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

Nominal Focal Spot Value:
- Large Focus .................................................................................................................. 0.8
- Small Focus .................................................................................................................. (\(^1\)) 0.5

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

Nominal Anode Input Power (at 0.1s) ................................................. See rating charts
- Large Focus .................................................................................................................. 90 kW
- Small Focus .................................................................................................................. 45 kW

Nominal Radiographic Anode Input Power:
- Large Focus .................................................................................................................. 86 kW
- Small Focus .................................................................................................................. 43 kW

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★ The information contained herein may be changed without prior notice. It is therefore, advisable to contact to CETD before proceeding with the design of equipment incorporating this product.
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 100 V, 2 A
Heat Exchanger Source Frequency: 50/60 Hz
Normal Operating Range of the Housing Temperature: 16 ~ 75 °C
Mode of Operation: Intermittent
Envelope Current (125kV/100mA): (Approx) 10 mA
Envelope Voltage (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:
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 .................................................. See rating charts
   Large Focus (0.8) ..................................................... 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 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

Filament Frequency Limits ...................................................... 0 ~ 25 kHz

Continuous Anode Input Power ........................................ 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:
   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

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.

Nominal Focal Spot Value: 0.5

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.
Cine-fluorographic Rating Charts

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

Nominal Focal Spot Value: 0.8

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.

Nominal Focal Spot Value: 0.5

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.
Angiographic Rating Charts

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

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.
Emission & Filament Characteristics

Constant Potential High-voltage Generator

Nominal Focal Spot Value: 0.8

For Reference Only

Nominal Focal Spot Value: 0.5

For Reference Only
Thermal Characteristics

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

Anode Heating / Cooling Curve
Dimensional Outline (1)

Unit: mm

Central Ray and Reference Axis

Center of Focal Spot

Pb Collimator

ANODE & CATHODE TERMINAL: CLAYMOUNT MINI-75
Dimensional Outline (2)

Unit: mm

VIEW from C

VIEW from B

LOW VOLTAGE WIRING DIAGRAM PORT TERMINAL CONFIGURATION

SYMBOL
LOW VOLTAGE TERMINAL
ET ...... EARTH TERMINAL
U ...... STATOR U
V ...... STATOR V
W ...... STATOR W
G ...... GETTER
MT ...... METAL CENTER TERMINAL

P ...... PUMP MOTOR (50/60Hz 100V)
C1 ...... TEMPERATURE RELAY COMMON
S1 ...... TEMPERATURE RELAY 80℃ (NORMALLY CLOSE)
S2 ...... TEMPERATURE RELAY 70℃ (NORMALLY CLOSE)
FE ...... FUNCTION EARTH TERMINAL
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Canon 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: https://etd.canon/eng/company/quality.htm.