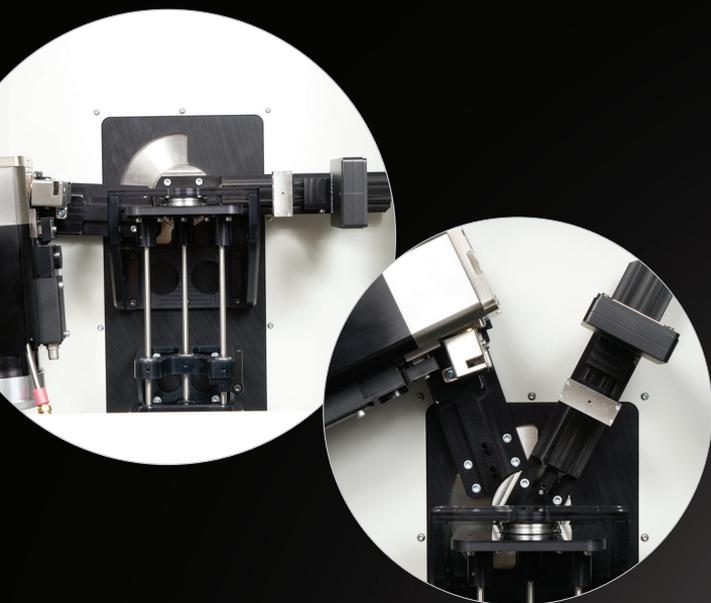


IMPROVE YOUR SCIENCE WITH THE ALL-NEW

# AXRD<sup>®</sup> THETA/THETA POWDER DIFFRACTOMETER



## ADVANCED SYSTEM FUNCTIONALITY IN A COMPACT FOOTPRINT

- 200 mm Goniometer Radius
- 1200 Watt X-ray System
- High-Speed Photon Counting Detector
- 1200°C Temperature Stage Option
- Gas Pressure Stage Option
- Compact Footprint (H x W x D) 67.5" x 37.6" x 24"

[www.protoxrd.com](http://www.protoxrd.com)

**PROTO**



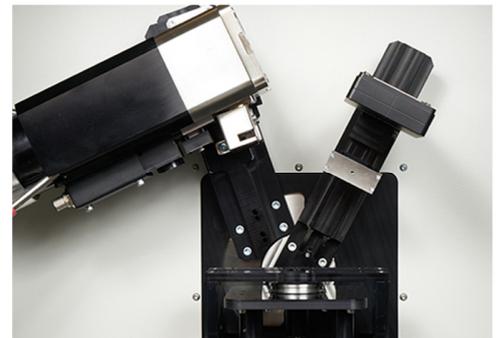
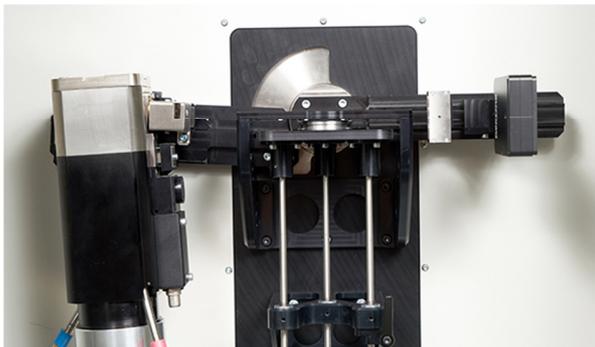
**PROTO Manufacturing Inc.**  
12350 Universal Dr.  
Taylor, Michigan  
USA, 48180-4070

Agent: Hanmi Tech Co  
02-2226-2421  
www.nayur.kr

### PROTO AXRD $\theta$ - $\theta$ Diffractometer

The AXRD  $\theta$ - $\theta$  diffractometer is easy to use and provides accurate and reliable measurements, with comparable speed to full size laboratory units. This unit combines the best qualities of lab systems and benchtop systems into one. The AXRD  $\theta$ - $\theta$  has the reduced footprint and easy maintenance of a benchtop and the seemingly infinite versatility and higher power of a traditional lab unit – without the noisy and bulky external chiller. Equipped with either our high-speed linear hybrid photon counting detector or our energy-discriminating silicon point detector (SPD), the AXRD  $\theta$ - $\theta$  has fast data collection capabilities while maintaining research-quality standards. With an achievable FWHM peak resolution of  $< 0.05^\circ 2\theta$  and an angular accuracy of  $< \pm 0.02^\circ \Delta 2\theta$  over the full angular range, the AXRD  $\theta$ - $\theta$  provides the necessary level of performance for even the most demanding x-ray diffraction material investigation.

The AXRD  $\theta$ - $\theta$  has everything you need for phase identification, quantitative phase analysis, percent crystallinity, crystallite size and strain, Rietveld refinement, characterization of films and thin coatings, and structure analysis. With multiple sample stages and holders, powerful software and database options, the AXRD  $\theta$ - $\theta$  provides the versatility you need for your measurements.



Item	Specifications	
1	<p><b>AXRD® <math>\theta</math>-<math>\theta</math> Powder Diffractometer</b></p> <p>High-accuracy powder diffraction and reliability in a benchtop configuration. 600 Watts and independent <math>\theta</math> and <math>2\theta</math> axes enable more flexibility in diffraction experiments.</p> <p><b>Geometries Included</b></p> <p>Bragg-Brentano vertical parafocusing <math>\theta/\theta</math> with horizontal sample orientation.</p> <p>Rocking curves and residual stress analysis</p> <p>Glancing-incidence for film and coating analysis</p> <p><b>Goniometer Radius</b></p> <p>200 mm</p> <p><b>Max. useable angular range</b></p> <p>-4 to 150° <math>2\theta</math></p> <p><b>Scanning Speed</b></p> <p>0.0001° to 100°/min (<math>2\theta</math>)</p> <p><b>Max Motor Speed (Slew)</b></p> <p>1000°/min</p> <p><b>Motor Step Resolution</b></p> <p>0.0003°</p> <p><b>Accuracy</b></p> <p>± 0.02° <math>2\theta</math></p> <p><b>Slits (universal slit size for all positions)</b></p> <p>Divergence: 4 fixed included (options (mm): 0.04, 0.1, 0.2, 0.3, 0.4, 0.5, 1.0, 2.0)</p> <p>Soller: Incident and diffracted beam (high-resolution or high-speed)</p> <p>Anti-scatter: 1 fixed (point detectors only)</p> <p>Receiving Slit: 3 fixed included (point detectors only; see size options above)</p> <p><b>Achievable peak width</b></p> <p>&lt; 0.05° <math>2\theta</math></p> <p><b>X-ray Tube (Cu, Co, Cr, Mo and Custom Tubes Available)</b></p> <p>Fine focus Cu-anode metal/ceramic construction 1500-Watt x-ray tube (Manufactured by PROTO)</p> <p><b>X-ray Power</b></p> <p>1,200 Watts (40 kV/30 mA)</p> <p>10-40 kV in steps of 0.1 kV</p> <p>0-30 mA in steps of 0.1 mA</p> <p>≤ 0.01% HV output for change in main of ± 30%</p> <p>Safety key to enable and disable x-ray generation</p> <p>Regulation features include: arc suppression, over voltage, over current and over power</p> <p>Automated tube warm-up, tube ramping</p> <p><b>X-ray tube cooling</b></p> <p>Internal water cooling radiator and tank</p> <p><b>Detector</b></p> <p>PROTO® Silicon Point Detector (SPD) (digital monochromator; qualitative XRF)</p>	

	<b>Exterior Dimension</b>	
	171 x 61 x 100 cm (h x d x w), 67.5" x 24" x 37.6"	
	<b>Weight</b>	
	200 kg (440 lbs)	
	<b>AC Input Power</b>	
	208 VAC, 50/60 Hz, 10 A, Single Phase	
	<b>Computer</b>	
	Desktop PC with Windows 10	
	<b>Interface</b>	
	Ethernet	
	<b>Software</b>	
	<i>XRDWIN PD Measurement Software</i>	
	Instrument warm-up and control, data collection	
	<i>PD Analysis Software</i>	
	Peak search, fitting, and profile analysis	
	Background fitting (manual and automatic)	
	Data smoothing and $K_{\alpha 2}$ stripping	
	Intensity ratio method for quantitative analysis	
	Spike method for quantitative analysis	
	Search-Match for Crystallography Open Database and/or ICDD (if purchased)	
	Lattice parameter refinement and indexing	
	Residual stress, free lime, crystallinity, crystallite size, and other analysis techniques	
	<b>Standards and Safety</b>	
	Compliant with: UL/CSA, CE, ANSI N43.2	
	Interlocked enclosure door for auto x-ray off	
	<b>Sample Holders</b> (Amorphous Polymer: single-sample stage) 6 holders total	
	3 Double-sided sample holder shallow (13 and 26 mm diameter cavity; 0.5 mm depth)	
	3 Deep sample cups (38 mm diameter; 10 mm depth)	
	<b>Reference Sample</b>	
	LaB <sub>6</sub> powder disc	
	<b>Databases Included</b>	
2	Crystallography Open Database (Over 300,000 structures for Search-Match & Rietveld)	
3	American Mineralogist Crystal Structure Database (19,727 entries for Search-Match & Rietveld)	
	<b>Warranty and Install</b>	
4	Year 1: Complete System Warranty (x-ray tube, parts, and labor)	
5	Install and training: 3 days total (includes training with a PROTO XRD scientist)	