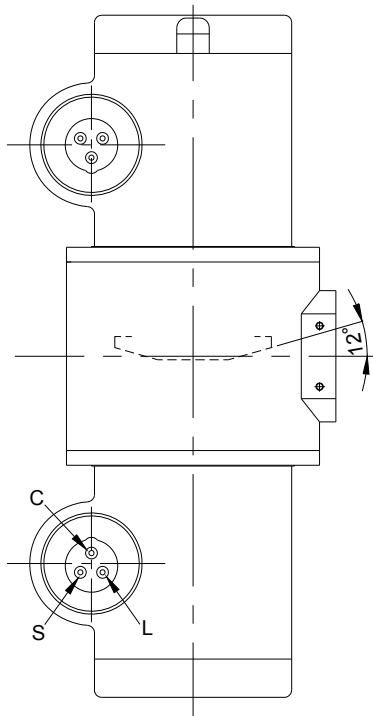
- ▲ : CENTRAL X-RAY ANODE & CATHODE TERMINAL : IEC60526 TYPE

Dimensional Outline of E7254FX

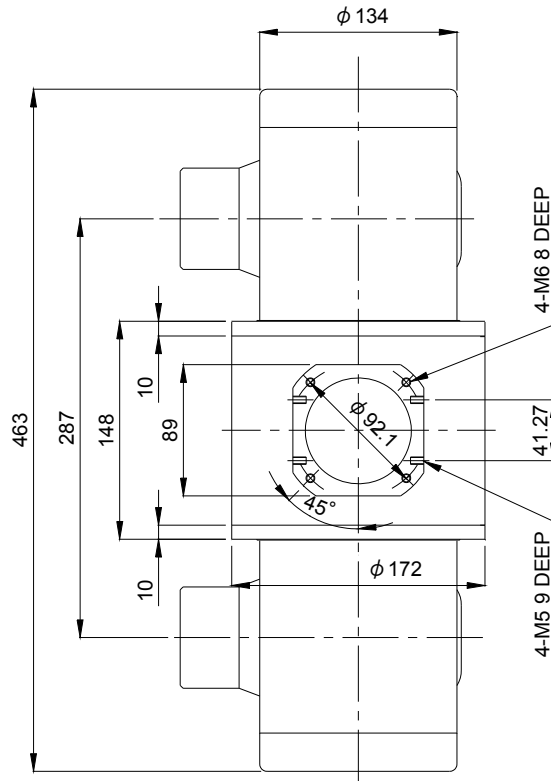
Unit mm



- 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

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TERMINAL CONNECTIONS

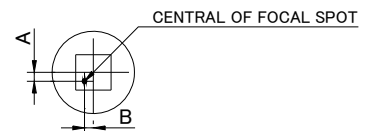
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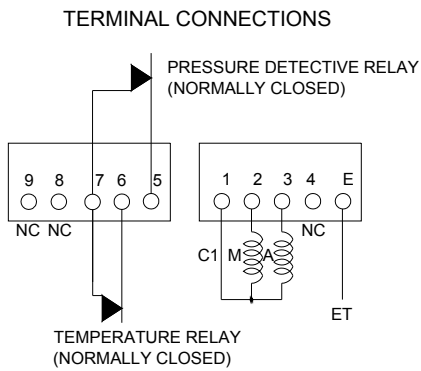
$$-1.5\text{mm} \leq A \leq 1.5\text{mm}$$

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

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

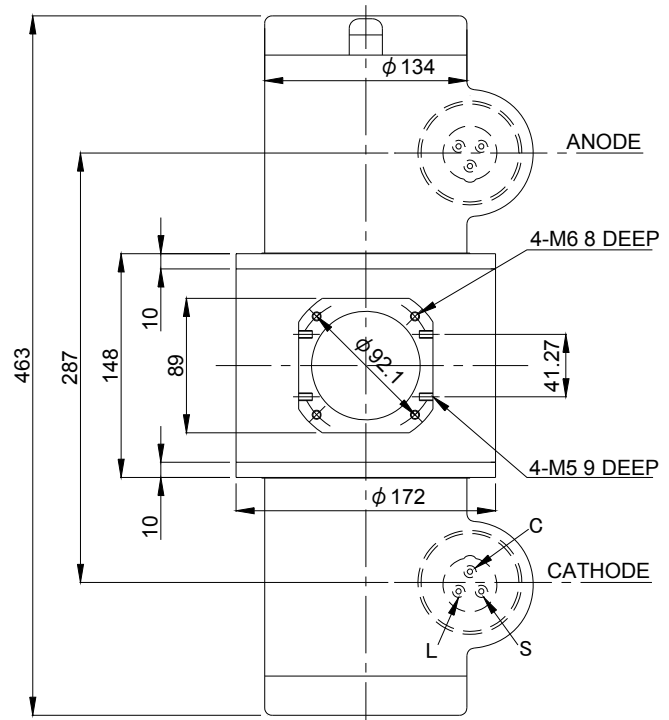
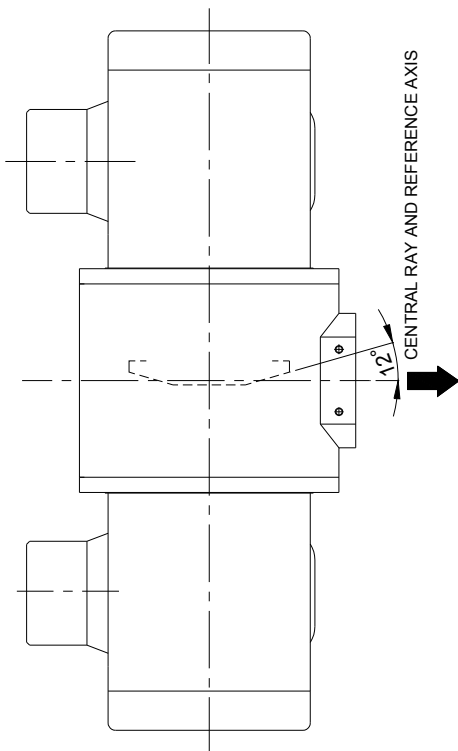
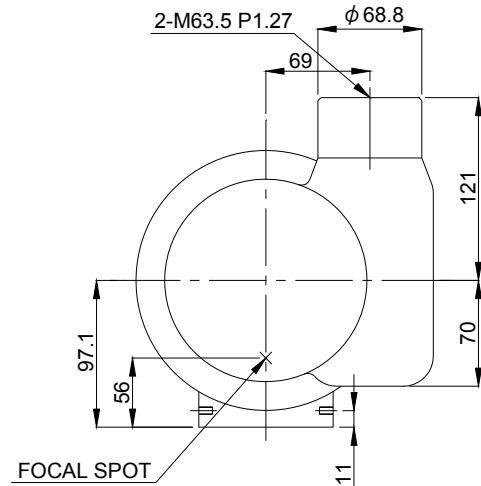
Dimensional Outline of E7254GX

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.



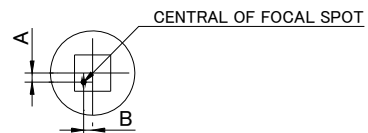
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CATHODE TERMINAL

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TERMINAL CONNECTIONS

- C1 : COMMON
- M : MAIN WINDING OF THE STATOR
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- 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

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