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 is 74 mm diameter and has an improved coating to increase thermal emissivity.
- These tubes have foci 1.2 and 0.6, and are available for a maximum tube voltage 150 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 ................................................................. 150 kV
- Fluoroscopic ................................................................. 125 kV

Nominal Focal Spot Value:
- Large Focus ...................................................................... 1.2
- Small Focus ........................................................................ 0.6

Nominal Anode Input Power (at 0.1s):

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Large Focus</th>
<th>Small Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 Hz</td>
<td>75 kW</td>
<td>27 kW</td>
</tr>
<tr>
<td>60 Hz</td>
<td>44.6 kW</td>
<td>16 kW</td>
</tr>
<tr>
<td>50 Hz</td>
<td>40.6 kW</td>
<td>14.2 kW</td>
</tr>
</tbody>
</table>

Nominal Radiographic Anode Input Power:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Large Focus</th>
<th>Small Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 Hz</td>
<td>70 kW</td>
<td>27 kW</td>
</tr>
<tr>
<td>60 Hz</td>
<td>40 kW</td>
<td>16 kW</td>
</tr>
<tr>
<td>50 Hz</td>
<td>37 kW</td>
<td>14.2 kW</td>
</tr>
</tbody>
</table>
Motor Ratings:  

<table>
<thead>
<tr>
<th>Stator: XS-AL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven Frequency [Hz]</td>
<td>Starting</td>
<td>Running</td>
</tr>
<tr>
<td>180 2)</td>
<td>60</td>
<td>180 2)</td>
</tr>
<tr>
<td>Input Power [W]</td>
<td>1100</td>
<td>910</td>
</tr>
<tr>
<td>Voltage 4) 6) [V]</td>
<td>220</td>
<td>130</td>
</tr>
<tr>
<td>Current 5) [A]</td>
<td>5.7</td>
<td>7.8</td>
</tr>
<tr>
<td>Min. Speed Up 2) 8) [s]</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Capacitor [µF]</td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td>Min. Braking 3) 8) [s]</td>
<td>3 / 90 V (DC)</td>
<td></td>
</tr>
</tbody>
</table>

Stator Resistance:
- Common - Main Winding: 9.4 Ω
- Common - Auxiliary Winding: 28.3 Ω

<table>
<thead>
<tr>
<th>Stator: XS-RA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven Frequency [Hz]</td>
<td>Starting</td>
<td>Running</td>
</tr>
<tr>
<td>180 2)</td>
<td>50/60</td>
<td>180 2)</td>
</tr>
<tr>
<td>Input Power [W]</td>
<td>2300</td>
<td>1450</td>
</tr>
<tr>
<td>Voltage 4) 6) [V]</td>
<td>460</td>
<td>240</td>
</tr>
<tr>
<td>Current 5) [A]</td>
<td>5.4</td>
<td>6.5</td>
</tr>
<tr>
<td>Min. Speed Up 2) 8) [s]</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Capacitor [µF]</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Min. Braking 3) 8) [s]</td>
<td>1.5 / 90 V (DC)</td>
<td></td>
</tr>
</tbody>
</table>

Stator Resistance:
- Common - Main Winding: 27.5 Ω
- Common - Auxiliary Winding: 58.0 Ω

Note  
1) To be obtained with AID starter Model 60/180.  
2) The speed up time from normal speed to high speed is 2/3 times of the specified speed up time from 0 to high speed, which is described on motor rating table.  
3) To be applied for high speed rotation.  
4) Applied voltage between common and main terminal.  
5) Common current.  
6) The every applied voltage must be never exceeded 110% of the above specification.  
7) No more than two high speed starts per minute are permissible.  
8) The speed-up time is allowed up to 110% of the above specification.

Anode Speed:  
- 180 Hz Minimum 9700 min⁻¹  
- 60 Hz Minimum 3200 min⁻¹  
- 50 Hz Minimum 2700 min⁻¹

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 ........................................................................................................ 476 mm
  Maximum Diameter ............................................................................................... 152.4 mm
Target:
  Anode Angle ......................................................................................................... 12 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 ............................................................................. 150 kV, 3.4 mA
  X-ray Coverage ............................................................................................... 430 × 430 mm at SID 1000 mm
  Weight (Approx.) ............................................................................................. 18 kg
High Voltage Receptacle ........................................................................ To meet the requirements of IEC60526 Corrigendum1:2010
Cooling Method .................................................................................................. Natural or Forced air
Tube Housing Model Number:
  E7252X .......................................................................................................... XH-106V
  E7252FX ......................................................................................................... XH-181
  E7252GX ......................................................................................................... XH-180
Absolute Maximum and Minimum Ratings
(At any time, these values must not be exceeded.)

Maximum X-ray Tube Voltage:
- 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:
- Large Focus: 1000 mA
- Small Focus: 400 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): 6.3 ~ 8.5 V

Filament Frequency Limits: 0 ~ 25 kHz

Continuous Anode Input Power: 120 W (169 HU/s)
(Fluoroscopic, Radiographic or mixed exposure)

Thermal Characteristics:
- Anode Heat Content: 210 kJ (300 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: 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 180Hz

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 60Hz

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 50 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

For Reference Only

Nominal Focal Spot Value: 0.6

For Reference Only
The heating curves are showing examples of average input power to the anode in operation.
Dimensional Outline of E7252X

Unit mm

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

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

CENTER OF FOCAL SPOT

-1.5mm≦A≦1.5mm
-1.5mm≦B≦1.5mm

1-M6 3 DEEP
2-M6 3.5 P=1.27
4-M5 10 DEEP
5-M5 10 DEEP

CENTRAL RAY AND REFERENCE AXIS
**Dimensional Outline of E7252FX**

Unit mm

**Terminal Connections**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
</tr>
</tbody>
</table>

**Temperature Relay (Normally Closed)**

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

**Center of Focal Spot**

-1. 5mm S1: 5mm
-1. 5mm S2: 5mm

**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

**Central X-Ray Anode & Cathode Terminal**

: IEC60526 Type
Dimensional Outline of E7252GX

TERMINAL CONNECTIONS

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1</td>
<td>M</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>ET</td>
</tr>
</tbody>
</table>

TEMPERATURE RELAY (NORMALLY CLOSED)

Note: Do not connect terminal No. 1 and No. 6 in series circuit.

FOCAL SPOT

CENTER OF FOCAL SPOT

EXPLANATION OF SYMBOLS

CATHODE TERMINAL

C : COMMON
L : LARGE FOCUS
S : SMALL FOCUS

TERMINAL CONNECTIONS

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TERMINAL CONNECTIONS

Note: Do not connect terminal No. 1 and No. 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
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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.