



IBIS White paper
Specifications of the IBIS MX96
1.151015

Abstract

In this white paper, the specifications of the IBIS MX96 are described. The large dynamic and linear range of the scanning angle optics allows measurements ranging from less than 1 Resonance Unit (RU) up to 30 000 RU with noise levels < 0.5 RU RMSD, making the MX96 the most sensitive SPR imaging instrument in the market. The imaging platform facilitates real-time sensing of analyte interactions on a 6x8, 4x12 or an 8x12 ligand array. Strong feature of the IBIS MX96 is the possibility to apply unlimited interaction time per sample for sub-picomolar limits of detection. Valve-less injection of samples and patented “back-and-forth” flow-based fluidics requires a sample volume of only 100 microliter to simultaneously measure the interactions on 96 ligand spots. The unsurpassed multiplex capacity of this platform provides scope to examine multiple interactions, simultaneously, whilst offering multiple referencing possibilities (up to 48 for 96 spots). An analysis cycle of 96 sample injections of 100 microliters in combination with a 96 spot microarray, generates 9216 referenced sensorgrams during unattended operation in a single run. MX96-SPRi software has been developed to analyze biomolecular interactions in such an organized way that kinetic evaluation of the measurement is straightforward. It enables the user to analyze high content screening assays with convenient data processing. The software is structured in a unique way enabling the highest performance in biomolecular interaction sensing.



IBIS White paper # 1.151015

General specifications

General	
Dimensions (DxHxW)	515 x 620 x 510 mm
Weight	65 kg
Electrical supply	110-240 V
MX96 optics	
Configuration	Kretschmann using hemispherical prisms
Optics	Scanning angle for full dynamic and linear range
Biosensor	SensEye®, hemispheric activated gold surfaces
Imaging or SPR microscopy	Yes, for visual quality assessment and facilitating multiplex array measurements
Wavelength	850 nm
Optical lateral resolutions	25 µm
Maximum number of ROIs	144 in a template 8x12 array including reference spots
SPR control	Multiplex sensorgrams and real-time sensor surface image
Angle range	10 degrees, ~ 1.33-1.43 RIU (100,000 RU, 1 RU = 10 ⁻⁶ RIU)
Dynamic angle range	4 degrees, linear between ~ 1.33-1.37 RIU (40,000 RU)
Analysis time	'Unlimited' (>3 days) using back and forth flow
Run time	> 6 days unattended operation
Baseline noise	< 0.5 RU (RMSD)
Baseline drift	< 0.8 RU/min
Low Molecular Weight compounds	Yes, > 200 Dalton
Temperature control and stability	Peltier for flow-cell, < 0.01 °C
Analysis temperature	15-45 °C (7 °C below ambient), thermohead
Liquid handling	
X-Y-Z robotic arm	Yes
Sample configuration	3 containers (10 ml), 12 vials (0.5 ml), microtiterplate (96 wells)
Pumps	2 syringes, Y connected to flow chamber and single needle
Volume	1000 µl/stroke
Injection Volume	100 µl, which can be recovered
Liquid cells	Single flow-cell using back and forth mixing
Microarray image area	6.6 x 8.8 mm, arrayed 6x8, 4x12 or 8x12 spots using CFM
Flow cell volume	10.7 µl
Flow cell area	107 mm ²
Injection rise time to steady	< 5 seconds, filling < 0.5 seconds.
Mix volume	14 µl (in standard scripts)
Mix speed	50 µl/s (in standard scripts)
Mass transport rate	High, fixed for short and long interaction times.
Association and dissociation rate constants (k _a and k _d)	Range from k _a : 5*10 ² – 5*10 ⁶ M ⁻¹ s ⁻¹ and 5*10 ⁻² – 2 *10 ⁻⁶ s ⁻¹
Dissociation equilibrium constant (K _D)	Range from 10 ⁻³ - 10 ⁻¹² M
Detection limit high affinity ligand > 0.5 hr interaction	< 1 pM (IgG)
Software	
Compatible OS and data management	MS Windows XP and Windows 7, personal, protected
Scripts	Pre-designed templates per application
Calibration of ROI's	Automated for equalizing the bulk RI sensitivities of all ROI's. SPrintX software for processing raw data files: serial, overlay, calibration, tiled plots: CRAZE function for automatic: Calibrating, Referencing, Aligning, Zeroing and Exporting
Data analysis	Affinity using K _D ^{RO} , Scrubber for IBIS and "binning" software
Referencing of ROI's	Yes, local and global referencing for compensation of bulk refractive index shifts and determination of the ligand density after the spotting process
Data export	txt file, xls (Excel), .ibmx, including a special export function for loading hundreds of sensorgrams in Scrubber (for IBIS)
Graph export	bmp, jpg, png, htm, postscript, pdf, pcx etc.