

# Octet® R2 System

The System that Grows  
with Your Biomolecule  
Characterization Needs



## Key Features and Benefits

- Most budget-friendly option designed for academic and start-up labs
- Flexibility of field upgrade to a 4-channel or 8-channel Octet® system for higher throughput
- High-quality kinetic screening and affinity characterization
- Microfluidics-free Dip and Read format reduces assay time and maintenance cost
- Crude sample compatibility saves valuable time by eliminating the need for sample pre-treatment
- Two parallel, independent channels, with the flexibility of using the second channel for a reference or for more samples
- Versatility to detect and analyze a diverse range of biomolecules from small molecules to viruses
- Non-destructive sampling to conserve precious samples for other assays
- Equipped with sample plate cooling for temperature-sensitive proteins and assays
- Easy to learn and use
- Integrated acquisition and analysis software eliminates dependency on external software.

## Product Information

The 2-channel Octet® R2 system offers an advanced, fluidics-free approach to protein analysis, with a wide variety of off-the-shelf Dip and Read biosensors for rapid binding kinetics and quantitation analysis. This system utilizes Sartorius' label-free Bio-Layer Interferometry (BLI) technology, enabling direct detection of specific proteins and other biomolecules – even in complex mixtures like crude cell culture supernatants and lysates.

Priced for academic and start-up customers, The Octet® R2 system offers low-cost access to accurate and sensitive biomolecular interaction data. Labs with lower throughput needs are no longer bound by the trade-off between cost and performance when choosing a label-free assay system.

This system can be used for a wide range of analyses including kinetic analysis, quantitation of IgGs and other proteins, reagent qualification, immunoassay development, bioprocess development, quality analysis, crude antibody screening, epitope binning/mapping, ligand binding assays and small molecule analysis, cell signaling mechanism studies and infectious disease monitoring. Analysis can be done using a single or both channels, enabling flexibility in sample throughput.

## Making Quality Analysis Affordable and Flexible

The Octet® R2 system provides a low-cost entry point for labs with lower throughput needs while providing the flexibility to upgrade to the higher channel Octet® R4 and Octet® R8 systems when the need arises. The upgrade is performed on-site within a single visit by trained Sartorius engineers, which minimizes instrument and operator downtime and saves on the cost and time of shipping the old unit to the factory. In addition, sample reuse capability and minimal preparation time combined with robust instrumentation reduces significant equipment and reagent costs. Optional biosensor regeneration further lowers the assay cost per sample. All Octet® BLI systems come with integrated Octet® BLI Discovery Software for data acquisition and the Octet® Analysis Studio Software for HT data analysis.

## Quantitation Assays

The Octet® R2 system directly measures the presence of specific proteins and other molecules in solution with minimal interference from complex matrices. Accurate and reproducible concentrations can be determined in as little as 2 minutes per sample using a simple, one-step assay

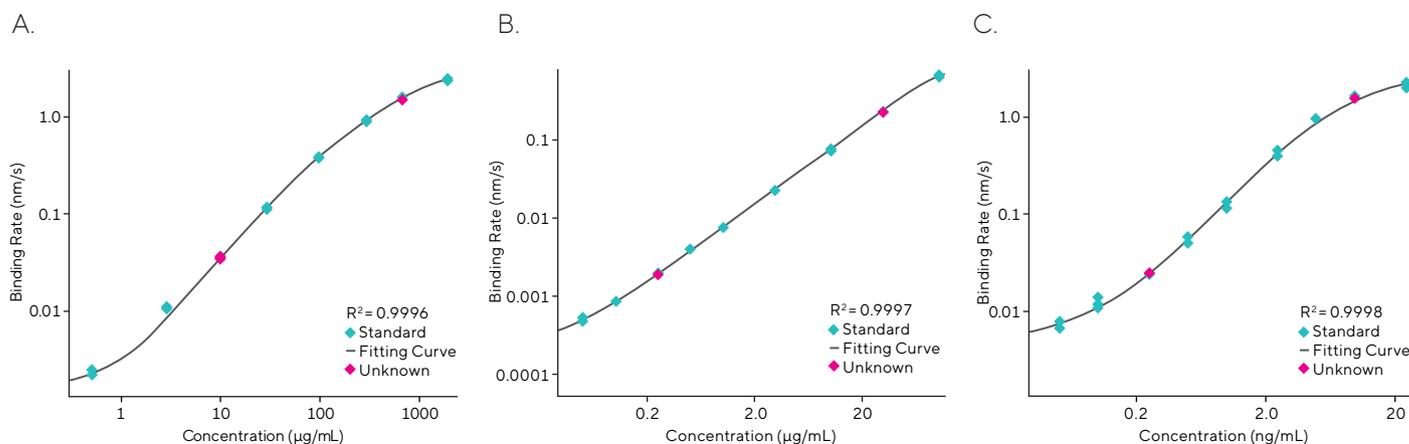


Figure 1: **Quantitation Assays.**

A) Detection of Human IgG and unknown samples using Protein A Biosensors on the Octet® R2 system with assay parameters of 400 rpm speed, 2 minutes per sample, at 30°C. The standard curve (0.5–2000 µg/mL) is shown on a log-log scale fitted with the unweighted 5-parameter logistic (5PL) regression model.

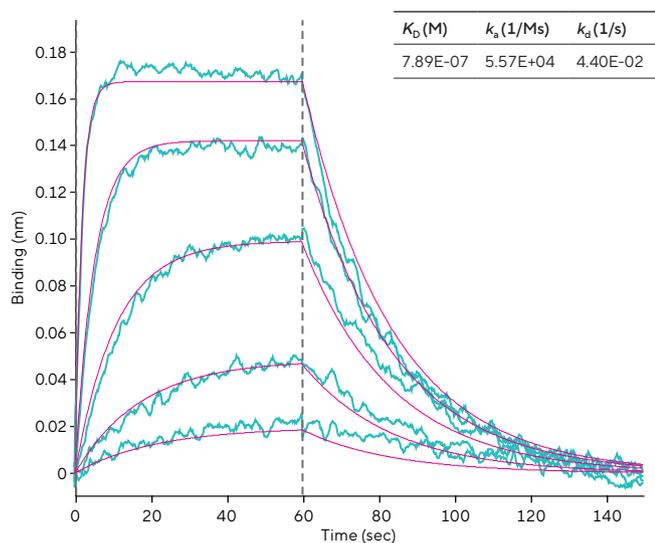
B) Detection of Human IgG and unknown samples using Protein A Biosensors on the Octet® R2 system with assay parameters of 1000 rpm speed, 5 minutes per sample, at 30°C. The standard curve (0.05–100 µg/mL) is shown on a log-log scale fitted with the unweighted 5-parameter logistic (5PL) regression model.

C) Detection of MabSelectSure analyte and unknown samples using Protein A Biosensors on the Octet® R2 system. The standard curve (0.05–25 ng/mL) is shown on a log-log scale fitted with the weighted 4-parameter logistic (4PL) regression model.

(Figure 1). High sensitivity in quantitation can be easily achieved by increasing read time and shake speed as shown in Figure 1B. Even higher sensitivity can be achieved to sub-ng/mL levels with 2-step or 3-step assay formats as shown in Figure 1C, allowing automated measurement of contaminants such as host cell proteins and residual protein A—faster and more precisely than ELISA. Process economics can be improved further by regenerating and re-using the biosensors.

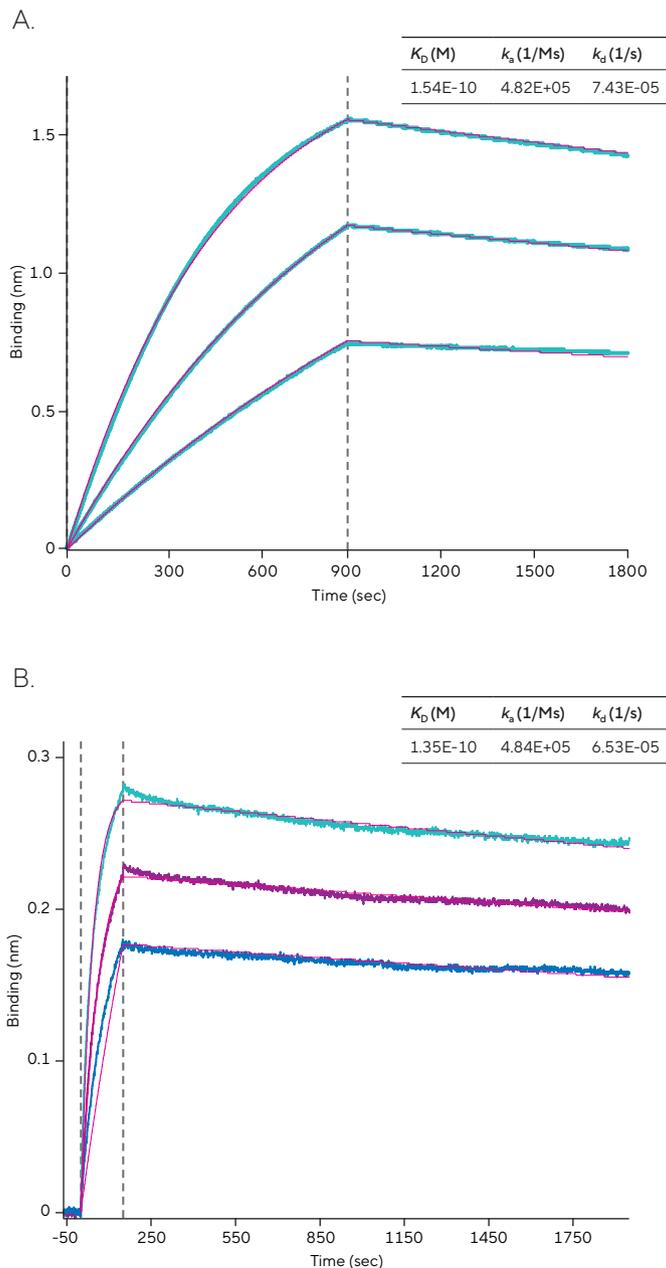
## Kinetic Assays

The Octet® R2 system monitors binding events in real time to calculate on rates ( $k_a$ ), off rates ( $k_d$ ) and affinity constants ( $K_D$ ). The superior sensitivity of the system enables measurement of small (Figure 2) and large (Figure 3) molecules and kinetic constants over a broad range. The sample plate temperature can be controlled from 15–40°C, which enables reliable kinetic determinations at different temperatures for temperature-sensitive proteins. Additional advantages of sample cooling include the ability to rapidly determine binding rate constants at multiple temperatures to extrapolate thermodynamic measurements. The Octet® R2 system's channels can be used independently to measure samples for screening purposes or in tandem, pairing the sample read with a dedicated reference for high-quality kinetic characterization.



**Figure 2: Small Molecule Characterization.**

Kinetic analysis of the interaction between a ligand, biotinylated-carbonic-anhydrase and the small molecule analyte Furosemide (330.7 Da) with Super Streptavidin (SSA) Biosensors at 1000 rpm and 25°C on an Octet® R2 system. Furosemide working solutions were prepared in serial dilutions of 0.1, 0.3, 1.0, 3.0, 10.0  $\mu$ M respectively. Data was processed and curve fitted using a 1:1 binding model.



**Figure 3: Large Molecule Characterization.**

A) Kinetic analysis of the interaction between biotinylated human CD64 and humanized IgG1k monoclonal antibody with High Precision Streptavidin 2.0 (SAX 2.0) Biosensors at 1000 rpm and 25°C on an Octet® R2 system. Humanized IgG1k mAb working solutions were prepared in serial dilutions of 1, 2 and 4 nM respectively. Data was processed and curve fitted using a 1:1 binding model.

B) Kinetic analysis of the interaction between biotinylated anti Her2 and Her2 protein with High Precision Streptavidin 2.0 (SAX 2.0) Biosensors at 1000 rpm and 25°C on an Octet® R2 system. Her2 working solutions were prepared in serial dilutions of 14.3, 28.5 and 57.0 nM respectively. Data was processed and curve fitted using a 1:1 binding model.

# Octet® BLI Discovery and Analysis Studio Software

Pre-defined templates in Octet® BLI Discovery Software streamlines setup prior to running an assay and minimizes training needs. Octet® Analysis Studio Software can overlay data from multiple plates over an extensive range of parameters and metrics to analyze acquired data from an entire project, thereby reducing analysis time from hours to

minutes. All settings in Octet® Analysis Studio Software can be saved and re-loaded for new similar datasets to speed up routine assays. The software can also generate customized reports of the experiments, combining various data elements such as graphs, text boxes, data tables, images and experimental details (Figure 4). These reports are ready to be uploaded to an electronic notebook or stored in the company database.

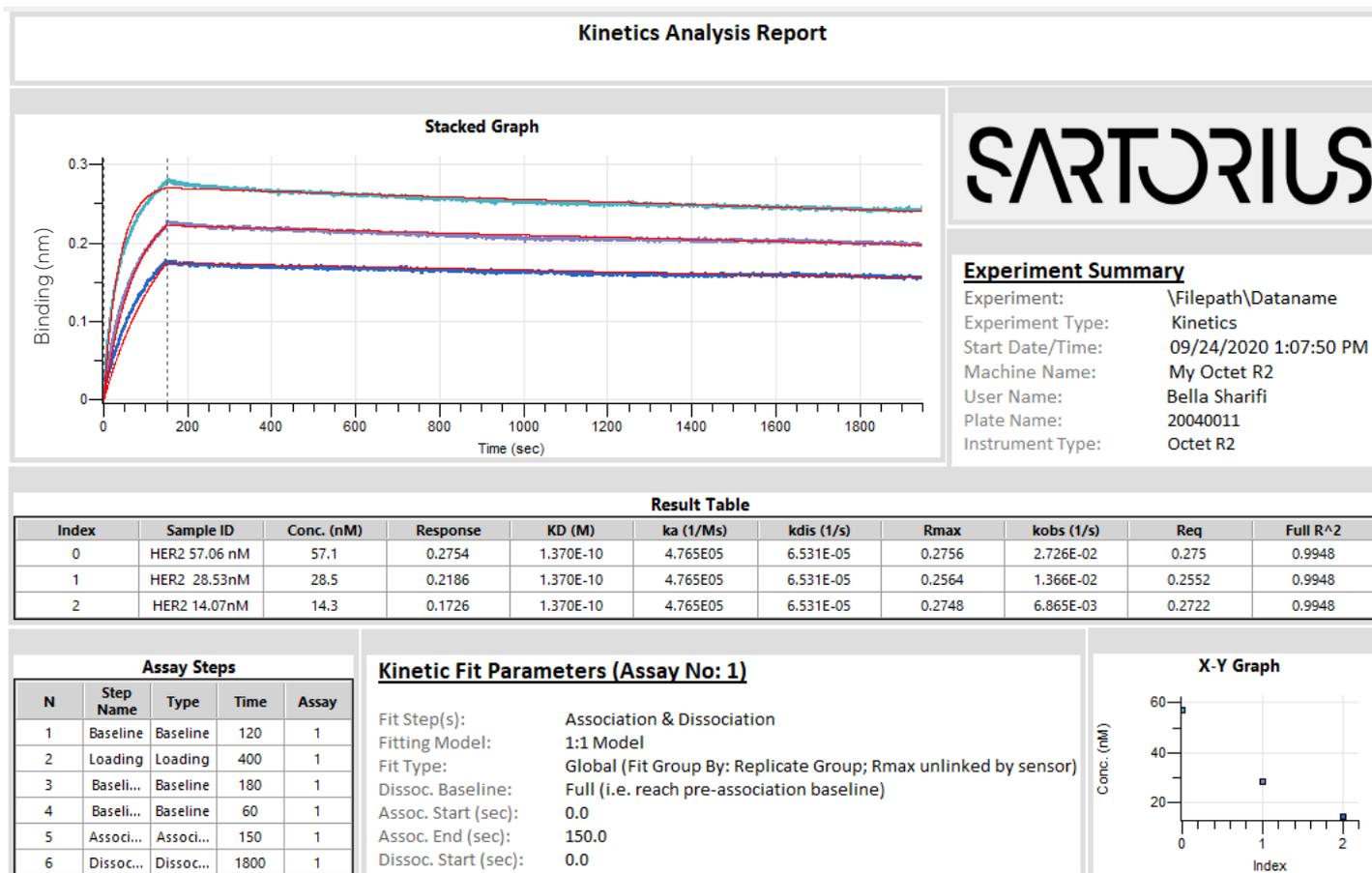


Figure 4: Octet® Analysis Studio Software version 12.2 and above enables creation of customized reports that can be uploaded into electronic notebooks and added to the database. In addition to the customized reports, Octet® Analysis Studio Software enables analysis of multiple plates and experiments together to maximize workflow efficiency.

# Octet® R2 System

## Technical Specifications<sup>1</sup>

Technical information and specifications		Quantitation and kinetics	
Detection technology	Bio-Layer Interferometry (BLI)	Throughput	Up to 2 assays in parallel
Biosensor type	Disposable, single-use fiber optic biosensors with optional reuse by regeneration and/or re-racking in the biosensor tray	Molecular weight detection	> 150 Da
Information provided	<ul style="list-style-type: none"> <li>Yes/No binding</li> <li>Kinetic and affinity analysis (<math>k_{obs}</math>, <math>k_{on}</math>, <math>k_{off}</math>, <math>K_D</math>)</li> <li>Specific and selective detection of molecules, even in crude samples</li> <li>Relative and absolute quantitation of specific proteins in crude matrices or purified samples</li> </ul>	Analysis time per sample	<ul style="list-style-type: none"> <li>hlgG Quantitation in 2 minutes for 2 samples</li> <li>Real-time kinetic binding experiments from 5 minutes to 4 hours for kinetic analysis</li> </ul>
Data presentation	<ul style="list-style-type: none"> <li>Graphs displaying real-time kinetic binding traces, fitted result plots and residuals of fits</li> <li>Concentration data analysis including calibration curves and output of tabulated concentration data</li> <li>Tabulated kinetic data</li> <li>Epitope binning and cross-blocking matrices and trace overlays</li> </ul>	Association rate constant ( $k_{on}$ )	$10^1$ – $10^7$ M <sup>-1</sup> s <sup>-1</sup>
Sample types	Proteins, antibodies, peptides, DNA, RNA, liposomes, viruses and VLPs in various media including serum, buffers containing DMSO, periplasmic fractions, bacterial cells, nanoparticles, untreated cell culture supernatants and crude cell lysates	Dissociation rate constant ( $k_{off}$ )	$10^{-6}$ – $0.1$ s <sup>-1</sup>
Number of spectrometers	2	Affinity ( $K_D$ ) constant	1 mM–10 pM
Maximum simultaneous reads	2	Quantitation range for hlgG	0.05 µg/mL to 2000 µg/mL
Data collection rate	2, 5 or 10 Hz	Baseline noise <sup>2</sup>	≤ 4.0 pm (RMS)
Sample position and format	1 standard 96-well, black, flat bottom microplate	Baseline drift <sup>2</sup>	≤ 0.12 nm/hour
Sample volume	180–220 µL/well, non-destructive testing	<b>Instrument</b>	
Orbital flow capacity	Static or 100–1500 rpm	Dimensions (H x W x D)	19.5 in x 22 in x 18.2 in (49 cm x 56 cm x 46 cm)
Analysis temperature range	15–40°C, 1°C increments	Weight	72 lb (32.7 Kg)
		Electrical requirements	Mains: 100–120/200–240 VAC, 50/60 Hz, 4 A max
		Power consumption	200 W (300 W peak)
		<b>Data handling and storage</b>	
		PC operating systems	Windows® 10 Professional, 64-bit Windows® 7 Professional, 64-bit Windows® 7 Professional, 32-bit
		<b>Compliance</b>	
		Safety standards	CE, Nemko

<sup>1</sup> All specifications are subject to change without notice.

<sup>2</sup> Baseline noise and drift are tested at 25 °C.

## Ordering Information

Part No.	UOM	Description
Octet® R2 / 30-0512	System	Includes Octet® R2 instrument, Octet® Software, desktop computer, LCD monitor, accessory kit and one-year warranty
41-0327	Kit	Octet® R2 Installation and Operational Qualification Kit

## Related Products

Part No.	UOM	Description
Octet® R4 / 30-0514	System	Includes Octet® R4 BLI system, Octet® Software, desktop computer, LCD monitor, accessory kit and one-year warranty
41-0326	Kit	Octet® R4 Installation and operational qualification kit
Octet® R8 / 30-0518	System	Includes Octet® R8 BLI system, Octet® Software, desktop computer, LCD monitor, accessory kit and one-year warranty
Octet® R8-GxP Package / 30-0518-GxP	System	Includes Octet® R8 BLI system, Octet® 21 CFR Part 11 Software, desktop computer, LCD monitor, accessory kit, IQOQ/PQ kits and services and one-year warranty
18-5132	Pack	Single-use evaporation covers to extend the experiment up to 12 hours. 3 covers per pack
18-1176	Kit	Octet® R8 Performance Qualification – Quantitation Kit
18-1177	Kit	Octet® R8 Performance Qualification – Kinetics Kit
18-1178	Kits Bundle	Octet® R8 Performance Qualification Kits Bundle
41-0325	Kit	Octet® R8 Installation and Operational Qualification Kit
50-0296	Pack	Octet® Software Validation Package

### Upgrade and Maintenance Services

Contact your regional sales representative for all the upgrade and maintenance services offered with the Modular Octet® R series configurations.

### More Information

For more information about Sartorius' Octet® platform for label-free, real-time detection of biomolecular interactions, applications and services, visit [www.sartorius.com/octet](http://www.sartorius.com/octet) or contact us directly at +1 888 OCTET 75.

### Technical Support

For technical questions please contact Sartorius Technical Support at [octetsupport@sartorius.com](mailto:octetsupport@sartorius.com).

**Germany**

Sartorius Lab Instruments GmbH & Co. KG  
Otto-Brenner-Strasse 20  
37079 Goettingen  
Phone +49 551 308 0

**USA**

Sartorius Corporation  
565 Johnson Avenue  
Bohemia, NY 11716  
Phone +1 888 OCTET 75  
Or +1 650 322 1360