

Appendix A System specifications

A.1 System performance

A.1.1 Measuring range

The range of measurements that can be performed with Biacore 3000 is in practice highly dependent on the experimental conditions (ligand size and immobilization level, analyte size and concentration, bulk refractive index effects etc). The figures below are typical values. Ranges may be significantly wider under favorable conditions.

Concentration measurement

For analysis times <15 minutes, precision $\leq 5\%$ CV dose:

High molecular weight analytes (10^4 - 10^6 daltons)

direct assay typically 10^{-5} - 10^{-9} M

sandwich assay typically 10^{-3} - 10^{-11} M

Low molecular weight analytes (<5000 daltons)

inhibition assay typically 10^{-3} - 10^{-9} M

Affinity measurements at equilibrium

K_D typically 10^{-4} - 10^{-11} M

Kinetic measurements

High molecular weight analytes (10^4 - 10^6 daltons)

k_D typically 10^3 - 10^7 M⁻¹ s⁻¹

k_D typically 10^{-1} - 5×10^{-6} s⁻¹

Precision of immobilized protein

Between flow cells on one chip

sequential method typically < 5% CV

serial method typically < 2% CV

Between sensor chips typically < 10% CV

A.2 Technical specifications

A.2.1 Processing Unit

Dimensions (l × w × h)	760 × 350 × 610 mm
Net weight	50 kg
Mains supply (type 1) ¹	100-120 V~ / 220-240 V~ switched 47-63 Hz, 580 VA max Fuses 2 × T6.25A / 2 × T3.15A
Mains supply (type 2) ¹	100-230 V~ Autorange 47-63 Hz, 400 VA max Fuses 2 × T5.0A H
Memory protection	Lithium backup battery
Ambient temperature range	15-35°C
Ambient humidity	20-85% RH
Safety standard	electronics designed to IEC requirements
Acoustic noise level (LEQ)	<60 dB(A) measured using standard procedures

¹ Instruments are fitted with one of two power supply types. Refer to the mains input panel to determine the specifications for your instrument.

A.2.2 Detection Unit

Light source	LED (Light Emitting Diode)
Wavelength	760 nm
Band width	< 5 nm
Refractive index range	1.33-1.40 (0-70,000 RU)
Baseline drift	typically < ±0.3 RU/minute
Data output	
one flow cell	0.1, 1 or 10 measurements/s (0.1-10 Hz)
two flow cells	0.1, 1 or 5 measurements/s (0.1-2 Hz)
four flow cells	0.1, 1 or 2 measurements/s (0.1-5 Hz)
Noise	typically < 0.3 RU RMS (10 Hz) < 0.1 RU RMS (1 Hz)
Temperature range	4 - 40 °C (not lower than 20 °C below ambient temperature)

Temperature stability	Better than $\pm 3 \times 10^{-3}$ °C/min
Temperature accuracy	< ± 0.5 °C (entire temp. range) < ± 0.1 °C at 25 °C
Temperature equilibration time after 5 °C step after 10 °C step	typically < 60 minutes typically < 120 minutes

A.2.3 Pump

Flow rate range	1-5000 μ l/min (1-100 μ l/min user-controlled)
Increment	Steps of 1 μ l/min
Flow rate accuracy	< $\pm 2\%$ (1-100 μ l/min, liquid at 25°C)
Flow rate precision	< 1% (1-100 μ l/min, liquid at 25°C)
Pressure range	< 0.2 MPa
Tubing	
Inlet (both pumps)	PEEK, i.d. 0.75 mm
Outlet (continuous flow)	PEEK, i.d. 0.5 mm
Outlet (autosampler)	Tefzel, i.d. 0.8 mm

A.2.4 Autosampler

Dispensing volume range	5-500 μ l (including air segment)
Increment	Steps of 1 μ l
Accuracy	< 1% deviation for volumes ≥ 50 μ l
Precision	
50 μ l	< 0.4% CV
5 μ l	< 2% CV
Carry over between vials	typically < 1 μ l without septum typically < 0.1 μ l with septum
Sample capacity per rack:	
Microplate*	96-well (0.2 ml/well)
Rack type A	5 vials, diam 16 mm (4 ml) 12 vials, diam. 9 mm (1.5 ml) 40 vials, diam. 7 mm (0.7 ml)

Rack type B	60 vials, diam. 9 mm (1.5 ml)
Rack type C	24 vials, diam. 10.8 mm (Eppendorff-type 1.5-2 ml)
Reagent rack	4 vials diam. 10.8 mm 4 vials diam 16 mm
Maximum vial height	55 mm
Optional thermostating:	¼" connections maximum inlet pressure 0.2 MPa

**Only some brands of microplates are compatible with the autosampler. Contact GE Healthcare for more information.*

A.2.5 Integrated μ -Fluidic Cartridge (IFC)

Number of flow cells	4
Valves	Pneumatic membrane valves
Injection volume to flow cell	5 -750 μ l, steps of 1 μ l
Carry over from previous injection	< 0.1%
Sample loop capacity	120 μ l (maximum injection volume 100 μ l)

Channel and valve configuration allows access to flow cell 1, 2, 3, 4, 1+2, 3+4 or 1+2+3+4 from loop or injection port.

For injection volumes and sample consumption see Section 4.4.6.

A.2.6 Sample recovery

Volume	2 μ l (3-7 μ l using MICRORECOVER)
Dilution of recovered sample	see Technical description below