

ROTANODE™
E7902X (C) (E) 0197

Rotating Anode X-ray Tube Assembly

- ◆ The rotating anode X-ray tube assembly E7902X is designed with Hydrodynamic bearing lubricated by liquid metal and its rotor offers continuous high speed, extra low noise and high reliability.
- ◆ This tube has the grid control function, which is capable of high-speed pulse-fluoroscopy suitable for high speed such as cine- fluoroscopy.
- ◆ It performs high cooling rate 3.5kW and high patient throughput with the featuring of 2130kJ anode heat capacity and water-cooling heat exchanger.

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 125 kV
 Fluoroscopic:
 Continuous 125 kV
 Grid-Control 110 kV

Nominal Focal Spot Value (IEC60336:2005):

Large Focus 0.8
 Small Focus (1) 0.5

Note(1) Two equivalent focal spots are available for 0.5 focus.

★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.

Nominal Anode Input Power (at 0.1s)	See rating charts
Large Focus	90 kW
Small Focus	45 kW
Nominal Radiographic Anode Input Power (IEC60613:2010):	
Large Focus	86 kW
Small Focus	43 kW
Anode Speed	Minimum 9000 min ⁻¹
Cut-off grid Voltage (Small Focus)	-2900 VDC
Resistance between Housing and Low Voltage Terminals	Minimum 2 MΩ (Measured by DC 500 V)
Heat Exchanger Input Voltage / Input Current	AC 100V, 2A
Heat Exchanger Source Frequency	50/60 Hz
Normal Operating Range of the Housing Temperature	16 ~ 75 °C
Mode of Operation	Intermittent
Envelope Current (IEC60613:2010) (125kV/100mA)	(Approx) 10 mA
Envelope Voltage (IEC60613:2010) (125kV/100mA)	0 kV

Mechanical:

Dimensions	See dimensional outline
Overall Length	562 mm
Maximum Diameter	213 mm
Target:	
Anode Angle (Effective)	8 degrees
Diameter	140 mm
Construction	Rhenium-Tungsten
Permanent Filtration	1.1 mm Al / 75 kV IEC60522:1999
Radiation Protection (In accordance with IEC60601-1-3:2008):	
X-ray Leakage	0.44 mGy/h
Leakage Technique Factor	125 kV, 18 mA
X-ray Coverage	φ 281 mm at SID 1000 mm
Weight (Approx.)	46 kg
High Voltage Receptacle	CLAYMOUNT MINI-75
Cooling Method	Water-Cooled Heat Exchanger
Inner Cooling Method	Oil Circulation
Tube Model Number	DSR-T7444G,U
Tube Housing Model Number	XH-177

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

Maximum X-ray Tube Voltage (IEC60613:2010):	
Radiographic	125 kV
Fluoroscopic:	
Continuous	125 kV
Grid-control	110 kV
Between Anode (or Cathode) and Ground	62.5 kV
Minimum X-ray Tube Voltage	50 kV
Maximum X-ray Tube Current (IEC60613:2010)	
Large Focus (0.8)	See rating charts
Small Focus (0.5)	950 mA
Small Focus (0.5)	600 mA
Maximum Filament Current:	
Large Focus (0.8)	5.9 A
Small Focus (0.5)	5.2 A
Filament Frequency Limits	0 ~ 25 kHz
Filament Voltage (At maximum filament current):	
Large Focus (5.9 A)	13.2 ~ 17.8 V
Small Focus (5.2 A)	11.5 ~ 15.5 V
Continuous Anode Input Power (IEC60613:2010)	
20 minutes	2200 W (3100 HU/s)
20 minutes	3000 W (4230 HU/s)
Thermal Characteristics:	
Anode Heat Content	2130 kJ (3000 kHU)
Maximum Anode Heat Dissipation	5500 W (7700 HU/s)
X-ray Tube Assembly Heat Content	2050 kJ (2890 kHU)
Nominal Continuous Input Power (IEC60613:2010):	
With Water-Cooling Heat Exchanger (HEX-125 or HEX-119)	3500 W (296 kHU/min)

Environmental Limits

Operating Limits:

Temperature 18 ~ 40 °C
Relative Humidity 30 ~ 85 %
(No condensation)
Atmospheric Pressure 70 ~ 106 kPa

Transport and Storage:

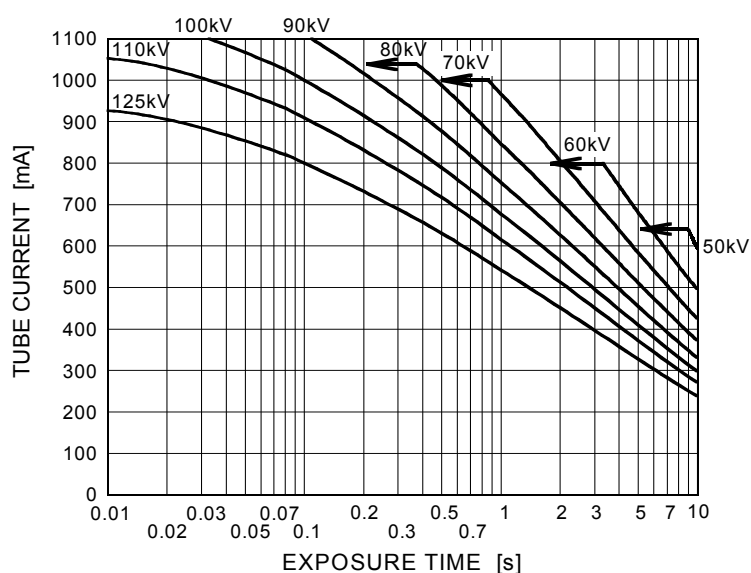
Temperature:

With cooling water empty -20 ~ 70 °C
With cooling water filled 2 ~ 60 °C
Relative Humidity 20 ~ 90 %
(No condensation)
Atmospheric Pressure 50 ~ 106 kPa

Absolute Maximum Rating Charts (Single Load Rating Charts)

Conditions: Constant Potential High-Voltage Generator
Anode Rotation Speed 9000min^{-1}

Nominal Focal Spot Value: 0.8 ■

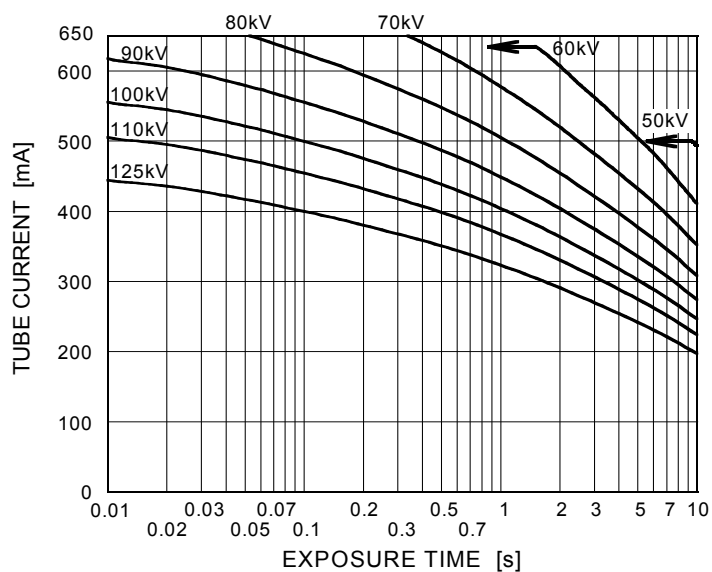


Note1) Do not exceed values in above table at all the time.

Equipment setting and calibration errors must be considered not to exceed the table values.

Note2) Refer to IEC60613:2010

Nominal Focal Spot Value: 0.5 □



Note1) Do not exceed values in above table at all the time.

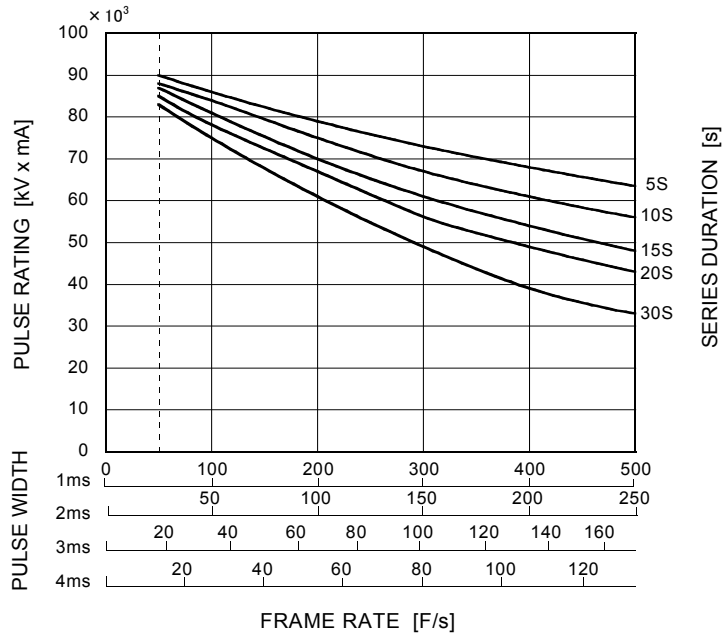
Equipment setting and calibration errors must be considered not to exceed the table values.

Note2) Refer to IEC60613:2010

Cine-fluorographic Rating Charts

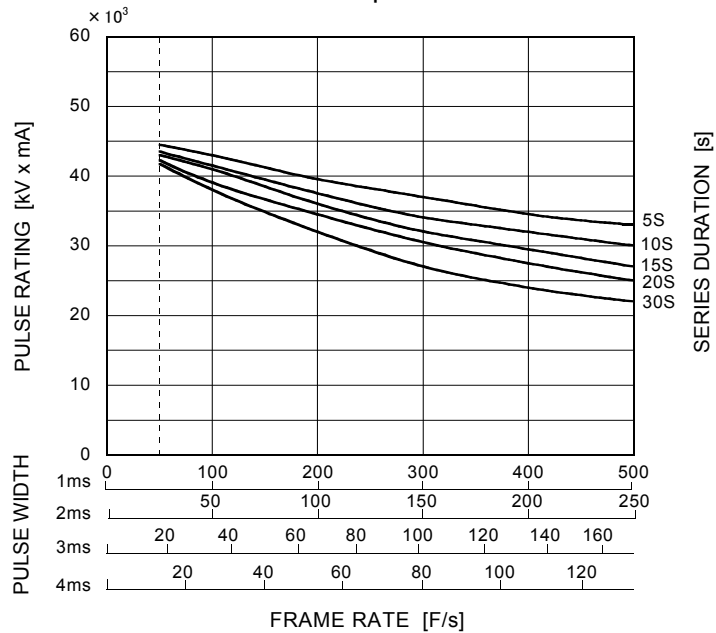
Conditions: Constant Potential High-Voltage Generator
Anode Rotation Speed 9000min⁻¹

Nominal Focal Spot Value: 0.8 ■



Note1) Do not exceed values in above table at all the time.
Equipment setting and calibration errors must be considered not to exceed the table values.
Note2) Refer to IEC60613:2010

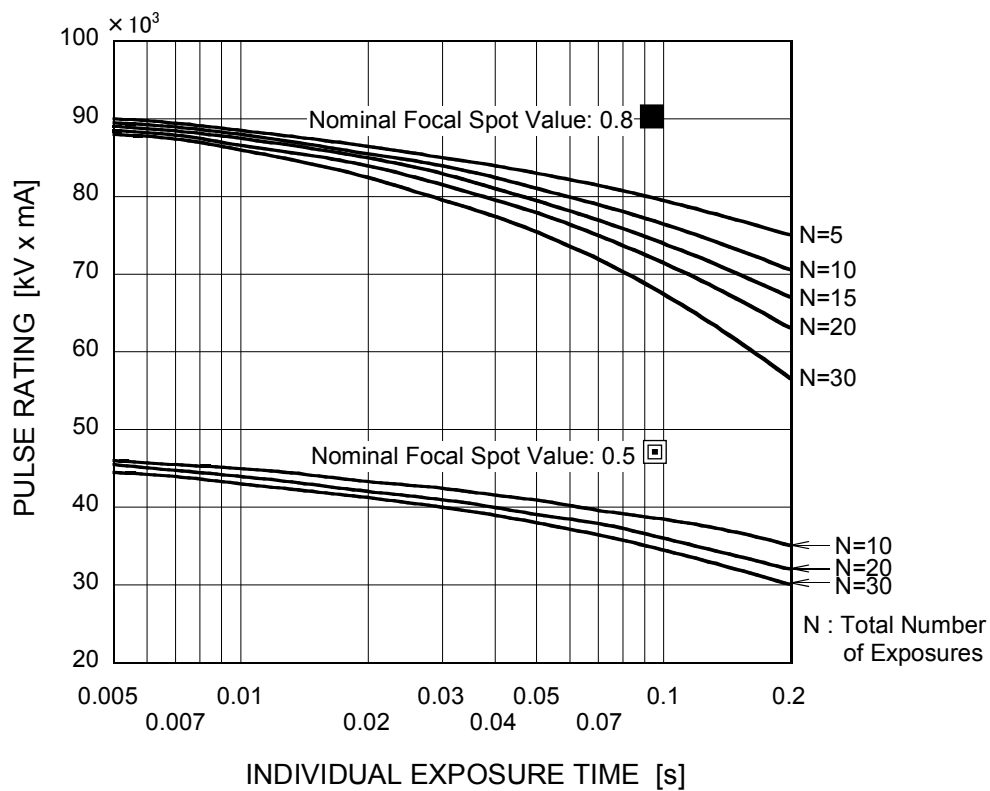
Nominal Focal Spot Value: 0.5 □



Note1) Do not exceed values in above table at all the time.
Equipment setting and calibration errors must be considered not to exceed the table values.
Note2) Refer to IEC60613:2010

Angiographic Rating Charts

Conditions: Constant Potential High-Voltage Generator
Anode Rotation Speed 9000min^{-1}



Note1) Do not exceed values in above table at all the time.

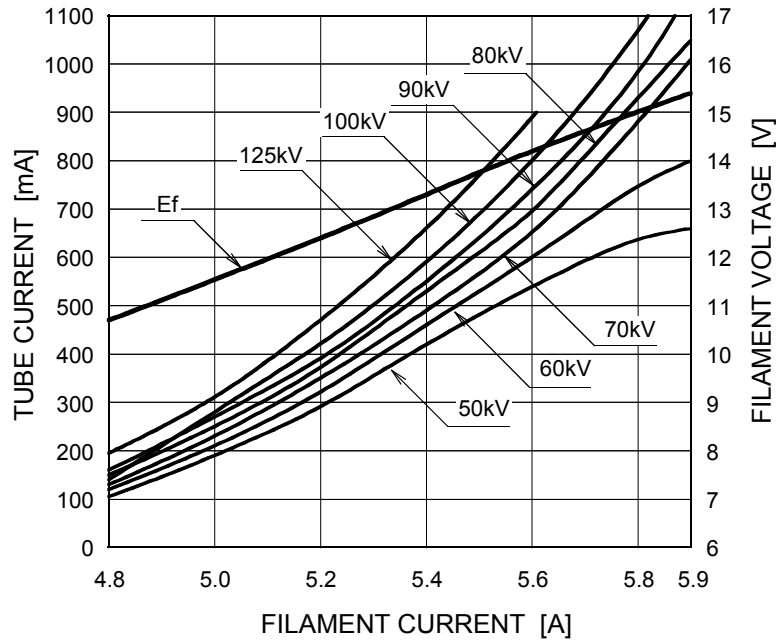
Equipment setting and calibration errors must be considered not to exceed the table values.

Note2) Refer to IEC60613:2010

Emission & Filament Characteristics

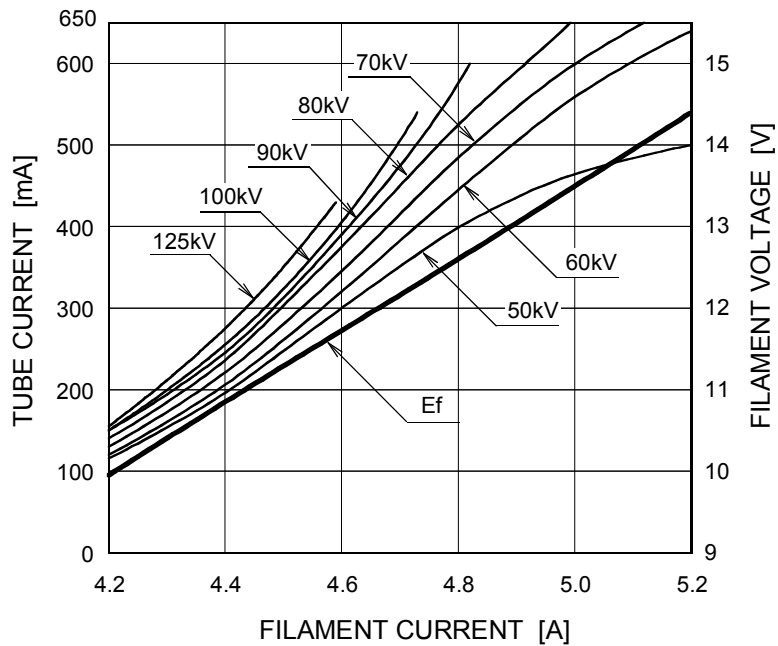
Constant Potential High-Voltage Generator

Nominal Focal Spot Value: 0.8 ■



Note1) For Reference Only
 Note2) Refer to IEC60613:2010

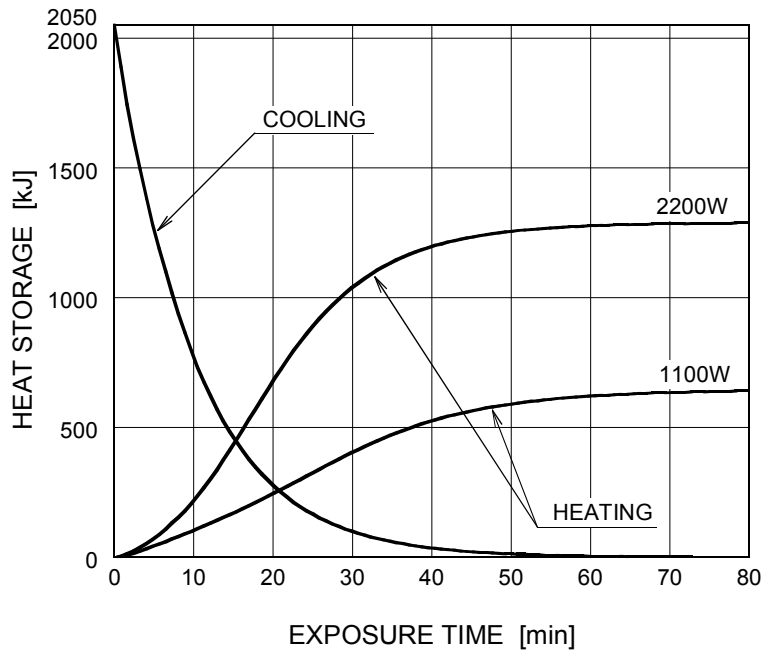
Nominal Focal Spot Value: 0.5 □



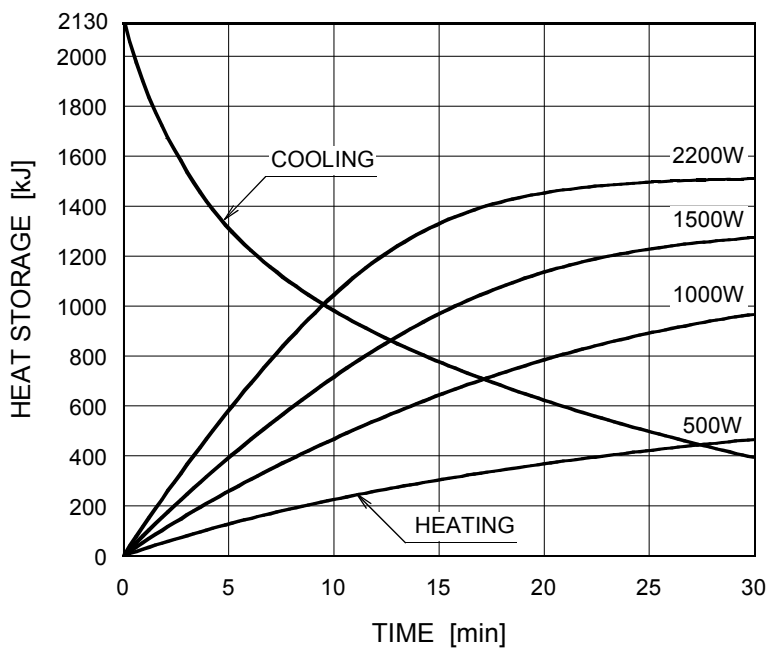
Note1) For Reference Only
 Note2) Refer to IEC60613:2010

Thermal Characteristics

X-ray Tube Assembly Heating / Cooling Curve
(Environmental Temperature: 25°C)

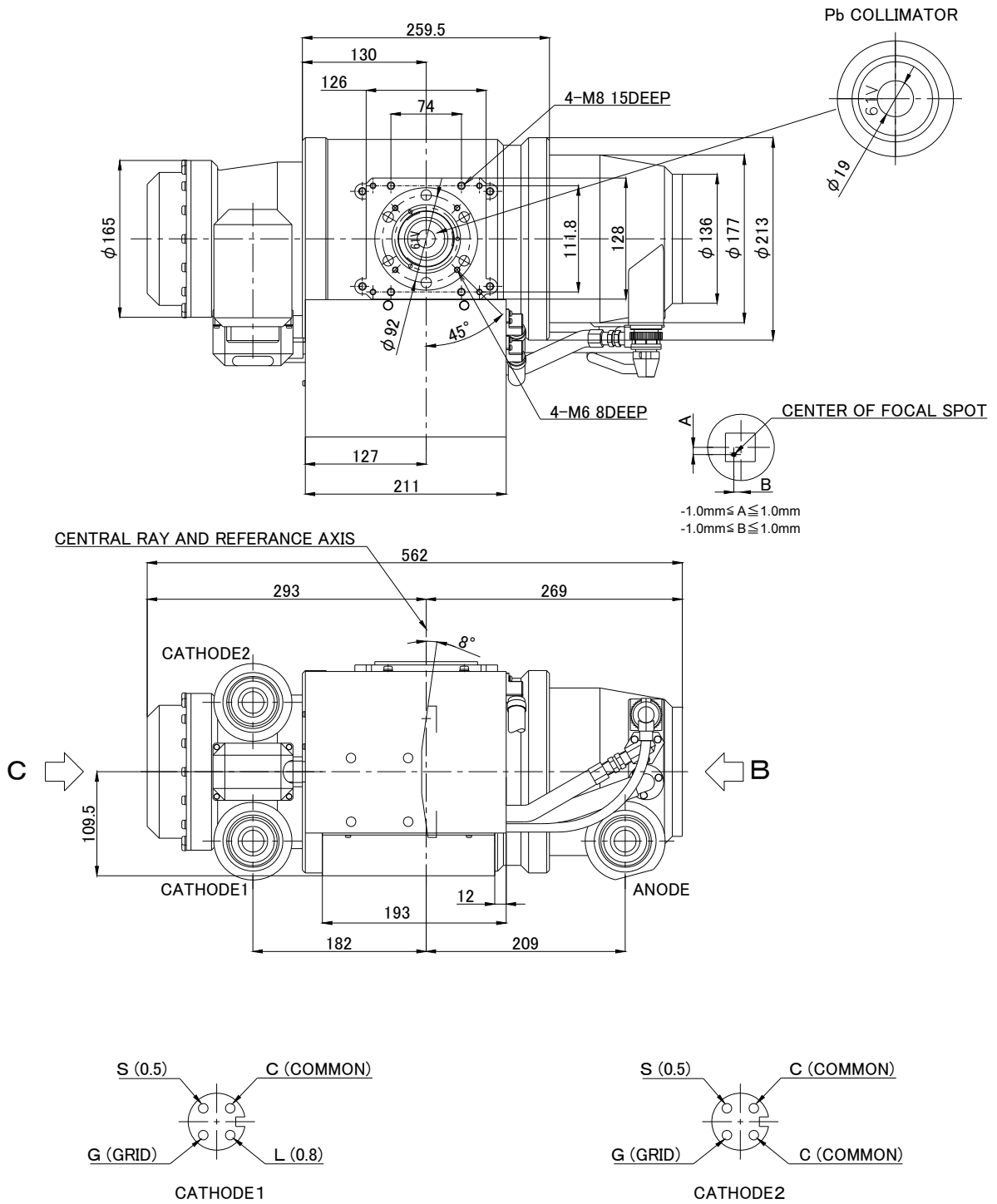


Anode Heating / Cooling Curve



Dimensional Outline (1)

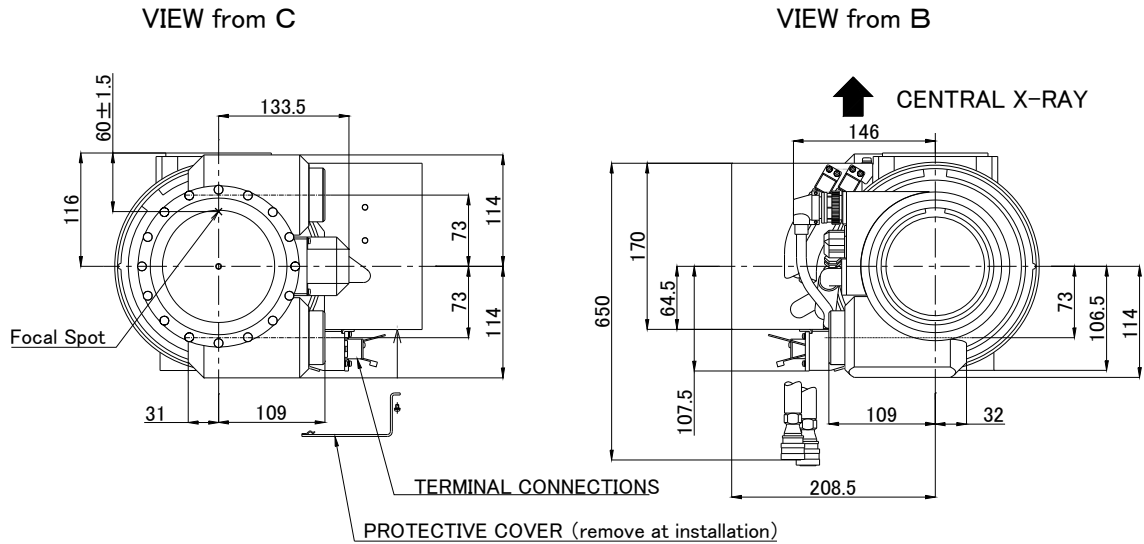
Unit: mm



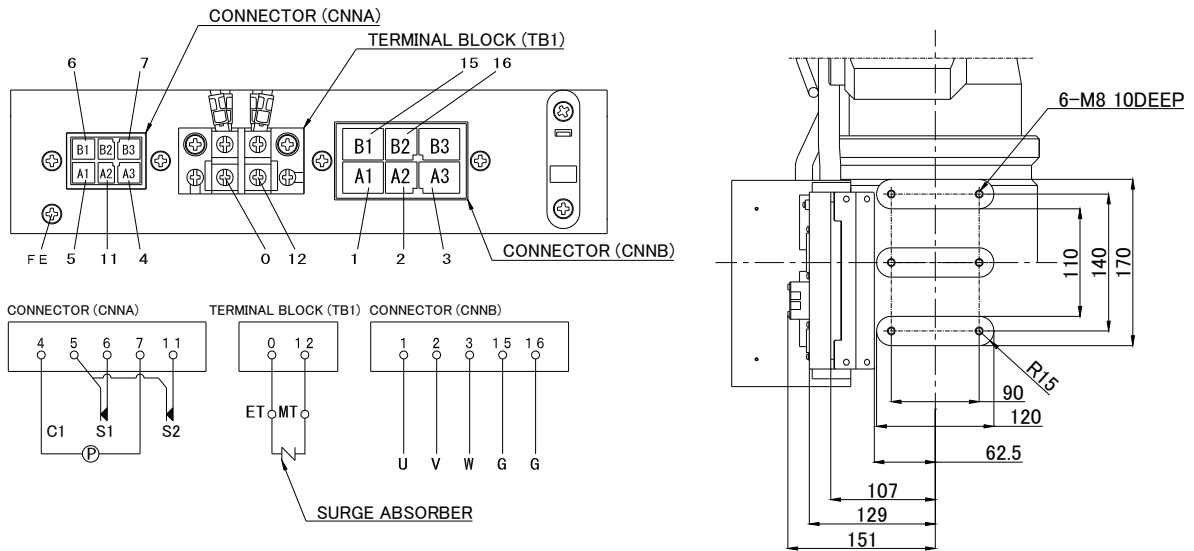
ANODE & CATHODE TERMINAL : CLAYMOUNT MINI-75

Dimensional Outline (2)

Unit: mm



LOW VOLTAGE WIRING DIAGRAM PORT TERMINAL CONFIGURATION



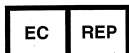
SYMBOL

LOW VOLTAGE TERMINAL

- ETEARTH TERMINAL
- USTATOR U
- VSTATOR V
- WSTATOR W
- GGETTER
- MTMETAL CENTER TERMINAL

- PPUMP MOTOR (50/60Hz 100V)
- C1TEMPERATURE RELAY COMMON
- S1TEMPERATURE RELAY 80°C (NORMALLY CLOSE)
- S2TEMPERATURE RELAY 70°C (NORMALLY CLOSE)
- FEFUNCTION EARTH TERMINAL

OVERSEAS SUBSIDIARIES AND AFFILIATES



EU REPRESENTATIVE

· **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY

PHONE +49 (211) 5296-107 FAX +49 (211) 5296-402

For Sales & Technical Services, please contact the following representative:

· **TOSHIBA ELECTRONICS EUROPE GMBH**

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY

PHONE +49 (211) 5296-107 FAX +49 (211) 5296-402

· **TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC.**

2150 EAST LAKE COOK ROAD, SUITE 310

BUFFALO GROVE, ILLINOIS 60089 USA

PHONE +1 (847) 484-2400 FAX +1 (847) 541-7287

· **TOSHIBA ELECTRON DEVICES & MATERIALS (SHANGHAI) CO., LTD. (TEMS)**

RM1606, SH-PLAZA,

No.336, XIZANG ROAD (MIDDLE), SHANGHAI, 200001, CHINA

PHONE +86 (21) 6361-0077 FAX +86 (21) 6351-5760

 **TOSHIBA ELECTRON TUBES & DEVICES CO.,LTD.**

Product Development Engineering 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>.