

ROTANODE™  
XRV-7247F C E 0197

## Rotating Anode X-Ray Tube Housing Assembly

- ◆ The rotating anode x-ray tube assembly XRV-7247F 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 3.1 kW 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 ..... 0.5

Nominal Anode Input Power (at 0.1s) ..... See rating charts

Large Focus ..... 100 kW  
Small Focus ..... 50 kW

Nominal Radiographic Anode Input Power (IEC60613:2010) ..... See rating charts

Large Focus ..... 96 kW  
Small Focus ..... 46 kW

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Anode Speed .....	Minimum 9000 min <sup>-1</sup>
Cut-off grid Voltage (Small Focus) .....	-2900 VDC
Resistance between Housing and Low Voltage Terminals .....	Minimum 2 MΩ (Measured by DC500V)
Input Voltage of Oil Pump in the Tube Housing .....	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 .....	552 mm
Maximum Diameter .....	213 mm
Target:	
Angle (Effective) .....	8 degrees
Construction .....	Rhenium-Tungsten
Permanent Filtration .....	1.5 mm Al / 75 kV IEC60522:1999
Radiation Protection (To meet the requirements of IEC 60601-1-3:2008):	
X-ray Leakage .....	Maximum 0.35 mGy/h
Leakage Technique Factor .....	125 kV, 18 mA
X-ray Coverage .....	230 × 230 mm at SID 900 mm
Weight (Approx.):	
X-ray Tube Assembly .....	39 kg
Heat Exchanger .....	17 kg
High Voltage Receptacle .....	CLAYMOUNT MINI-75
Low Voltage Terminal .....	Refer to the Outline Drawing
Cooling Method .....	Water-Cooled Heat Exchanger
Inner Cooling Method .....	Oil Circulation
Operating position .....	Non-designated
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 .....	40 kV
Maximum X-ray Tube Current (IEC60613:2010).....	See rating charts
Large Focus .....	860 mA
Small Focus .....	550 mA
Maximum Filament Current:	
Large Focus .....	5.8 A
Small Focus .....	5.0 A
Filament Voltage: (At Maximum Filament Current)	
Large Focus (5.8 A) .....	13.0 ~ 17.4 V
Small Focus (5.0 A) .....	10.3 ~ 13.8 V
Filament Frequency Limits .....	0 ~ 25 kHz
Continuous Anode Input Power (IEC60613:2010):	
60 minutes average .....	2200 W (3100 HU/s)
Within 30 minutes .....	2500 W (3525 HU/s)
Within 20 minutes .....	2800 W (3950 HU/s)
Thermal characteristic:	
Anode heat content .....	2130 kJ (3000 kHU)
Anode heat dissipation .....	5500 W (7700 HU/s)
X-ray tube assembly heat content .....	2050 kJ (2890 kHU)
Continuous Anode Input Power (IEC60613:2010)	
Including water-cooled heat exchanger <sup>1)</sup> .....	3100 W (260 kHU/min)

Note 1) This is specified with the heat exchanger HEX-125.

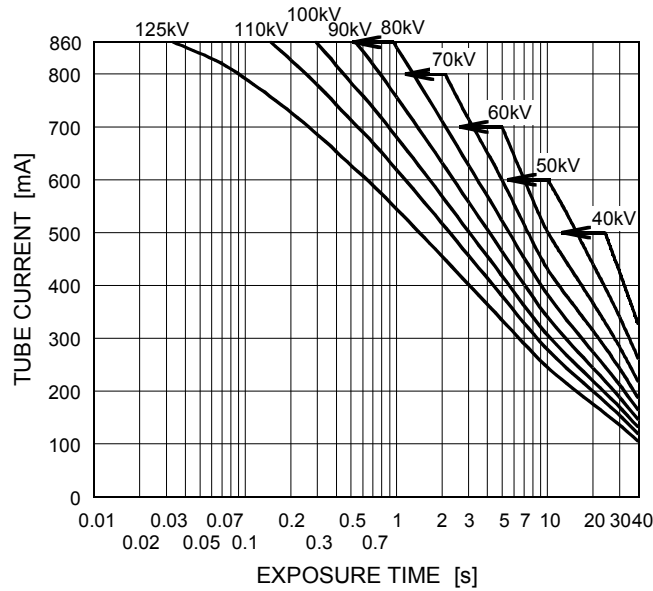
## Environmental Limits

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
Tube Positioning .....	Cathode side needs to be lower

## Radiographic Rating Charts (Absolute Maximum Rating Charts)

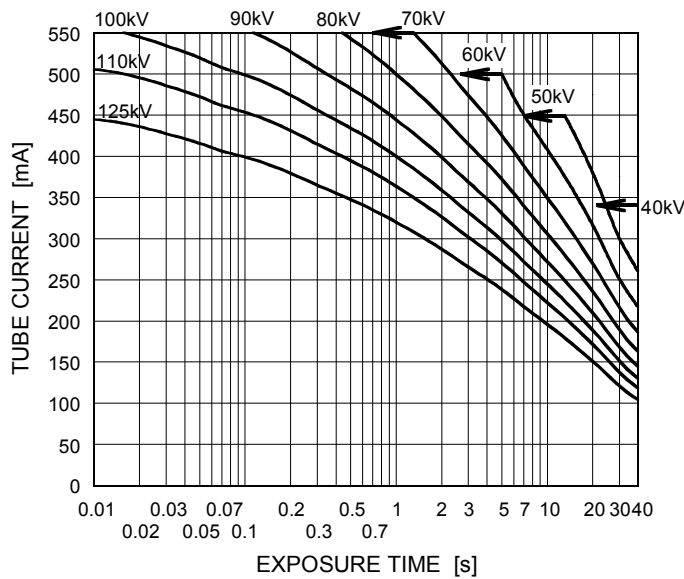
Operating Condition: Constant Potential High-Voltage Generator  
Anode rotation speed 9000 min<sup>-1</sup>

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 □

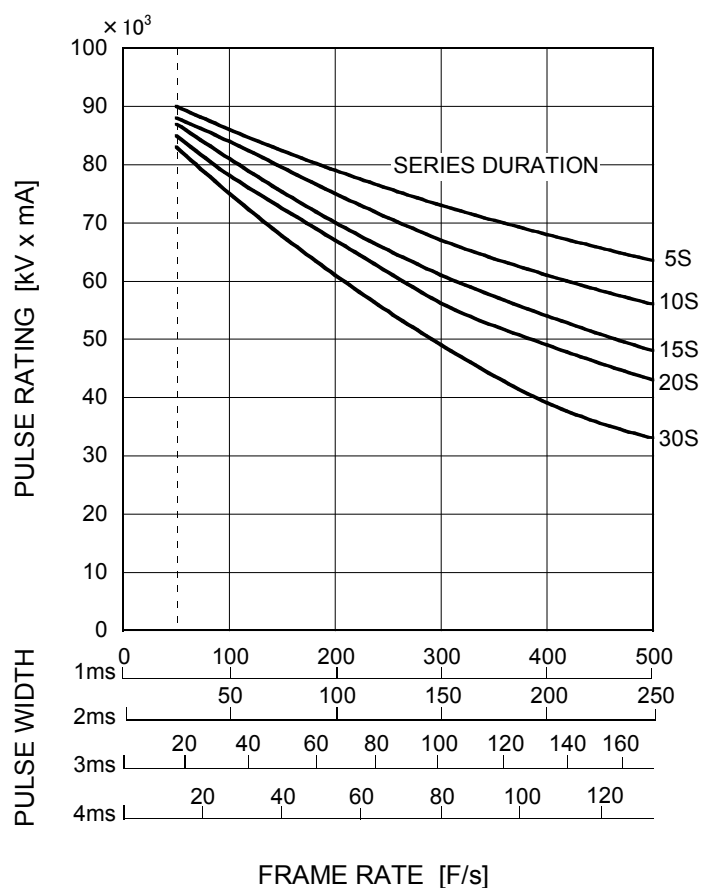


- Note1) Do not exceed values in above table at all the time.  
Equipment setting and calibration errors must be considered not to exceed the table values.
- Note2) Refer to IEC60613:2010

## Cine-Pulsed Rating Charts

Operating Condition: Constant Potential High-Voltage Generator  
 Anode rotation speed 9000 min<sup>-1</sup>

Nominal focal spot value: 0.8 ■



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

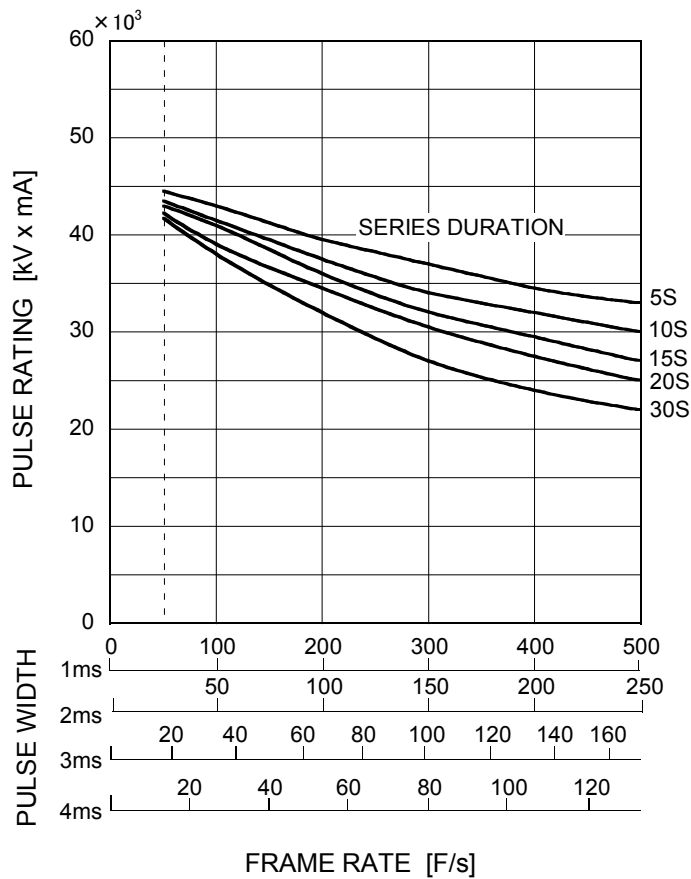
Equipment setting and calibration errors must be considered not to exceed the table values.

Note2) Refer to IEC60613:2010

## Cine-Pulsed Rating Charts

Operating Condition: Constant Potential High-Voltage Generator  
 Anode rotation speed  $9000 \text{ min}^{-1}$

Nominal focal spot value:  $0.5 \text{ mm}$



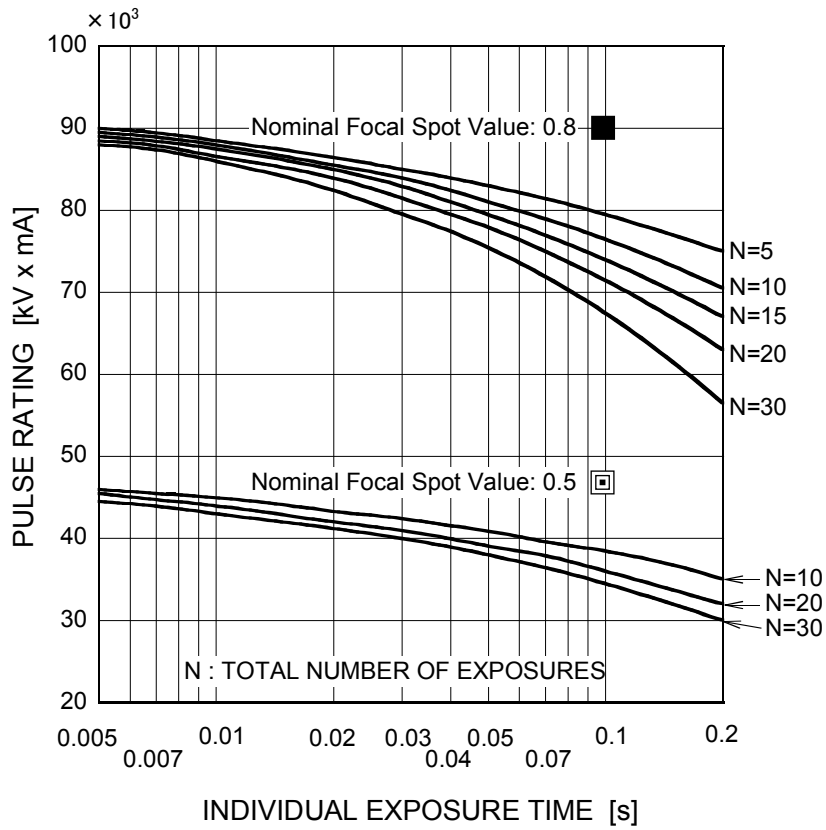
Note1) Do not exceed values in above table at all the time.

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

Note2) Refer to IEC60613:2010

## Serial Radiographic Rating Charts

Operating Condition: Constant Potential High-Voltage Generator  
 Anode rotation speed 9000 min<sup>-1</sup>



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

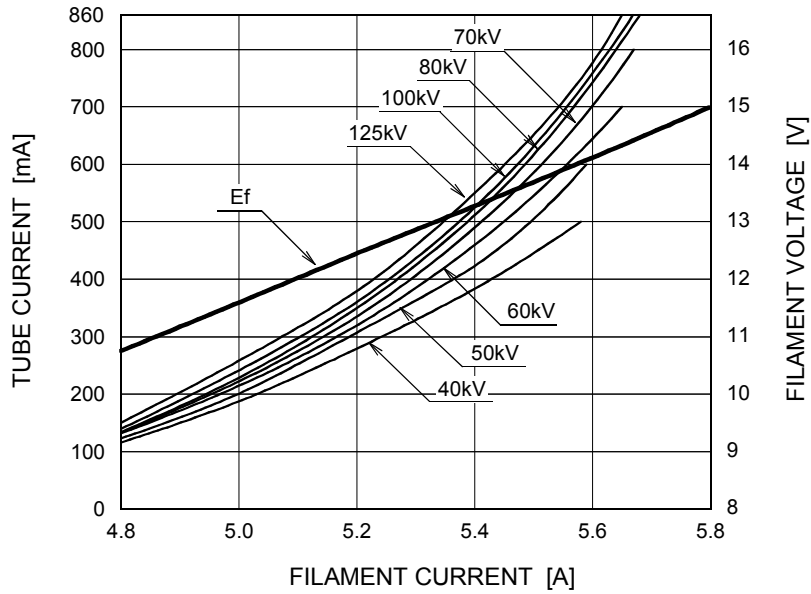
Equipment setting and calibration errors must be considered not to exceed the table values.

Note2) Refer to IEC60613:2010

## Filament & Emission Characteristics

Constant Potential High-Voltage Generator

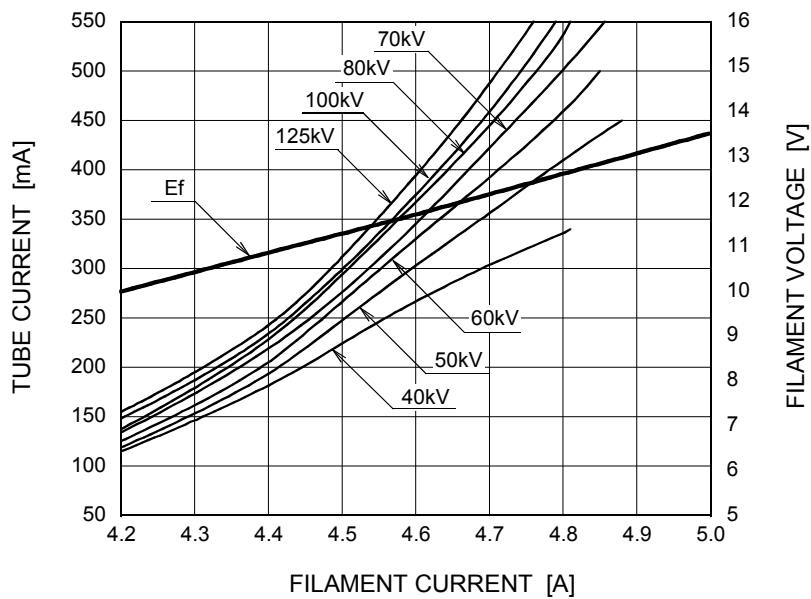
Nominal focal spot value: 0.8 ■



Note 1) For Reference Only

Note 2) Refer to IEC60613:2010

Nominal focal Spot value: 0.5 □



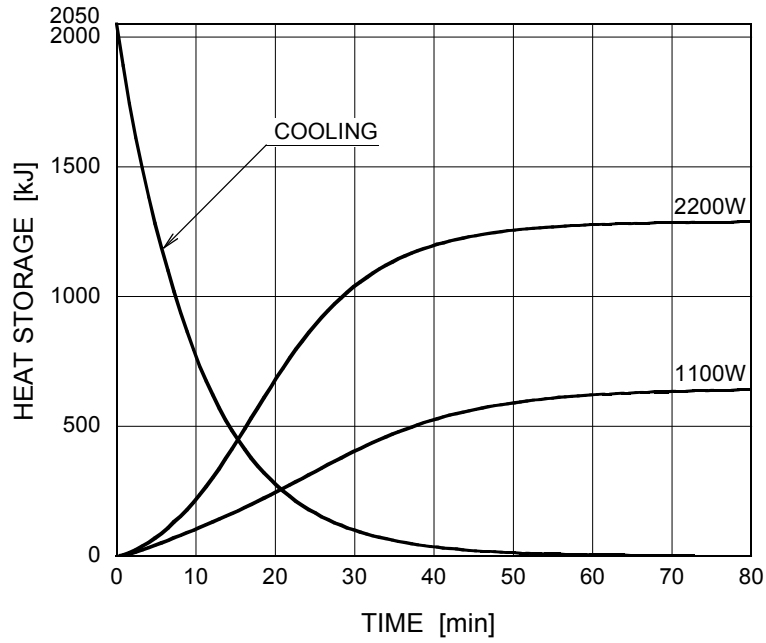
Note 1) For Reference Only

Note 2) Refer to IEC60613:2010

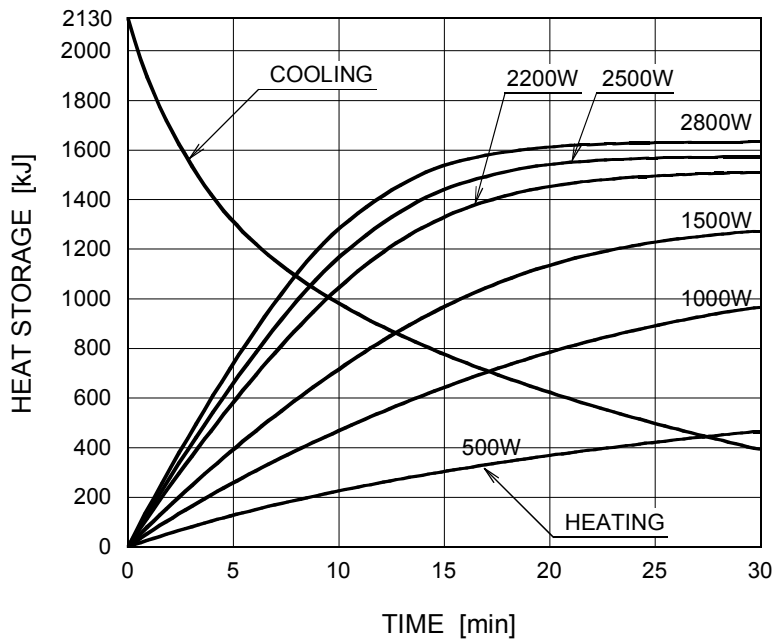


## Thermal Characteristics

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

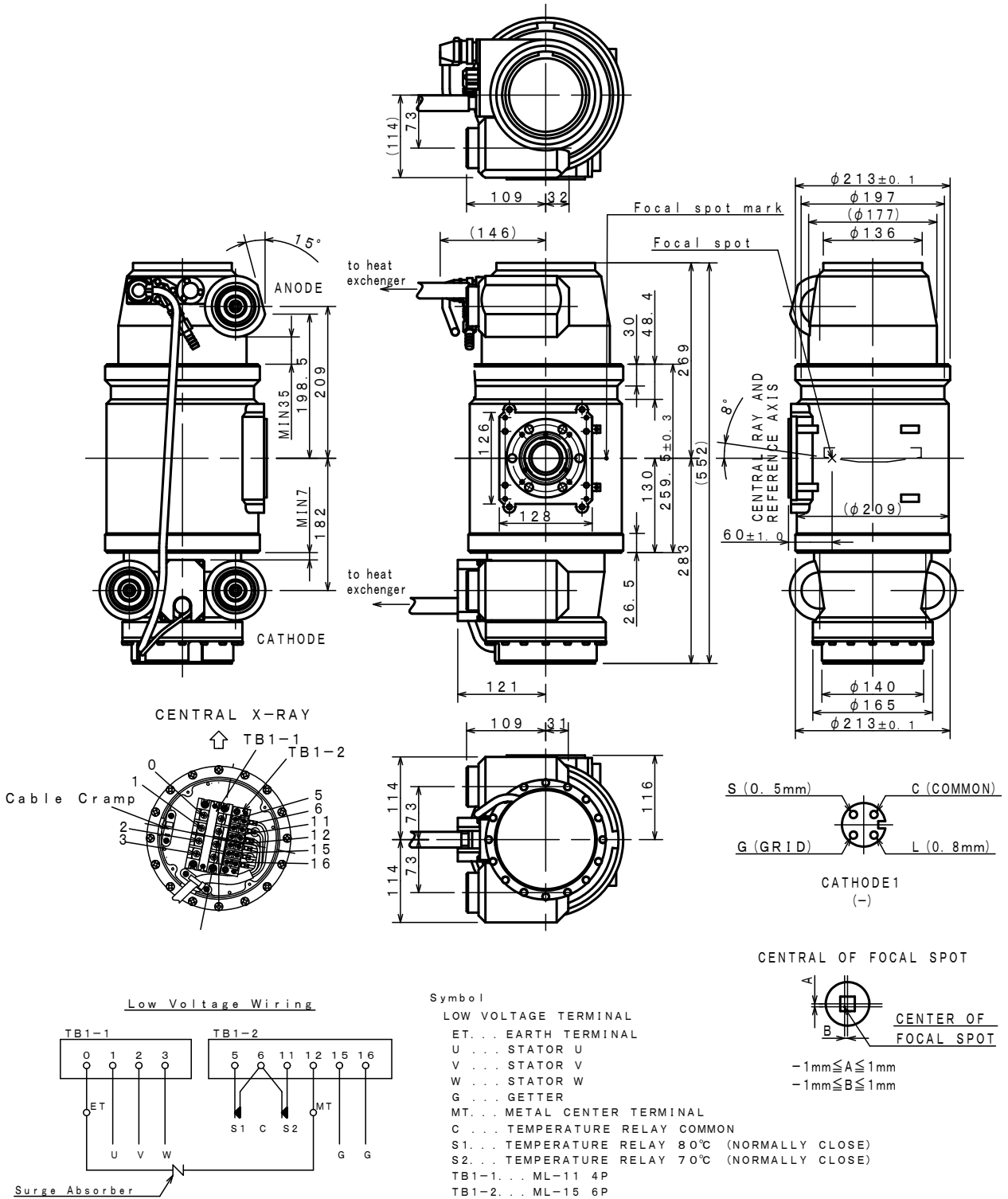


Anode Heating / Cooling Curve



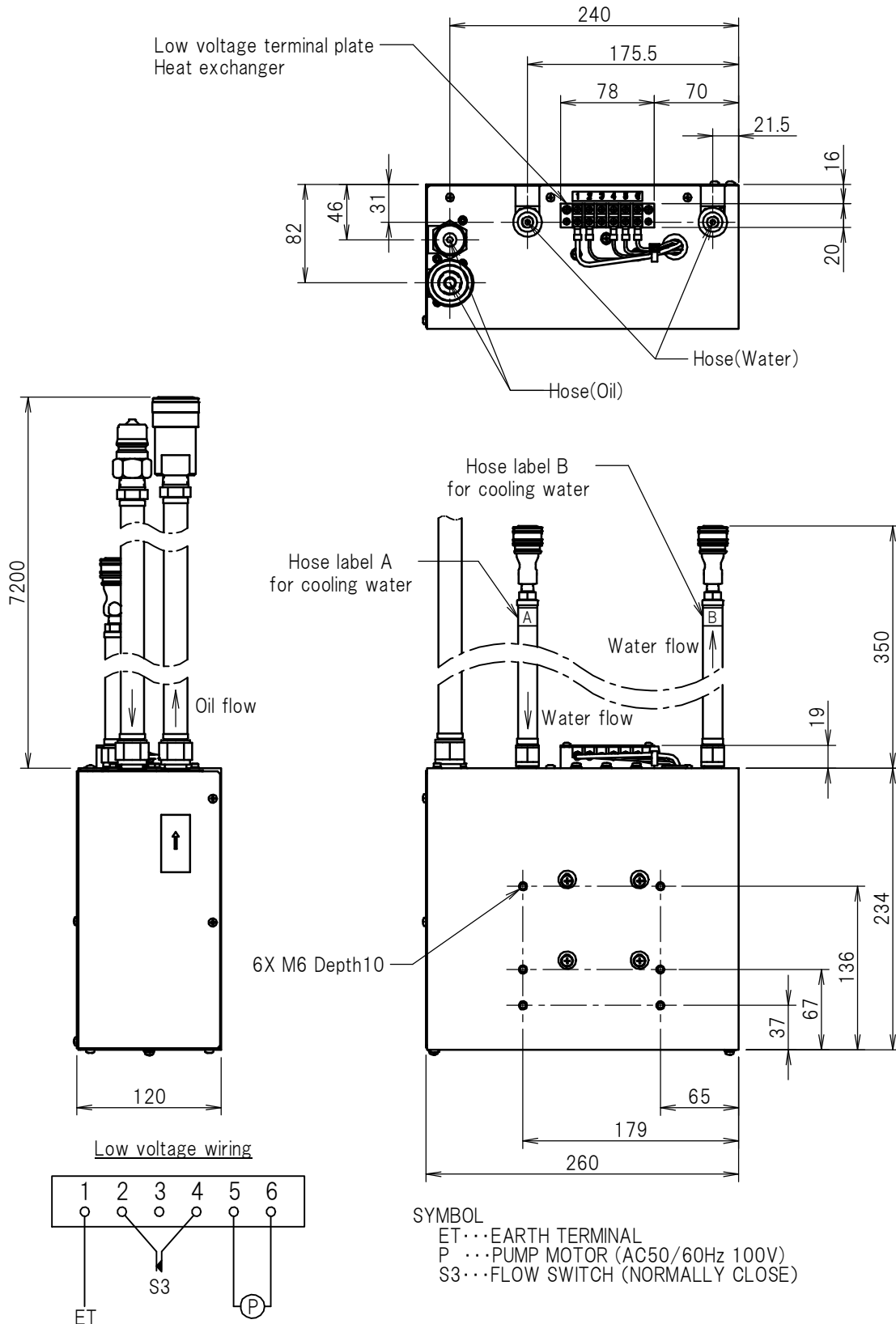
### Dimensional Outline (1)

Unit: mm



### Dimensional Outline (2)

Unit: mm



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·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>.