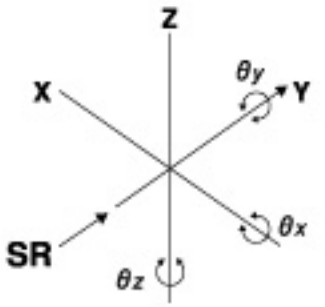
Variable-included-angle VLSPGM for BL-28 of KEK/PF

■ Outline of Apparatus and Feature

State-of-the-art Grating Chamber to be applied to a variable included angle VLSPGM, the features of which are 1)both incoming and outgoing beam angles are horizontally fixed, 2)keeping ultra-high resolution for the wide range of wave-length, 3)high heat-load compatible by high-efficiency double-tubing water cooling system, 4)direct angle reading with UHV-compatible precise rotary encoder of Hei-denhain RON905UHV with IK320.

Definition of Adjustment Axis



■ Source

Variable Polarization Undulator

■ Energy Range

30 to 300eV

■ Plane Mirror

40mm(W)× 395mm(L)× 60mm(T)
Water Cooled
Scanning Angle -0.5° to + 10° with Resolution 0.002 arcsec / step

■ Gratings

G1(400L/mm VLSPG) / G2(800L/mm VLSPG)Interchangeable
40mm(W)×110mm(L)×40mm(T)
Water Cooled
Scanning Angle 0° to + 12° with Resolution 0.002 arcsec / step

■ Included Angle

162° to 176°

■ Encoder

RON905UHV with IK320 made by Heidenhain

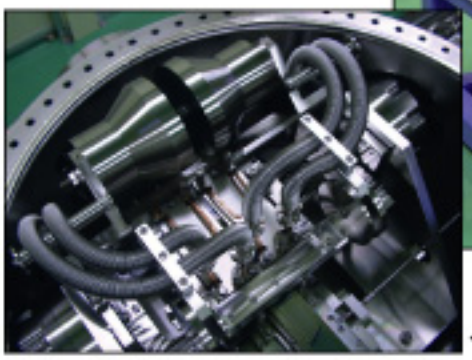
■ Size

・Chamber: φ760mm(Main flange= φ850)
・Distance of optical axis flange:1050mm
・Height(FL～Height of beam):1200mm

■ Weight

Approx. 1 metric ton

M2 & G Chamber ▲



◀ Internal Mechanisms of PGM

■ Main Specifications

1)Holder for a plane mirror
○ Driving shaft

Axis	Range for coarse adjustment	Resolution per revolution	Range for fine adjustment	Resolution per revolution	Drive method
X	40mm	0.5mm	—	—	Manual by magnet-coupling feedthrough screwdriver
Z	±2mm	0.5mm	—	—	Kinematical adjustment by fine screws
θx(Pitch)	±20.9mrad (±1.2°)	2.1mrad (0.12°)	—	—	Kinematical adjustment by fine screws
θy(Roll)	±43.6mrad (±2.5°)	62.4mrad (3.57°)	—	—	Kinematical adjustment by fine screws

2)Two gratings can be mounted and interchangeable with each other
○ Driving shaft

Axis	Range for coarse adjustment	Resolution per revolution	Range for fine adjustment	Resolution per division	Drive method
X	130mm	0.002mm	—	—	Stepping motor driven
Z	±2mm	0.5mm	±0.3mm	0.083mm	Kinematical adjustment by using differential micrometer screws
θx(Pitch)	±17.5mrad (±1°)	3.2mrad (0.185°)	±5.2mrad (±0.3)	0.32mrad (0.018°)	Kinematical adjustment by using differential micrometer screws
θy(Roll)	±43.6mrad (±2.5°)	10mrad (0.57°)	±8.72mrad (±0.5°)	1mrad (0.057°)	Kinematical adjustment by using differential micrometer screws