

IKOsize BC – series



IKOsize BC instruments are based on the dynamic light scattering (photon correlation spectroscopy). This technique is ideal for measurements of nanoparticle size, diffusion coefficient, and molecular weight of polymers in solutions. Additionally possible technologies are static light scattering, backscattering and angle-dependent light scattering. A traditional design of the IKOsize BC instruments is optimal for a wide range of applications: from simple industrial tests to the most advanced research tasks. Measurement procedure and powerful software are suitable for any level of users. This device fully complies with International standard ISO 22412:2008.

Features

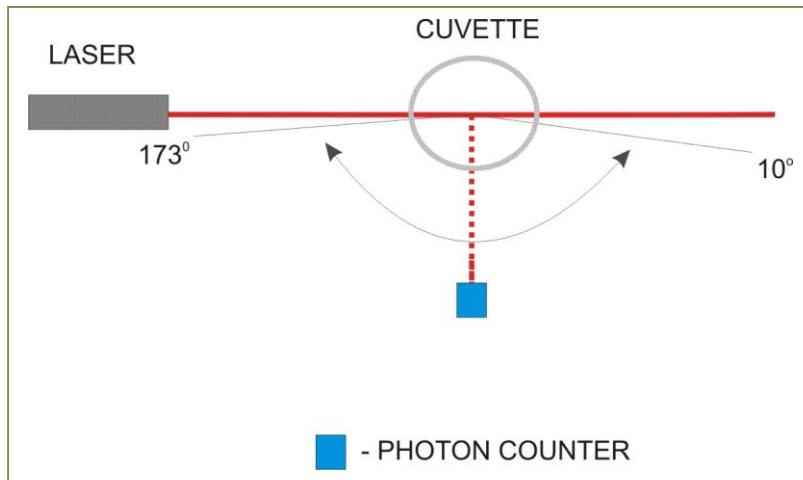
- ▲ Full-featured multi-angle dynamic and static light scattering, fast measurements, real-time size monitoring of nanoparticles
- ▲ Traditional user-open modular architecture, rigid design, no optical table needed, easily configurable by user
- ▲ Easy-to-prepare samples, suitable for various commercial sample cells and vials, replaceable index-matching vat system
- ▲ Stepper-motor controlled turntable, compatibility with various lasers and APD/PMT photon counting systems
- ▲ Precise thermostat with PID controller and provision for temperature control via external circulator/chiller
- ▲ Unique flex-logic single-board correlator, linear and multiple-tau time scale, upgrade of hardware configurations
- ▲ Original light-scattering geometry for particle sizing of opaque dispersions
- ▲ Exceptional quality and reliability with all light scattering features for optimal price

Specifications

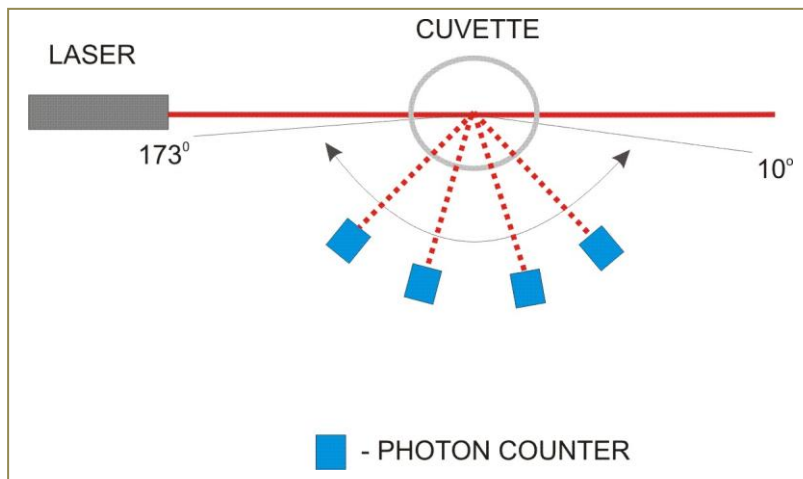
Particle size	0.3 ... 10000 nm
Accuracy	0.8%
Diffusion coefficient	$10^{-5} \dots 10^{-10} \text{ cm}^2/\text{s}$
Molecular weight	$10^3 \dots 10^{12} \text{ g/mol}$
Sample volume	1 μL ... 10 mL
Sample concentration	0.0001 ... 40%
Scattering angle	$10^\circ \dots 173^\circ$, resolution 0.01° , accuracy 0.01° , stepper-motor controlled turntable
Laser	Laser 650 nm 50 mw (also available: 405 nm, 635 nm, 780 nm with power up to 100 mw)
Dimensions/Weight/Power	740 x 410 x 225 mm / 19 kg / 220(110) v, 140 w

IKOsize BC is available in 3 models

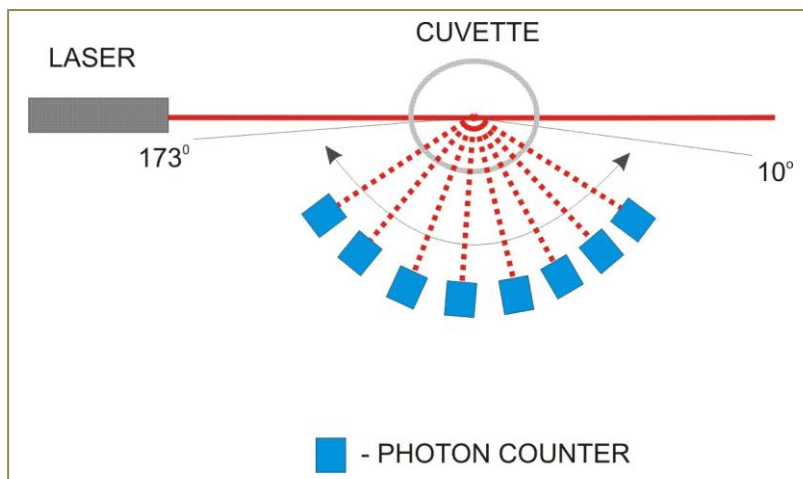
BC-1



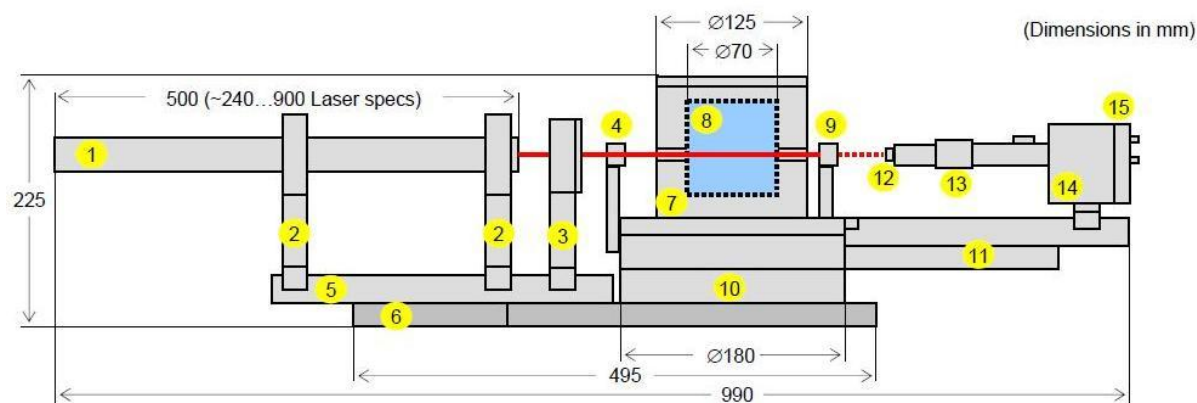
BC-2



BC-3



IKOsizer BC – 1 optical unit



The optical bench (5) and precision turntable (10) are mounted on a rigid base plate (6). Diode or He-Ne laser (1) in adjustable laser holders (2) and the focusing optics (3) are fixed on the bench. The incident laser beam can be attenuated by Interchangeable neutral-glass filter (4). The transmitted laser beam is attenuated by a neutral-glass filter (9). The thermostat (7) and the sample-cell holder (8) are coaxial with the turntable axis. The photon counting system (14) is mounted on the rotating arm of turntable (11). The photon counting system comprises the efficient receiving optics (13) with the interchangeable pinholes for selection of aperture (12), low-noise single-APD, and amplifier-discriminator (15). The output signal of the photon counting system is analyzed by the flex-logic single-board correlator, which is plugged in PCI or USB bus of personal computer. The personal computer performs the instrument control and data fitting and analysis.

Photon counting system

High sensitive photon counting system includes collimating optical system and counting unit based on APD diode. Two models of the photon counting units are available:

- ▲ Single-APD unit for routine measurements
- ▲ Quasi-crosscorrelation two-APD unit for precise wide-range particle sizing including the smallest particles in range of 0.3-10 nm.

Correlator

The key part of the photon correlation spectrometer is a digital real-time correlator, which defines the basic features of the particle-sizing instrument. The operation algorithm of correlator exactly corresponds to the mathematical definition of the time-dependent correlation function. It enables one to reach the highest efficiency of the signal analysis and high precision of particle sizing.

State-of-the-art design of the single-board FC correlators is based on the latest flex-logic integrated circuits and the fast digital signal processors. The correlators are completely self-sufficient hardware devices, which accumulate data by itself without interfering with PC program operations. The correlators are optimized for light scattering applications.

The FC correlator is a multipurpose real-time device for auto- and cross-correlation measurements built on the software-configurable flex-logic integrated circuits. A capability of further software upgrade of hardware functions is the unique feature of the FC correlator. The software for multiple-tau and linear time-scale regimes are available.

Processing	32 bits
Input frequency	100 MHz
Capacity of each channel (hardware)	48 bits
Minimum sample time (true real-time operation)	10 ns
Maximum sample time	1h
Number of channels	288
Multiple-tau mode	35 sections x 8 channels, factor 2
Operation modes	autocorrelation; cross-correlation
Interface	PCI or USB

Thermostat

Thermostat consists of two temperature-controlled shells: internal shell with distributed heater, temperature stabilized via PID controller, and independent external shell with provision for temperature control via external circulator or chiller. Thermostabilization is possible by using any shell separately or in combination both shells.

Temperature range	5°C ... 110°C, accuracy 0.1°C
Temperature control	Internal PID, external circulator/chiller
Sensor	Platinum temperature sensor 100 Ohm
Heater	30 Ohm, distributed
Sample cells	Square (12.5x12.5 mm, 12x12 mm) Cylindrical (diameter 8, 10, 17, 27 mm)
Immersion unit	Cylindrical (diameter 60 x 40 mm)
Sample cell compartment	Diameter 70 x 85 mm
Dimensions	Diameter 125 x 155 mm
Weight	1.8 kg

Applications

Physics and Chemistry	Colloids, polymers, latex, micelles, microemulsions, vesicles, gels, soles, liquid crystals, nucleation and aggregation processes, chemical reaction kinetics, phase transitions...
Chemical Engineering	Pigments, dyes, glues, powders, abrasives, lubricants, petroleum and fuels, mud fluids, membrane filters and ultra filtration testing...
Biochemistry and Biotechnology	Cells, viruses, proteins, liposomes, membranes, DNA, immunology reactions...
Environmental Technology	Disperse pollution, water and food quality testing...
Education and Training	Novel labs for physical, chemical, biological, medical and engineering education...