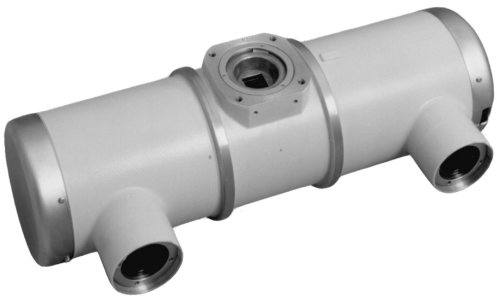
TOSHIBA ELECTRON TUBES & DEVICES

Product Information PI

ROTANODE™
E7242X
E7242FX CE 0197
E7242GX

Rotating Anode X-ray Tube Assembly

- Rotating anode X-ray tube assembly for the purpose of general diagnostic X-ray procedures.
- Specially processed Rhenium-tungsten faced molybdenum target of 74 mm diameter.
- These tubes have foci 1.5 and 0.6, and are available for a maximum tube voltage 125 kV.
- 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 ..... 125 kV

Nominal Focal Spot Value:

Large Focus 1.5

Small Focus 0.6

Nominal Anode Input Power (at 0.1s):

	60 Hz	50 Hz
Large Focus	50 kW	47 kW
Small Focus	18 kW	16.5 kW

Nominal Radiographic Anode Input Power:

	60 Hz	50 Hz
Large Focus	41 kW	37 kW
Small Focus	16 kW	15 kW

Motor Ratings:

Stator: XS-RA

		Starting		Running
Driven Frequency	[Hz]	50/60		50/60
Input Power	[W]	1050	270	43
Voltage [1) 3)]	[V]	200	100	40
Current [2)]	[A]	6.0	3.0	1.2
Min. Speed Up [4)]	[s]	0.8	1.5	-
Capacitor	[μF]	24	24	24

Note: 1) Applied voltage between common and main terminal.
2) Common current.
3) The every applied voltage must be never exceeded 110% of the above specification.
4) The speed-up time is allowed up to 110% of the above specification.

Anode Speed:

60 Hz ..... Minimum 3200 min^{-1}

50 Hz ..... Minimum 2700 min^{-1}

Stator Resistance:

Common-Main Winding ..... 27.5 Ω

Common-Auxiliary Winding ..... 58.0 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 ..... 479 mm

Maximum Diameter ..... 152.4 mm

Target:

Anode Angle ..... 14 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 ..... 125 kV, 4 mA

X-ray Coverage ..... 354 × 354 mm at SID 710 mm

Weight (Approx.) ..... 16 kg

High Voltage Receptacle ..... To meet the requirements of IEC60526 Corrigendum1:2010

Cooling Method ..... Natural or forced air

Tube Housing Model Number:

E7242X XH-121

E7242FX XH-126

E7242GX XH-150

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

Maximum X-ray Tube Voltage:
- Radiographic ..... 125 kV

Between Anode (or Cathode) and Ground ..... 62.5 kV
Minimum X-ray Tube Voltage ..... 40 kV
Maximum X-ray Tube Current ..... See rating charts
- Large Focus ..... 800 mA
- Small Focus ..... 290 mA

Maximum Filament Current:
- Large Focus ..... 5.3 A
- Small Focus ..... 5.3 A

Filament Voltage:
- Large Focus (At maximum filament current 5.3 A) ..... 10.6 ~ 14.4 V
- Small Focus (At maximum filament current 5.3 A) ..... 5.1 ~ 6.9 V

Filament Frequency Limits ..... 0 ~ 25 kHz
Continuous Anode Input Power ..... 60 W (85HU/s)
Thermal Characteristics:
- Anode Heat Content ..... 142 kJ (200 kHU)
- Maximum Anode Heat Dissipation ..... 475 W (667 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

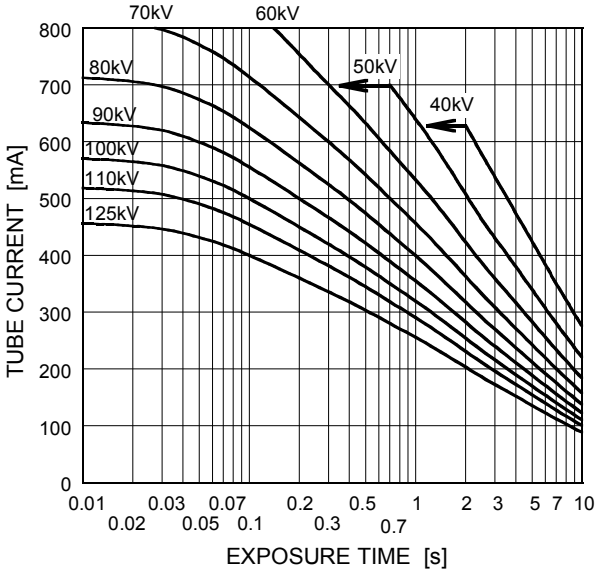
Operating Limits:
- Temperature ..... 10 ~ 40 °C
- Humidity ..... 30 ~ 85 %
  (No condensation)
- Atmospheric Pressure ..... 70 ~ 106 kPa

Shipping and Storage Limits:
- Temperature ..... -20 ~ 70 °C
- Humidity ..... 20 ~ 90 %
  (No condensation)
- Atmospheric Pressure ..... 50 ~ 106 kPa

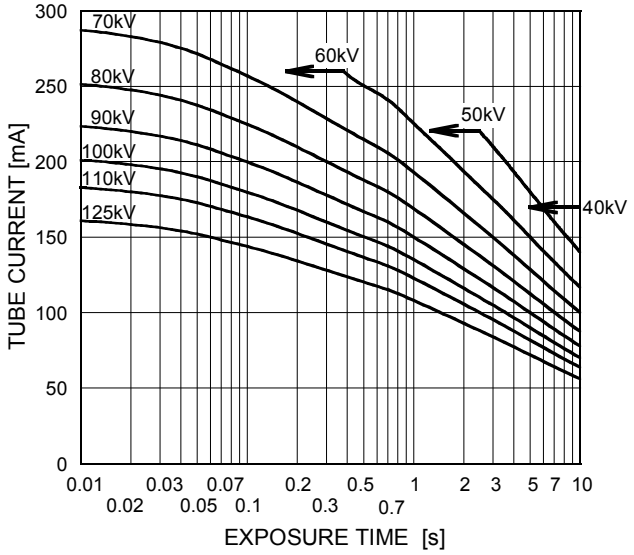
Maximum Rating Charts
(Absolute Maximum Rating Charts)

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

Nominal Focal Spot Value: 1.5 ■

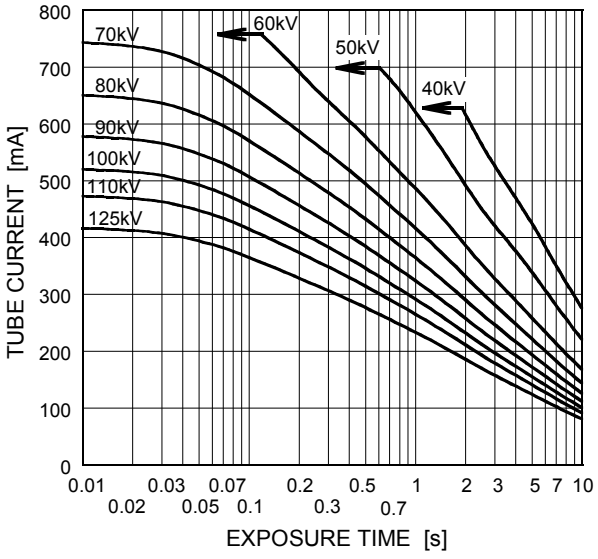


Nominal Focal Spot Value: 0.6 ▣

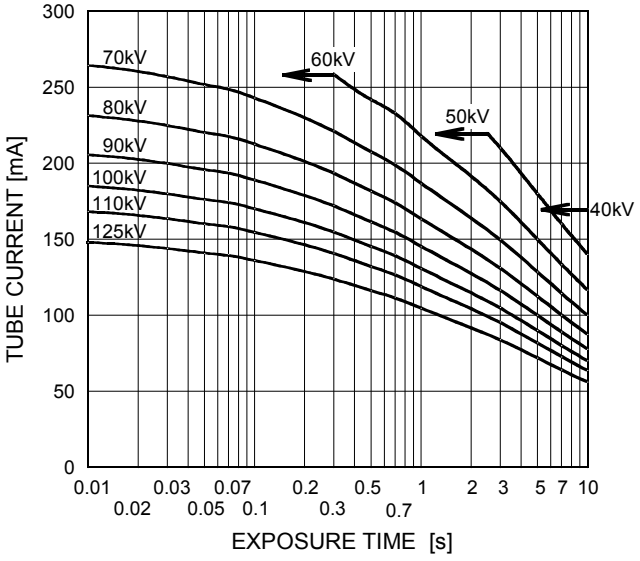


Conditions: Tube Voltage
Constant Potential High-Voltage Generator
Stator Power Frequency 50Hz

Nominal Focal Spot Value: 1.5 ■



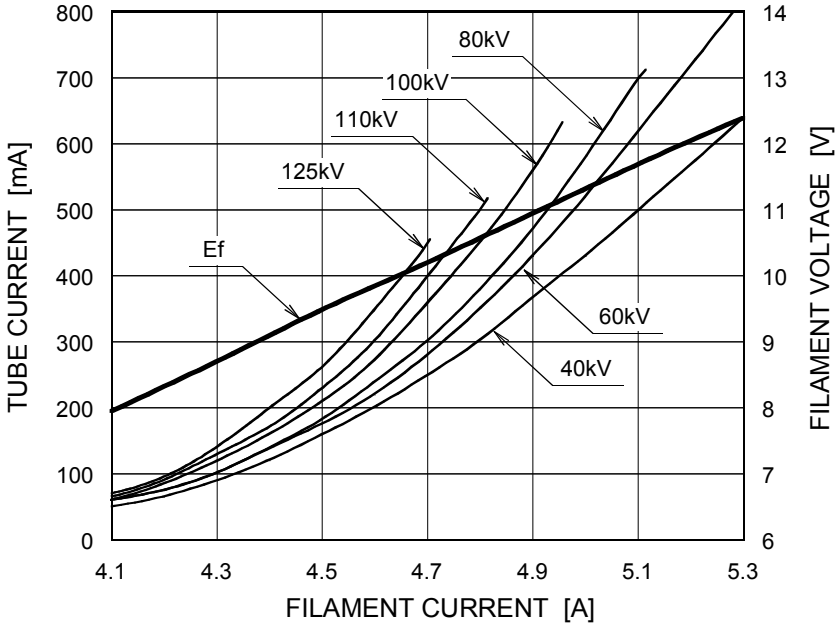
Nominal Focal Spot Value: 0.6 ▣



Emission & Filament Characteristics

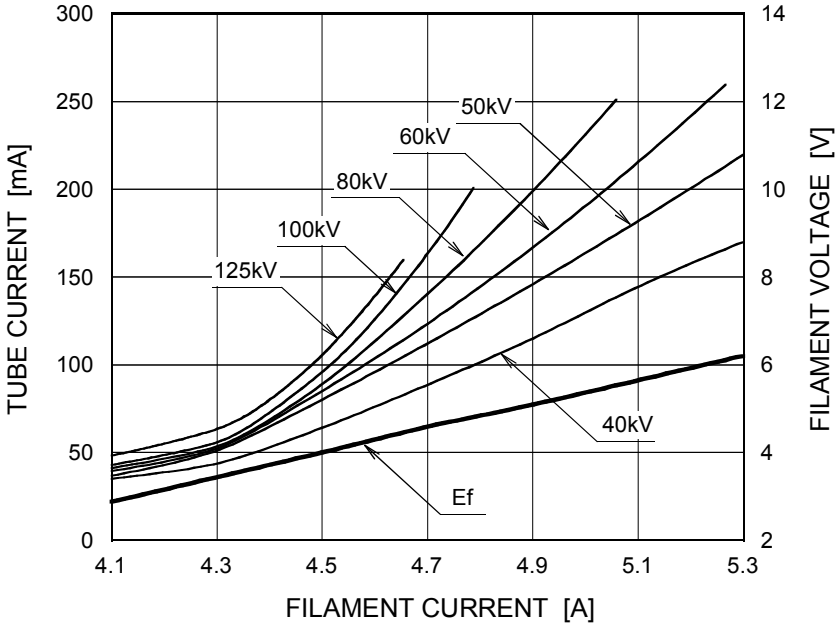
Constant Potential High-Voltage Generator

Nominal Focal Spot Value: 1.5 ■



For Reference Only

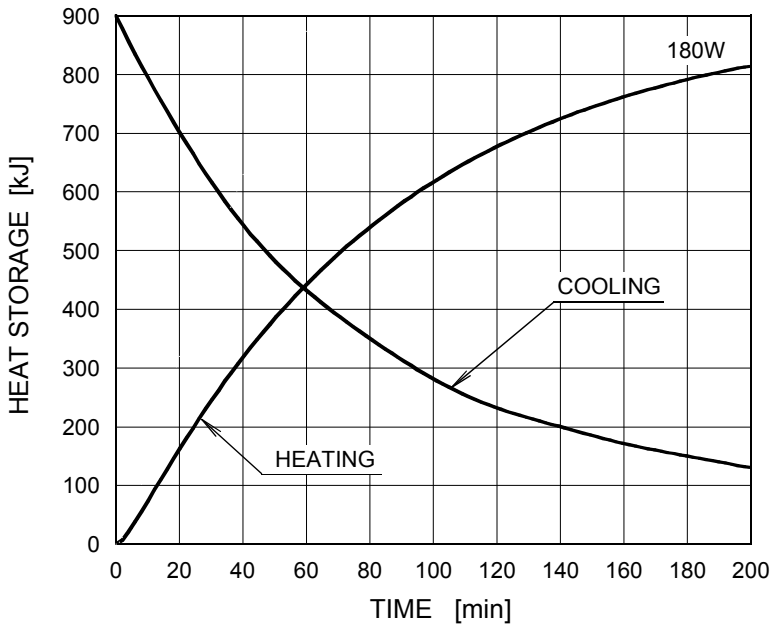
Nominal Focal Spot Value: 0.6 ▣



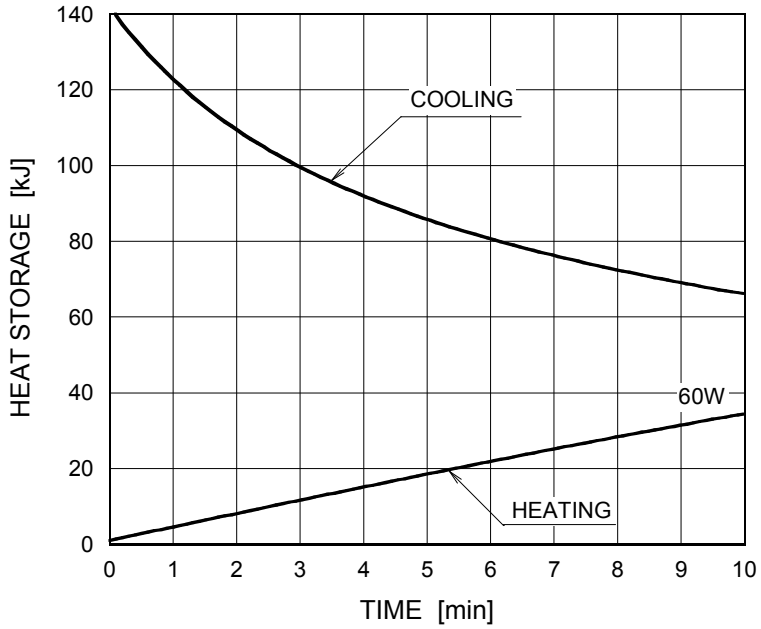
For Reference Only

Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve



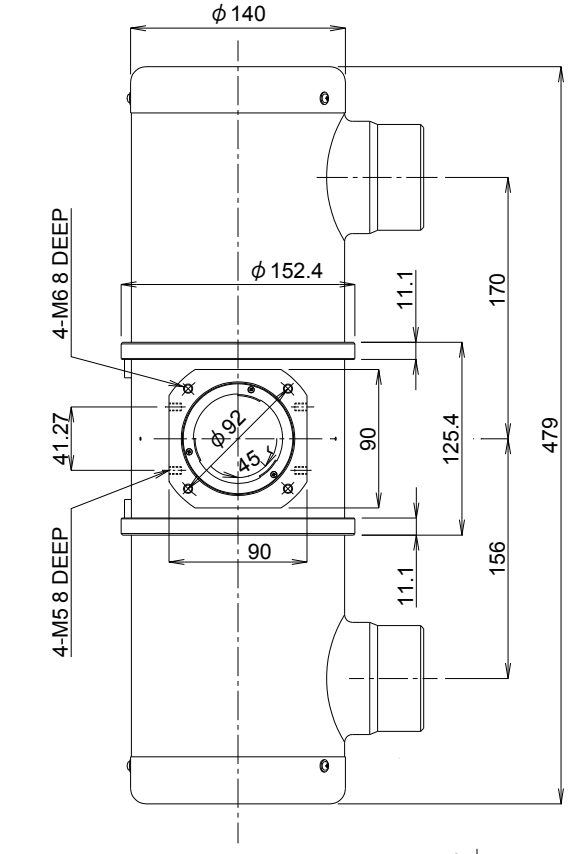
Anode Heating / Cooling Curve

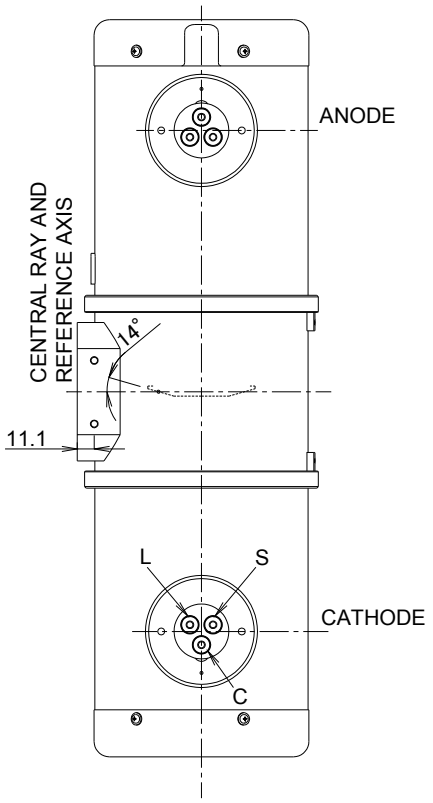


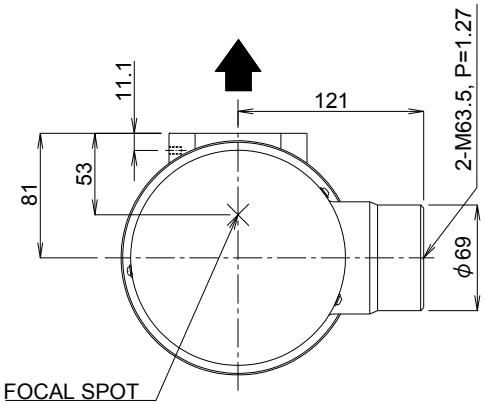
The heating curves are showing examples of average input power to anode in operation.

Dimensional Outline of E7242X

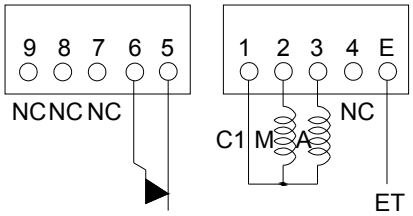
Unit mm







TERMINAL CONNECTIONS

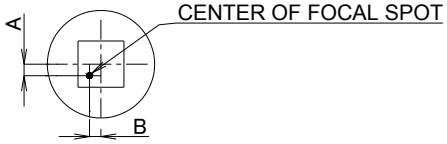


TEMPERATURE RELAY
(NORMALLY CLOSED)

Note) Do not connect terminal No.1 and No.5 or 6 in series circuit.

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



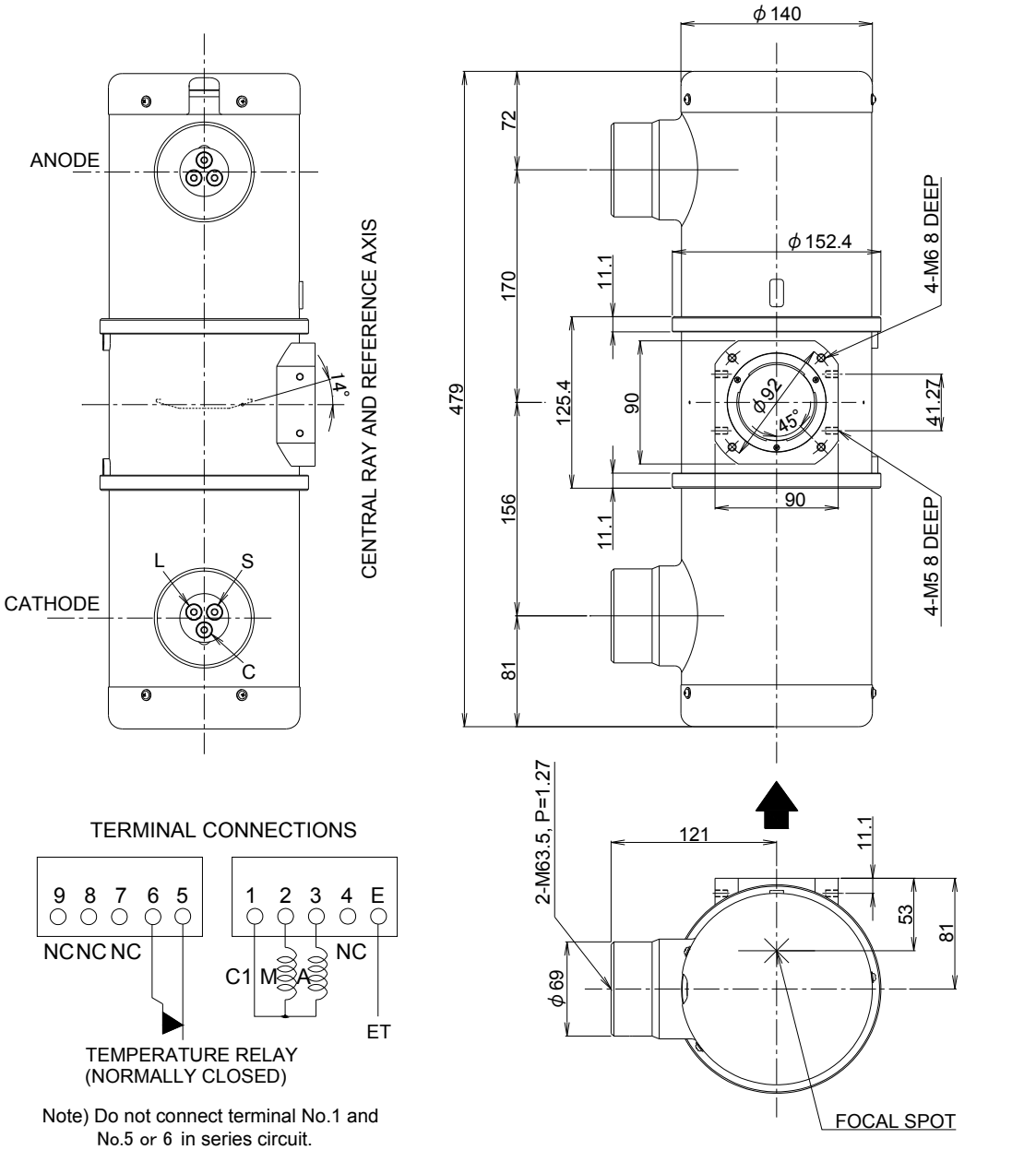
-1.5mm≦A≦1.5mm
-1.5mm≦B≦1.5mm

▲: CENTRAL X-RAY

ANODE & CATHODE TERMINAL
: IEC60526 TYPE

Dimensional Outline of E7242FX

Unit mm



TERMINAL CONNECTIONS

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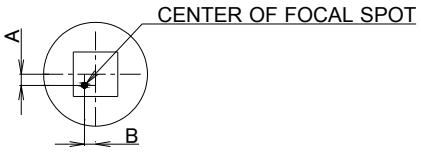


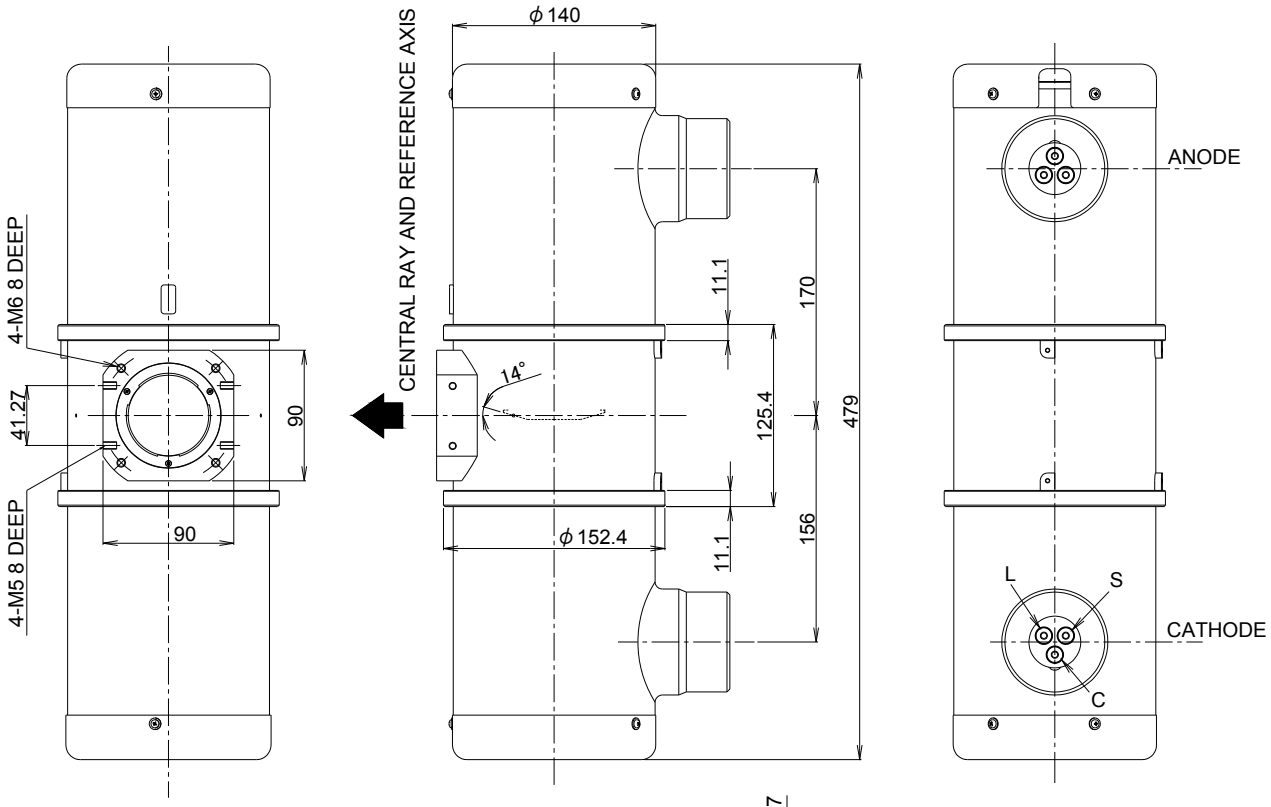
-1.5mm≦A≦1.5mm
-1.5mm≦B≦1.5mm

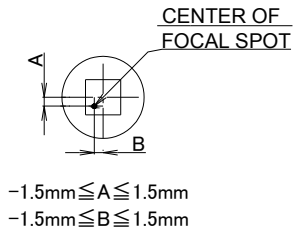
⬆ : CENTRAL X-RAY

ANODE & CATHODE TERMINAL
: IEC60526 TYPE

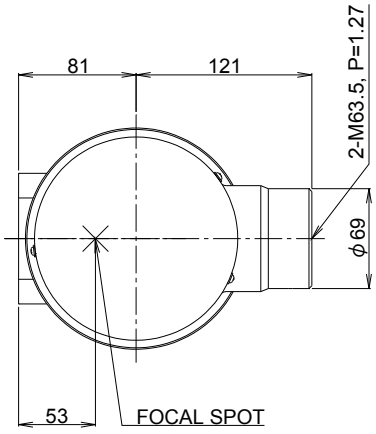
Dimensional Outline of E7242GX

Unit mm

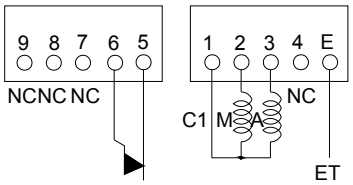




−1.5mm≦A≦1.5mm
−1.5mm≦B≦1.5mm



TERMINAL CONNECTIONS



TEMPERATURE RELAY
(NORMALLY CLOSED)

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EXPLANATION OF SYMBOLS

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

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