

# ForteBio's Octet System

Label-free, real-time detection of molecular interactions

## Octet 蛋白质相互作用工作站

专利 BLI 技术  
Bio-layer  
Interferometry



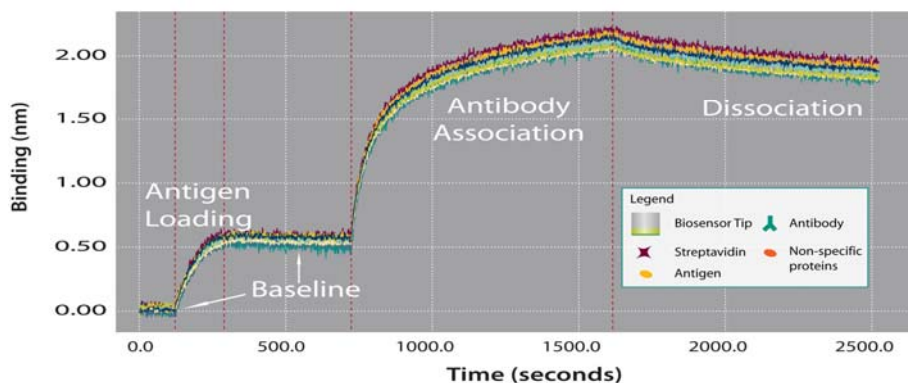
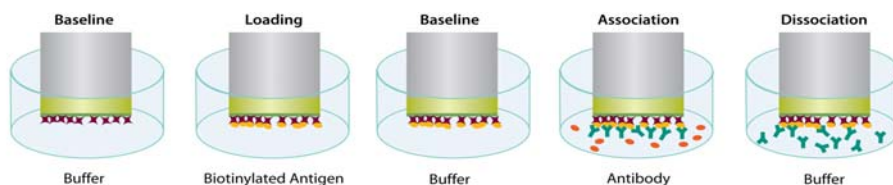
● Label-free detection  
无需标记

● Real-time analysis  
实时检测

● Simple and fast  
简单快速

● Automated  
全自动操作  
和数据分析

● Crude Sample compatibility  
可以直接使用  
原始粗样品



美国 ForteBio 公司生产

冷泉港生物科技股份有限公司独家代理

# Octet Systems Solve Critical Issues

## —— Octet 客户的观点

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### Increase Screening Throughput 3X

A small biotech company needed to increase its screening throughput to accommodate three screenings of 1200 antibodies per year. Buying additional SPR systems was not an option, nor was hiring additional personnel. A single Octet System gave the company the screening capacity it needed to meet the challenge.

*在我们的实验室只需要一台Octet就可以满足对文库的各种筛选工作*

*“The Octet System gave us the capacity to handle multiple screenings of our library with one instrument in our own lab.”* — Screening Lab Manager

### Ensure Full Utilization of Bioreactor Capacity

A leading biotech company realized that waiting for HPLC results to come back from a distant analytical core lab was affecting the utilization of bioreactor capacity and placing processes at risk. By placing an Octet System in their own department, scientists in the facility eliminated delays and got their data back instantly, improving their processes.

*Octet和HPLC一样可靠，我们刚刚购入了第二套Octet系统*

*“Correlation with HPLC was extremely high. We just added our second Octet System.”*

— Process Development Scientist

### Improve Capital Efficiency

A startup biotech needed to characterize humanized yeast proteins without making a large capital investment. Outsourcing protein kinetics analyses was costly and required time-consuming purification steps. Investing in an Octet System enabled the company to run crude samples quickly, in its own lab, eliminating both outsourcing costs and the time required for sample purification.

*我们没有Octet之前，蛋白质动力学分析是花费最大的项目，有了Octet之后，支出减少了。*

*“Protein kinetics characterization was our biggest expense until we invested in the Octet System.”*

— Associate Director of Antibody Therapeutics

### Increase Confidence in Kinetic Data

A biotech company needed to evaluate large numbers of therapeutic MAbs quickly and accurately. Endpoint reactions and workflow factors were producing large coefficients of variation in their ELISA assays. The company eliminated the problem by replacing endpoint assays with a real-time Octet System.

*Octet让我们不再因为动力学数据感到沮丧，不再需要重复实验*

*“We’ve eliminated a major source of frustration and re-analysis.”*

— Hybridoma Research Manager

### Save Money by Finding Antibody Clones Earlier

*现在我们细胞培养的工作量只有从前的十分之一*

*“We need to culture only about ten percent of what we used to.”* — Director of Biochemistry

# BLI (Bio-Layer Interferometry) 技术介绍

光纤制成的 Biosensor 底端覆盖了生物分子相容层，可以用来固定相互作用分子中的一个，形成生物膜层。

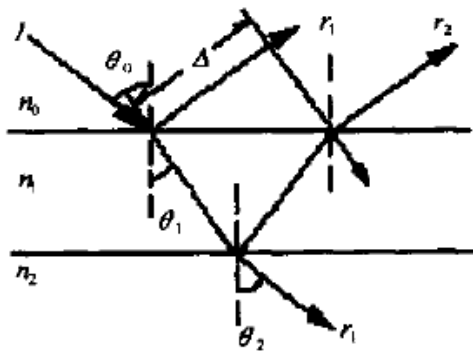
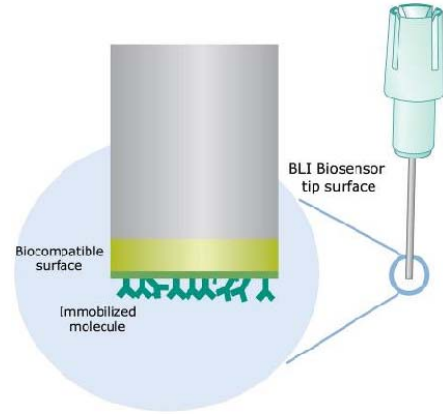
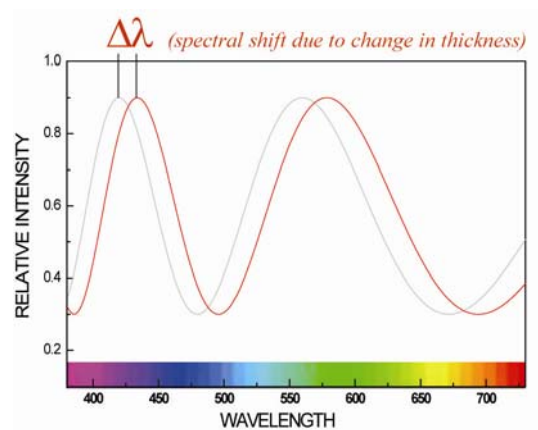
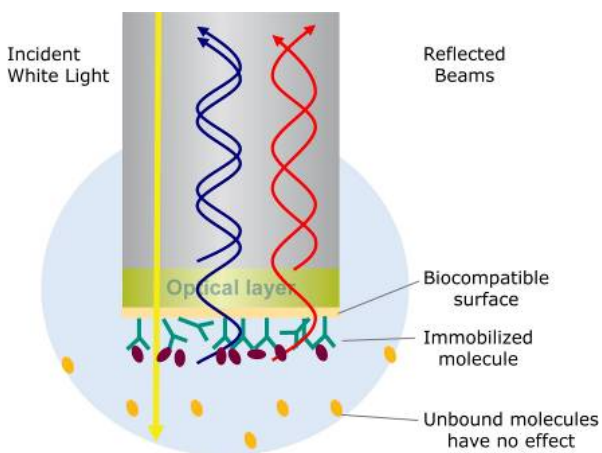
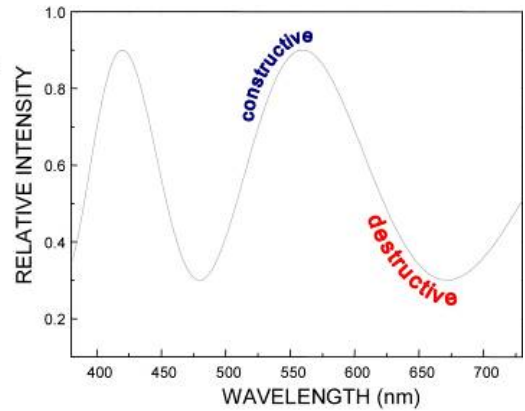
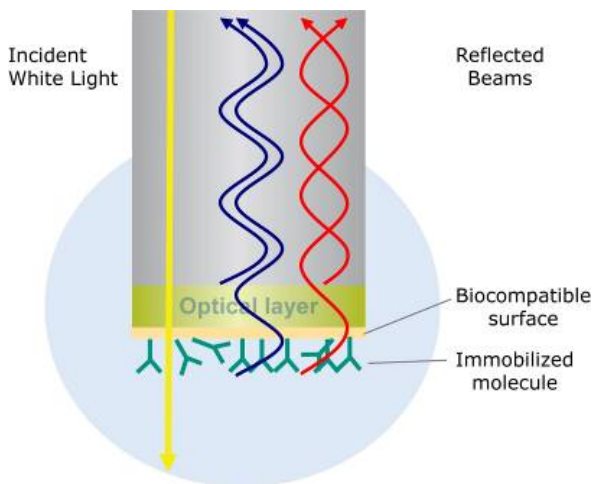


图 1 薄膜干涉简化模型

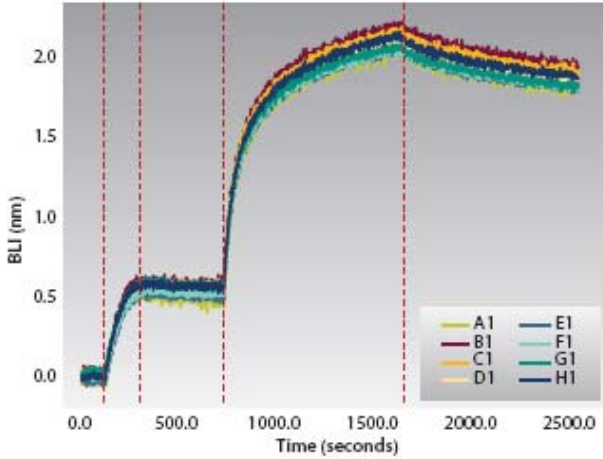


当具有一定带宽的可见光入射生物膜层时，根据薄膜干涉的简化模型和光线反射折射定律，入射光线在生物膜层表面被分成两部分，形成第一部分反射光，进入生物层的透射部分在生物层的第二个界面产生反射，形成第二部分反射光。光束垂直入射时，两部分反射光形成干涉波，被光谱仪所检测。相互作用发生时，生物层厚度增加，反射光干涉光谱曲线整体向波长增加方向移动。分子结合或解离时，都会导致干涉曲线的漂移。



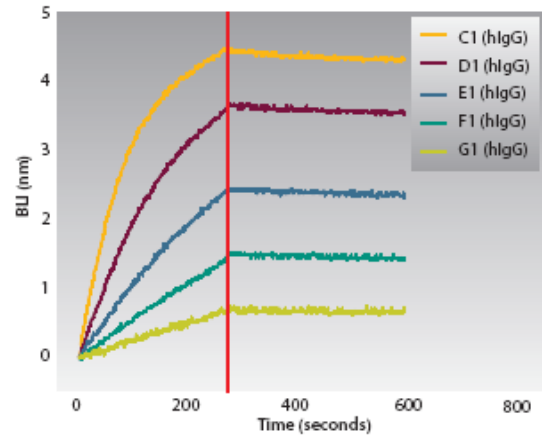
# Octet 系统的应用

## (一) Kinetics Analysis 分子相互作用的动力学分析



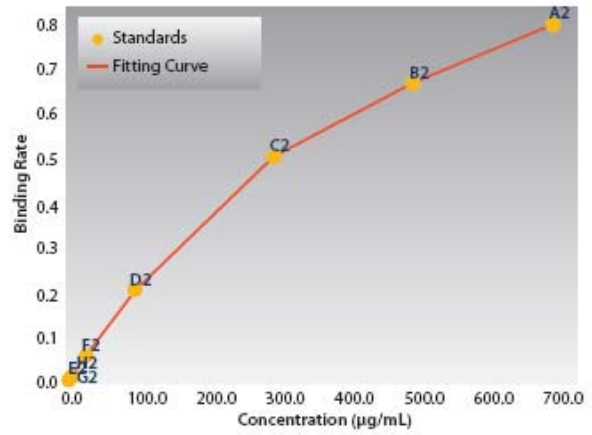
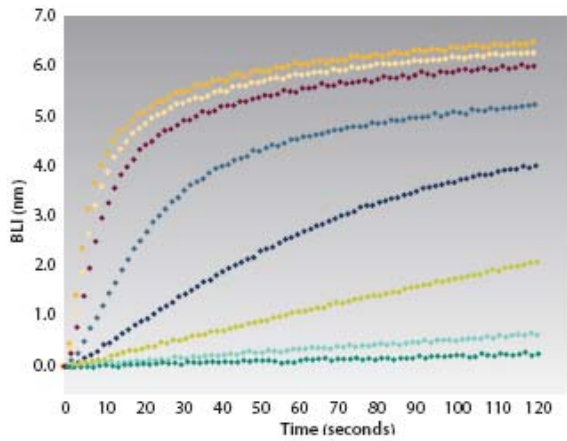
Top: Real-time binding chart from online immobilization of a biotinylated protein onto eight Streptavidin Biosensors run in parallel.

Right: Globally fitted kinetics of a hIgG Ab assayed in parallel.



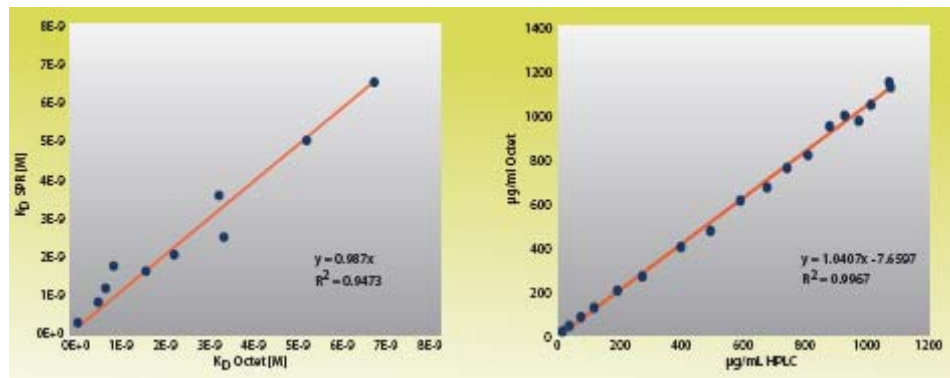
$K_a$ , [1/Ms]	$K_{dis}$ , [1/s]	$K_{obs}$ , [1/s]	$K_D$ , [M]
4.06E+06	9.41E-05	1.02E-02	2.32E-11
		5.17E-03	
		2.63E-03	
		1.37E-03	
		7.28E-04	

## (二) Concentration Determination 蛋白质定量



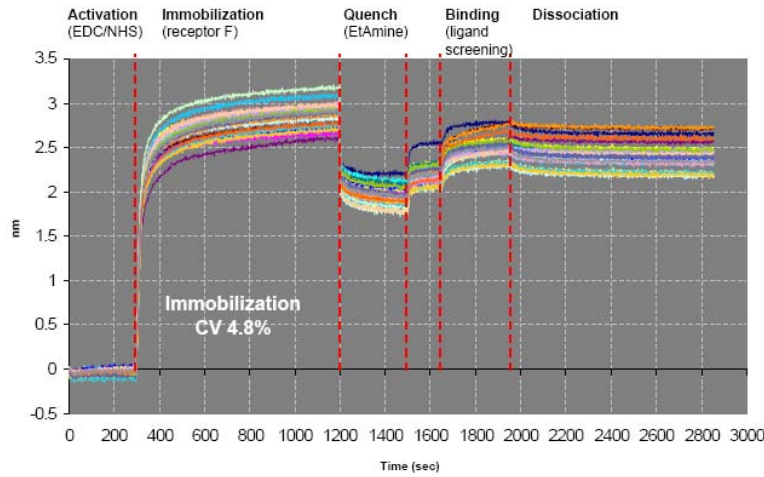
The dose-dependant binding curves of an immobilized molecule and its binding partner allow a standard curve to be produced. Unknown concentrations are automatically determined by back-calculating their concentration from the standard curve.

与 SPR 和 HPLC 相比，数据可靠性相同，但 Octet 系统检测通量高，速度快，操作简单。

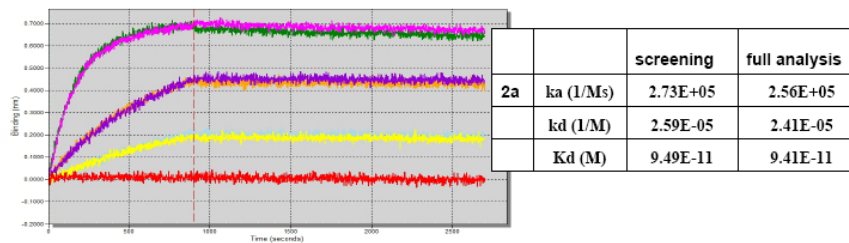
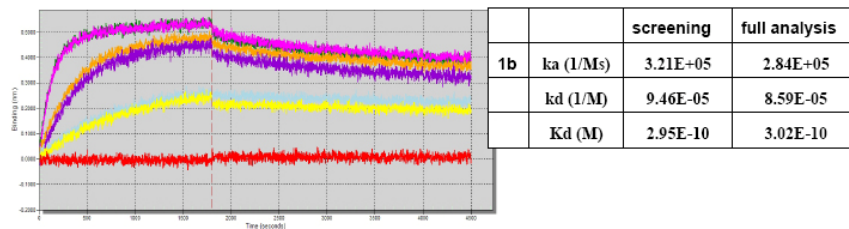


# Octet 客户应用举例

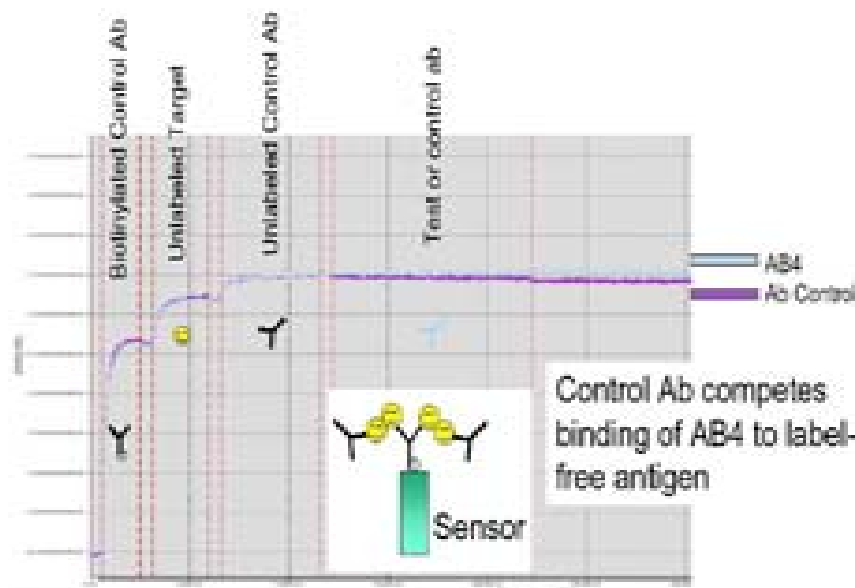
## Screening of ligands for Receptor F using Amine Reactive Biosensors



## Using the Amine Reactive Biosensor to immobilize antibodies and screen analyte variants



## Binning Antibodies to multiple epitopes in real-time using label-free antigen



## Octet Q&QK System Specifications

检测技术	基于光纤生物传感器的生物膜层光学干涉技术 (BLI, BioLayer Interferometry)
传感器	根据具体实验, 可以使用 10 次
检测结果包括	<ul style="list-style-type: none"> <li>* 动力学和亲和力分析 (<math>k_{obs}</math>, <math>k_a</math>, <math>k_d</math>, <math>K_D</math>), 结合特异性和结合协同性</li> <li>* 动力学筛选 <math>k_{on}</math> 或 <math>k_{off}</math></li> <li>* 实时结合的浓度监测 (不需要扣除背景)</li> <li>* 蛋白质定量</li> </ul>
动力学分析	<ul style="list-style-type: none"> <li>* 一次同时做 8 个检测, 最多可以自动完成 32 个检测。</li> <li>* 每个样品分析时间: 5min-3hr</li> <li>* 结合速率常数 (<math>k_a</math>): <math>10^3</math>-<math>10^7</math> <math>M^{-1}s^{-1}</math></li> <li>* 解离速率常数 (<math>k_d</math>): <math>10^{-5}</math>-<math>10^{-1}</math> <math>s^{-1}</math></li> <li>* 样品浓度: 1mM-5pM</li> <li>* 分子量: &gt;3000 da</li> <li>* 基线噪音: 0.05nm (RMS)</li> <li>* 基线漂移: &lt;0.1nm/hour</li> </ul>
动力学筛选	<ul style="list-style-type: none"> <li>* 一次同时做 8 个检测, 最多可以自动完成 96 个检测。</li> <li>* 分析时间: 96 个样品最短分析时间 1 小时</li> <li>* 数据输出: 克隆按 <math>k_a</math> 或 <math>k_d</math> 排序</li> </ul>
定量分析	<ul style="list-style-type: none"> <li>* 一次同时做 8 个检测, 最多可以自动完成 96 个检测。</li> <li>* 分析时间: 8 个样品分析时间 &lt;2min, 96 个样品分析时间 &lt;30min</li> <li>* 定量范围: 1ug/ml - 500ug/ml</li> <li>* 精确度: CV&lt;10% , 根据具体实验而定</li> </ul>
检测结果格式	<ul style="list-style-type: none"> <li>* Plots displaying kinetic binding, equation fits, and residuals of fits,</li> <li>* Tabulated kinetic data and data charts</li> </ul>
自动处理样品量	96
样品种类	蛋白质, 抗体, 多肽 (>3000da), 含血清 ( $\leq 10\%$ ) 培养基, 含 DMSO 缓冲液, 胞质悬液, 未经处理的细胞培养上清, 粗制的细胞裂解液
样品体积	终稀释液 200ul, 非破坏性检测, 易回收
样品板	标准 96 孔板, 黑色平底
样品平台轨道运动	静止, 或 100-1500rpm
分析温度范围	室温+2°C 至 42°C, 增量单位 1°C
样品折射率	和生物样品的折射率无关, 样品折射率的变化不影响检测。
规格	47.5cm × 43cm × 53cm
重量	23kg

电源	AC100-240V, 2.0-0.9A, 50/60Hz, 120W
电脑	PC 机, Windows XP 操作系统, RS232 和 USB 接口, 自动操作和数据分析软件
安全标准	符合 CE, CSA 安全标准

## Octet RED System Specifications

检测技术	基于光纤生物传感器的生物膜层光学干涉技术 (BLI, BioLayer Interferometry)
传感器	根据具体实验, 可以使用 10 次
检测结果包括	<ul style="list-style-type: none"> <li>* 动力学和亲和力分析 (<math>k_{obs}</math>, <math>k_a</math>, <math>k_d</math>, <math>K_D</math>), 结合特异性和结合协同性</li> <li>* Epitope mapping/binning</li> <li>* 判断是否有相互作用发生</li> <li>* 蛋白质定量</li> </ul>
动力学分析	<ul style="list-style-type: none"> <li>* 每个样品分析时间: 5min-3hr</li> <li>* 结合速率常数 (<math>k_a</math>): <math>10^1</math>-<math>10^7</math> <math>M^{-1}s^{-1}</math></li> <li>* 解离速率常数 (<math>k_d</math>): <math>10^{-6}</math>-<math>10^{-1}</math> <math>s^{-1}</math></li> <li>* 亲和力范围: <math>10^{-3}</math>-<math>10^{-12}</math>M</li> <li>* 分子量: &gt;150 da</li> <li>* 基线噪音: 2.5pm (RMS)</li> <li>* 基线漂移: &lt;21pm/hour</li> </ul>
定量分析	<ul style="list-style-type: none"> <li>* 分析时间: 8 个样品分析时间&lt;2min, 96 个样品分析时间&lt;30min</li> <li>* 定量范围: 0.25ug/ml - 2000ug/ml</li> </ul>
自动处理样品量	8 道光纤生物传感器, 一次同时做 8 个检测, 最多可以自动完成 96 个检测。
样品种类	<p>低分子量分析物, 多肽, 蛋白质</p> <p>适合多种液体环境: 含血清培养基, 含 DMSO 缓冲液, 胞质悬液, 未经处理的细胞培养上清, 粗制的细胞裂解液。</p>
样品体积	终稀释液 100-200ul, 非破坏性检测, 易回收
样品板	标准 96 孔板, 黑色平底
样品平台轨道运动	静止, 或 100-1500rpm
分析温度范围	室温至 47°C, 增量单位 1°C
规格	47.5cm×43cm×53cm, 24.5 kg
电源	AC100-240V, 2.0-0.9A, 50/60Hz, 120W
电脑	PC 机, Windows XP Professional 操作系统, RS232 和 USB 接口, 自动操作和数据分析软件

**ForteBio 提供多种 Biosensors 用于不同的实验，而且还在不断推出新的产品，详情查询：[www.fortebio.com](http://www.fortebio.com)，[www.cs-biotech.com](http://www.cs-biotech.com)**

Kinetics Biosensors	Quantitation Biosensors
<ul style="list-style-type: none"> <li>➤ <b>Streptavidin sensors</b> <ul style="list-style-type: none"> <li>✓ <b>Standard Binding Capacity (SBC)</b></li> <li>✓ <b>High Binding Capacity (HBC)</b></li> <li>✓ <b>Screening sensors (FA)</b></li> <li>✓ <b>Super Streptavidin sensors</b></li> </ul> </li> <li>➤ <b>Amine Reactive sensors</b></li> <li>➤ <b>Amino-Propyl-Silane (APS) sensors</b></li> </ul>	<ul style="list-style-type: none"> <li>➤ <b>Anti-human IgG sensors</b></li> <li>➤ <b>Protein A sensors</b></li> <li>➤ <b>Anti-mouse IgG sensors</b></li> <li>➤ <b>Streptavidin sensors (FA)</b></li> </ul>

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