

RADIATION DETECTORS

PRODUCT CATALOG

Canon

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<https://etd.canon/>



<https://etd.canon/en/download/index.html>

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2020-03

CANON ELECTRON TUBES & DEVICES CO., LTD.

Product lineup

PC

Proportional Counters



Proportional Counters

PSD

Position Sensitive Detectors



Position Sensitive Detectors

IC

Ionization Chambers



Ionization Chambers

NPC

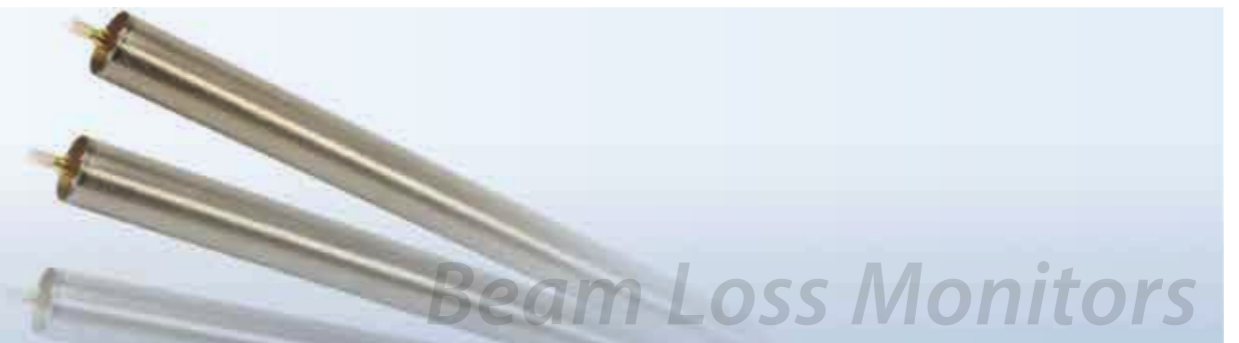
Neutron Proportional Counters



Neutron Proportional Counters

BLM

Beam Loss Monitors



Beam Loss Monitors

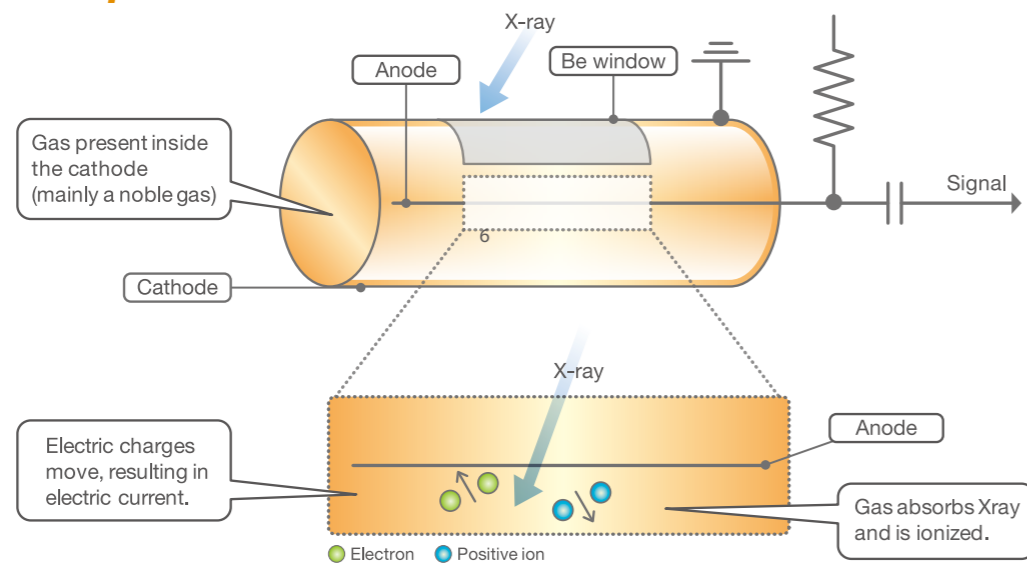
PC

Proportional Counters

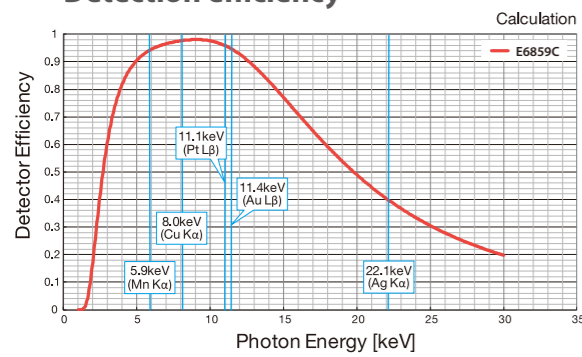


X-ray Proportional Counter (PC) is a detector which uses ionization caused by interaction between X-ray and internal gas. This detector is suitable for measuring thickness of metal plating.

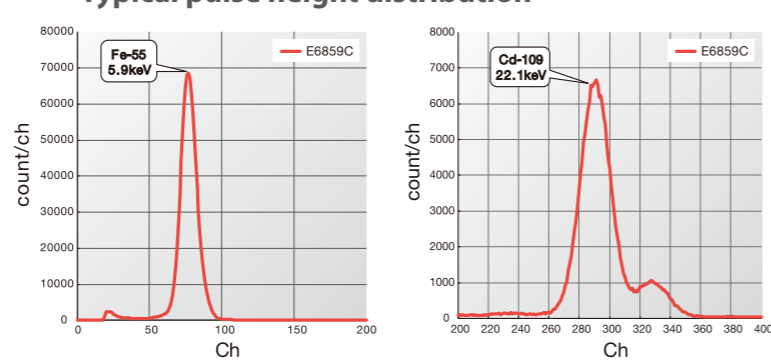
Principle of Operation



Detection efficiency



Typical pulse height distribution



Proportional Counters



Model Name	E6859B	E6859C	E6864B	E68937	E68942	E6860 (C)	E6860 (P)	E68931-12P	E68946
General Specification									
Fill Gas	Xe + additive gas					Ne + additive gas			
Housing Material	Stainless Steel								
Gas Pressure (Approx) [kPa]	90	100	100	760	500	70	70	150	500
Maximum Length [mm]	204	204	178	63.5	148	178	126	165	138
Maximum Diameter [mm]	50.8	50.8	50.8	33	38	50.8	38	25.4	32 × 32
Effective Length [mm]	142	142	116	30	85	116	75	100	90
Connector	MHV	MHV	MHV	Pin	Pin	MHV	Pin	Pin	Pin
Operating Temperature [°C]	-20 to 70			0 to 50	-20 to 70				

Window Specification

Material	Beryllium								
Thickness [mm]	0.2	0.1	0.1	0.025	0.15	0.062	0.062	0.04	0.05
Dimension (W) × (L) [mm]	40 × 82	26 × 52	26 × 52	2 × 29.5	20 × 42	20 × 20	20 × 20	9.5 × 25.4	φ18

Electrical Specifications

Operating Voltage Range [V]	1,800 to 2,100	1,900 to 2,300	1,900 to 2,300	1,500 to 1,700	1,600 to 1,800	1,100 to 1,400	1,100 to 1,400	1,500 to 1,700	900 to 1,100
Recommended Voltage [V]	1,850	2,000	2,000	1,600	1,700	1,300	1,300	1,600	900

Resolution

Fe-55 (5.9 keV) (Max) [%FWHM]	19	19	19	22	19	20	20	20	22
Cd-109 (22.1 keV) (Max) [%FWHM]	9	9	9	-	-	-	-	-	-

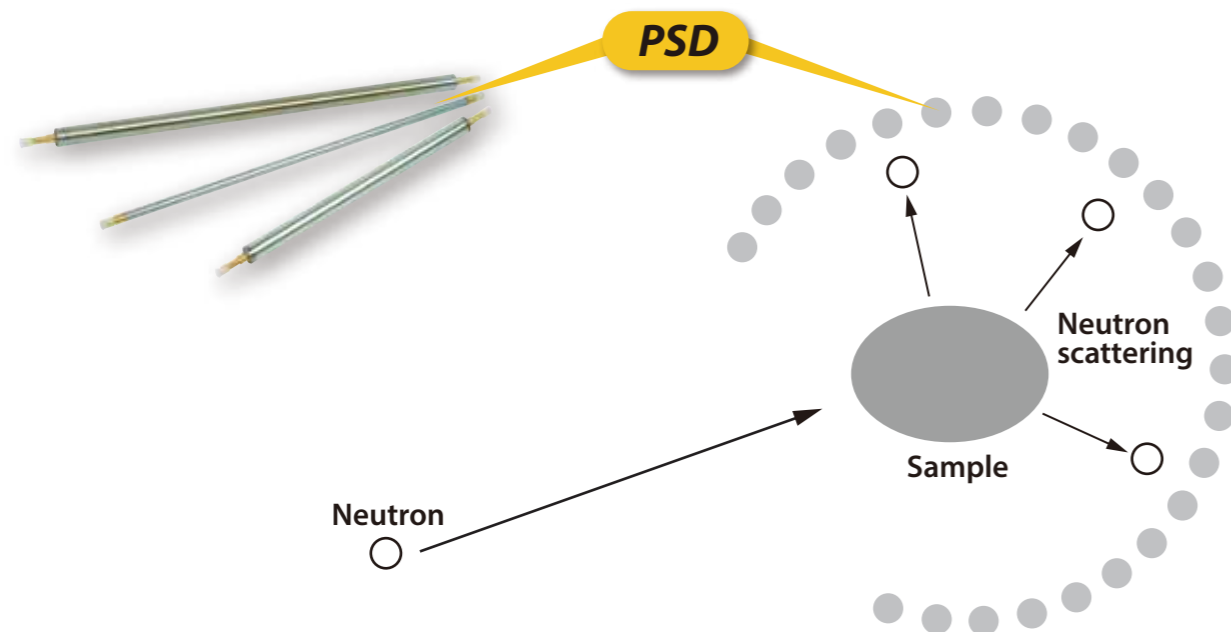
PSD

Position Sensitive Detectors



Position Sensitive Detector (PSD) is one dimensional position sensor, which uses nuclear reaction between neutron and ^3He . Its signal is amplified by high electric field around center electrode and you can calculate neutron position by connecting outer circuit. Touchback can offer various kinds of PSD, which fit your neutron scattering instruments.

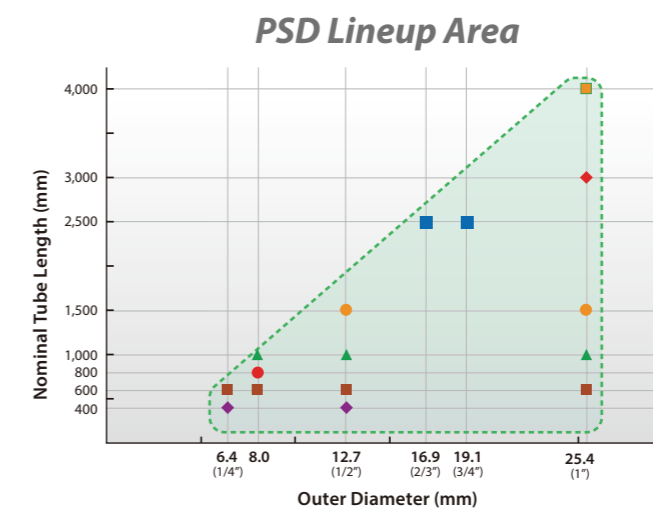
Usage Example of PSD, NBM



Position Sensitive Detectors



Tube Type	E6871	E6882	E6867	E6880	E6868
General Specifications					
Fill Gas	^3He + additive gas				
Gas Pressure [MPa]	1 to 2 (other pressure is available)				
Housing Material	SUS304				
Effective Length	Depends on "PSD Lineup Area" (other length is available)				
Maximum Diameter [mm]	6.4	8.0	12.7	19.1	25.4
Connector	SHV or Pigtail lead				
Electrical Specifications					
Operating Voltage Range [VDC]	1,500 to 1,900				
Performance					
Sensitivity [cps/nv]	-				
Resolution (Approx) [mm]	5 (Ex. E6867)				

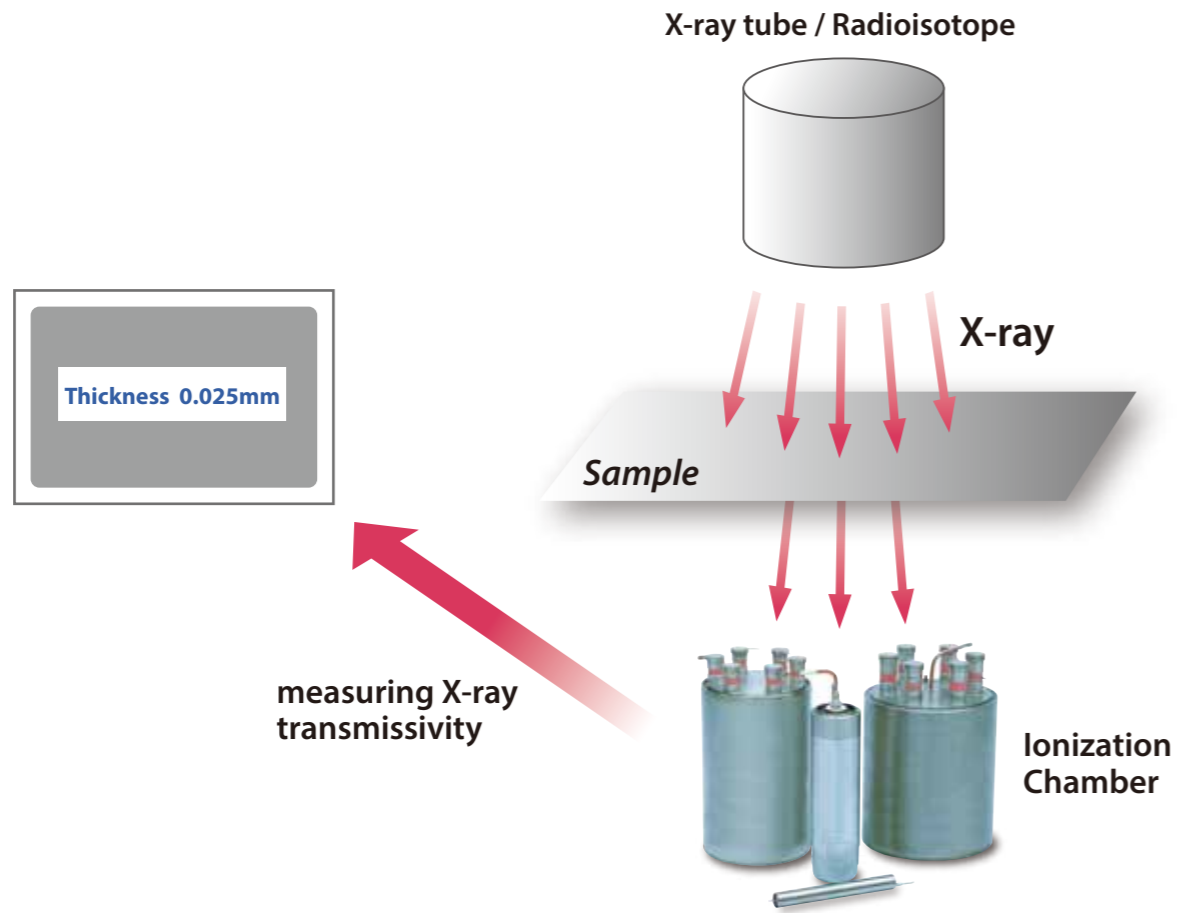




Ionization Chamber is a detector which uses ionization caused by interaction between X-ray or gamma-ray and internal gas. This detector is suitable for measuring in high radiation environment.

Application of Ionization Chamber

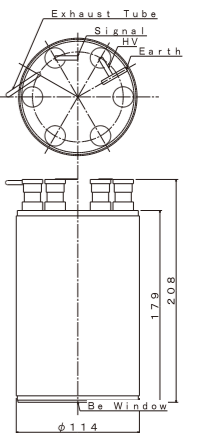
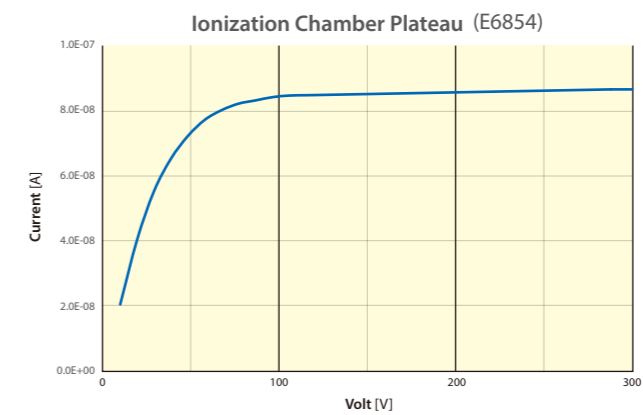
Usage Example: Thickness Meter



Ionization Chambers



Tube Type	E6854	E6861	E6866A	E6866C	M4952F
Type	End Window + Plate electrode	Co-axial electrode			End Window + Plate electrode
General Specifications					
Fill Gas	100% Xe				
Housing Material	SGP	Al	SUS304		SGP
Gas Pressure (Approx)[MPa]	0.8	0.8	1.5	3.0	0.4
Maximum Length [mm]	209	220	174.5		220
Maximum Diameter [mm]	113	50	15		140
Effective Length [mm]	150	167	100		50
Operating Temperature [°C]	-20 to 70				
Window Specifications					
Material	Beryllium	—	—	—	SUS304
Thickness [mm]	2.0	1.0	0.5		0.5
Dimension [mm]	φ70	—	—		φ132
Electrical Specifications					
Operating Voltage Range [VDC]	200 to 700	300 to 700	300 to 700		100 to 300
Maximum Voltage [VDC]	1,500				



NPC

Neutron Proportional Counters



BLM

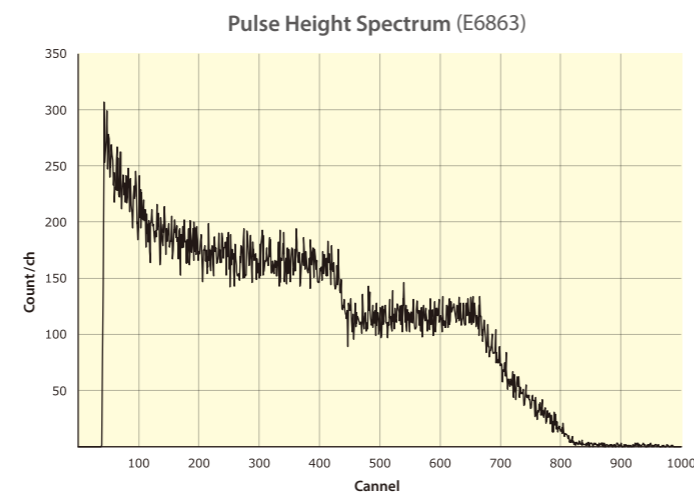
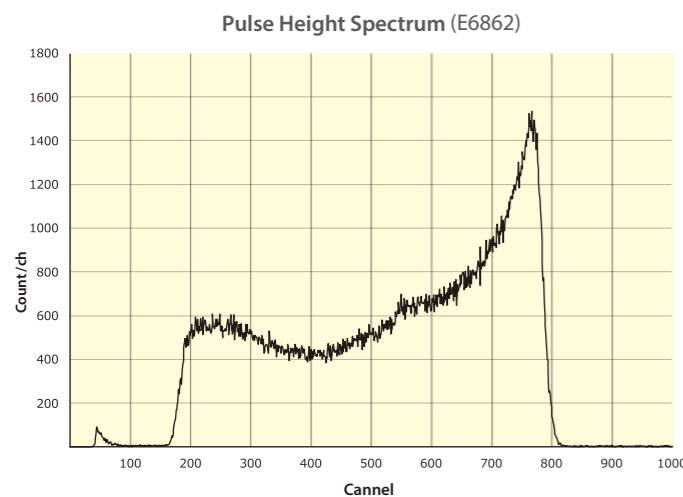
Beam Loss Monitors



Neutron Proportional Counter(NPC) is a detector which uses nuclear reaction between neutron and ^3He or ^{10}B . Its signal is amplified by high electric field around center electrode. This detector is suitable for measuring in low radiation environment.

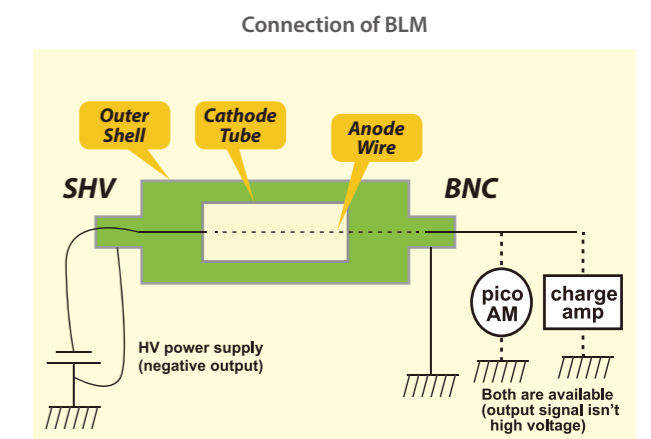
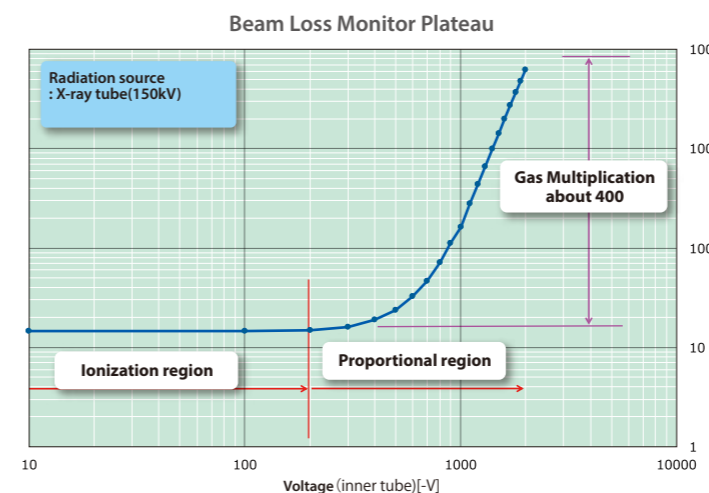
Tube Type	E6862	E6863
General Specifications		
Fill Gas	^3He + additive gas	Ar + additive gas
Gas Pressure (Approx)	0.4MPa*1	30kPa
Housing Material	SUS304	
Effective Length [mm]	150, 300, 500*1	150, 300, 500, 1,000*2
Maximum Diameter [mm]	25.5*1	25.5
Connector	HN	
Electrical Specifications		
Operating Voltage Range [VDC]	1,550 to 1,850	650 to 850
Performance		
Sensitivity [cps/nv]	23 to 64 (depends on Effective Length)	3.3 to 12.3 (depends on Effective Length)
Resolution (Approx) [mm]	-	

*1: Please contact us for other dimensions, pressure. *2: Please contact us for other effective length.



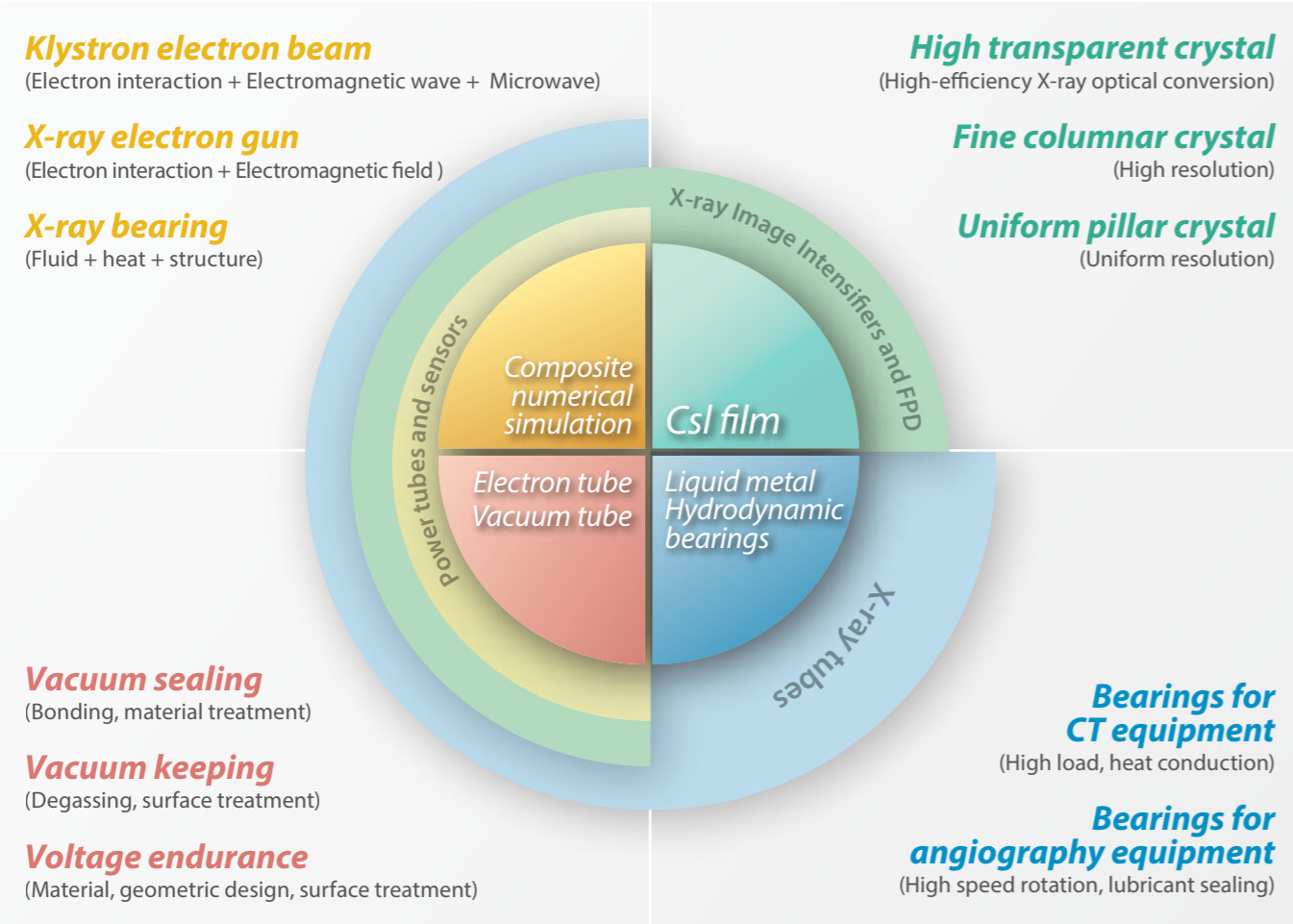
Beam Loss Monitor(BLM) is a detector which uses ionization phenomenon, caused by interaction between charged particle or gamma-ray and internal gas. Its sensitivity is too high and response time is very short, so BLM is suitable for beam protection systems.

Tube Type	E6876 - 1000	E6876 - 600	E6876 - 400
Enclosed gas	Ar + additive gas		
Gas Pressure (Approx)[atm]	1		
Outer shell	Stainless steel		
Length [mm]	1,000	600	400
Diameter [mm]	50.8		
Effective Length [mm]	900	500	300
Connector	SHV, BNC		
Maximum Voltage [VDC]	2,000		



Technologies for Products

Core Technologies



World's Largest Shipment Volume Products (An internal investigation)

World's largest shipment volume share based on long life, high reliability, superior cost performance



Environmental Consideration

Aiming at a Society to Hand on the Rich Earth to Future Generations

We are promoting the creation of environmentally friendly products. These products contribute to the realization of a low-carbon, resource circulation society, avoid chemical hazardous material rejection and prevent pollution. While being committed to reducing environmental burdens, we offer medical system components and other products that contribute to society in the fields of industrial and scientific technologies. Our focus is on creating products that contribute to society and enhance the total value of our customers' medical systems and others.

Environmentally Conscious Products Spawned from Core Technologies

Products Certified In-House for Outstanding Environmental Performance

2MHU-CT X-ray Tube Assemblies

Realization of Resource Circulation Society
Reduction in weight by downsizing from previous higher-end models
Development of technology to improve reliability of anode target
Development of technology to improve maintainability of cooler

Chemical Hazardous Material Rejection & Pollution Prevention
Conforms to the revised European RoHS2 Directive (2011/65/EU)

X-ray Flat Panel Detectors

Realization of Low-Carbon Society
Low-dose imaging using Quadcel, our developed core technology. Reduces exposure of patients to radiation and saves energy through the use of a low-power technology

Realization of Resource Circulation Society
Compact sizing and product-life extending can be achieved with Quadcel technology

Chemical Hazardous Material Rejection & Pollution
Conforms to the revised European RoHS2 Directive (2011/65/EU)

X-ray Image Intensifiers

Realization of Low-Carbon Society
High sensitivity through technical improvements in the input fluorescent surface and photoelectric surface

Realization of Resource Circulation Society
Extended life through technical improvements in the output fluorescent surface

Chemical Hazardous Material Rejection & Pollution
Conforms to the revised European RoHS2 Directive (2011/65/EU)
First in the world to be free of Cd and Cr (VI). Cd-free output fluorescent surface
Photoelectric surface manufacturing process that does not leave behind any Cr (VI)

Multi-beam Klystrons

Realization of Low-Carbon Society
Large power efficiency achieved with a low operating voltage

Realization of Resource Circulation Society
Extended life through optimization of the cathode loading

Chemical Hazardous Material Rejection & Pollution
Conformance with European RoHS2 Directive (2011/65/EU) from the prior period of application onwards

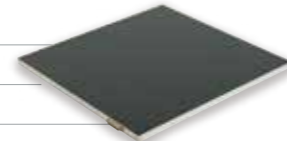
Company Profile

History

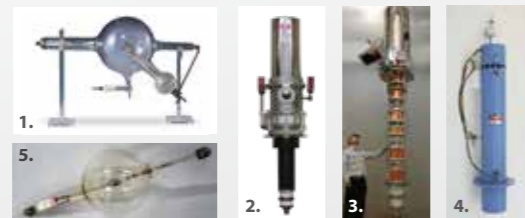
Our products, such as Japan's first commercially available X-ray tube in 1915, X-ray Image Intensifiers, Flat Panel Detectors, and electron tubes, have served as components in a wide range of equipment. Building on the reliability and business performance achieved so far, we will continue to pursue stable and continuous growth for the next 100 years.



- 1915** :Developed X-ray tube.
- 1954** :Developed X-ray Image Intensifiers (I.I.).
- 1977** :Succeeded in growing CsI crystals with a pillar structure and using them in the input phosphor.
- 1986** :Developed high DQE Super Metal X-ray image intensifier.
- 1990** :Developed high-Gx and high-contrast advanced super-metal I.I. (H-series).
- 1991** :Completely discontinued use of Freon and trichloroethane.
:Achieved production of a total of 200,000 rotating anode X-ray tubes.
- 1992** :Developed 4 inch I.I. for industrial-use soft X-ray (initial full-scale entry into industrial-use equipment market).
- 1994** :Developed 4 MHU CT tube with hydrodynamic pressure bearing (CSRX-7713D-H).
- 1995** :Developed high-DQE and high-contrast I.I. (J-series).
- 1996** :Obtained CE mark certification, BS 7750 certification, and ISO 14001 certification.
:Achieved compliance with the European Medical Devices Directive.
- 1998** :Developed SD series I.I. with high MTF and high image uniformity.
- 2001** :Developed LM cardiac tube.
- 2008** :Developed digital X-ray sensor with CsI and CMOS technology.
:Developed the world's first nano focus soft X-ray tube with a closed structure and thermal field emitter.
- 2009** :Commenced commercial production of 43 cm x 43 cm Flat Panel Detector for radiography (FDX4343R).
- 2012** :Commenced commercial production of 35 cm x 43 cm portable Flat Panel Detector for radiography (FDX3543RP).
- 2013** :Commenced commercial production of 35 cm x 43 cm portable Wireless Flat Panel Detector for radiography (FDX3543RPW).
- 2015** :100th anniversary
- 2016** :Developed 5.7 MHU CT tube with hydrodynamic pressure bearing.
- 2017** :Commenced commercial production of 43 cm x 43 cm Flat Panel Detector for radiography(FDXA4343R)
- 2018** :Renamed "Canon Electron Tubes & Devices Co.,Ltd."

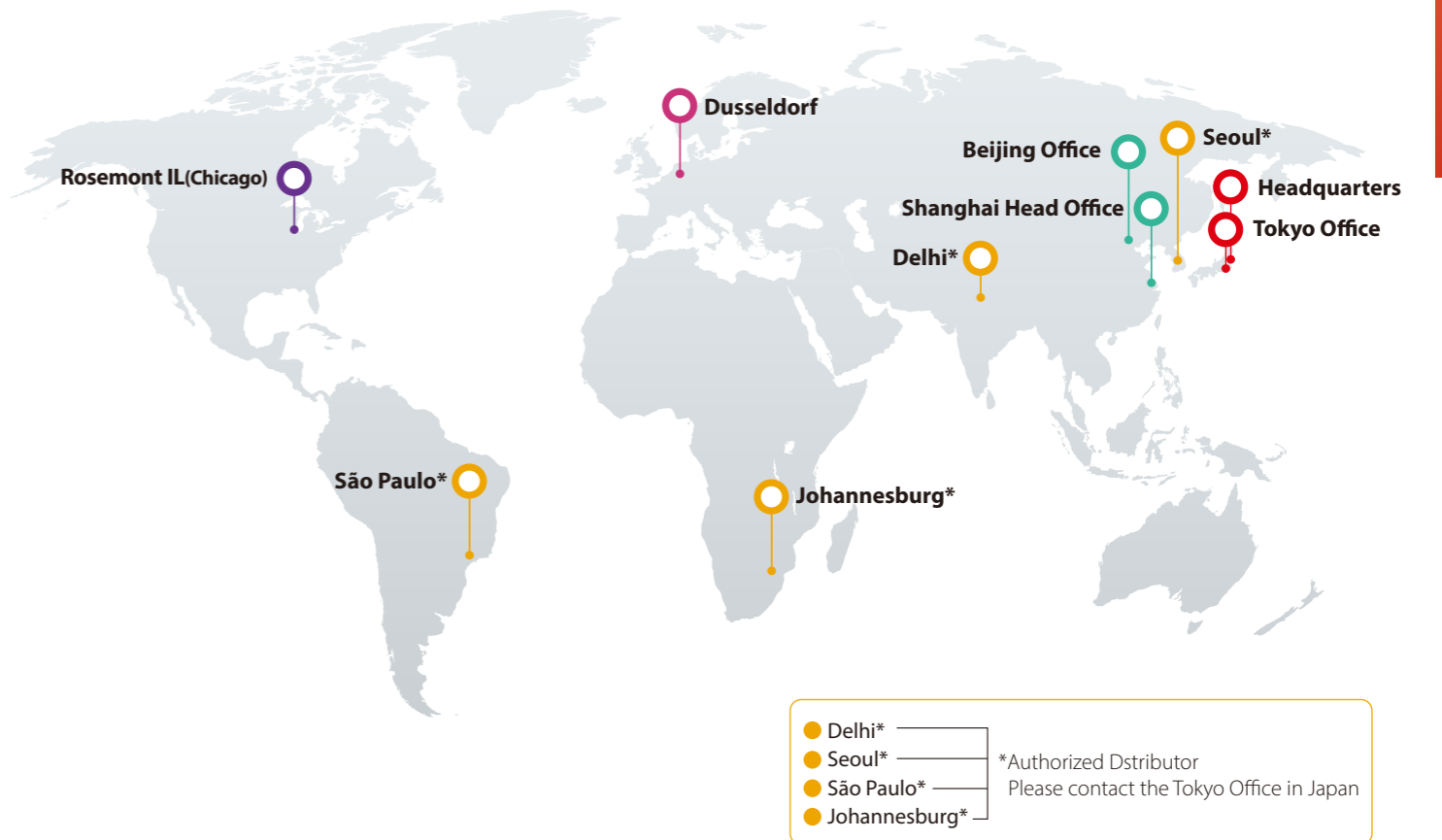


Essential Historical Materials for Science and Technology (Mirai Technology Heritage) in Japan



1. GIBA X-ray Tube (Registered in 2010)
2. Collector Potential Depression (CPD) type gyrotron (Registered in 2009)
3. Klystron E3732 (Registered in 2014)
4. Traveling Wave Tube 1W50 (Registered in 2014)
5. Coolidge U-Type X-ray Tube (Registered in 2018)

Company information



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