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Biomedical Optical Module Solution Provider

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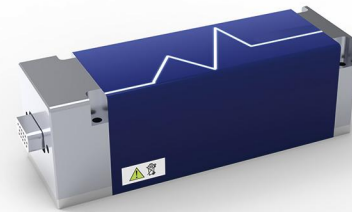
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About DayOptics



DayOptics was founded in 2005, has consistently focused on the research, development, and manufacturing in the field of optoelectronic technology. Its core products encompass optical systems, optical components, optical devices, and precision optics.



2005

Nearly 20 Years of Experience
in the Optical Industry



Biomedical Diagnostics

Customized Optical Solutions



DayOptics Philosophy

To Simplify and Beautify Optical Making

Product Vision

Continuously uncover technical demands, delve into module applications, and accumulate industry experience.

Optimize and iterate universal technologies while focusing on providing customers with one-stop "Optics, Mechanics, Electronics, Computing, and Software" solutions. Dedicated to becoming a cost-effective core module provider.



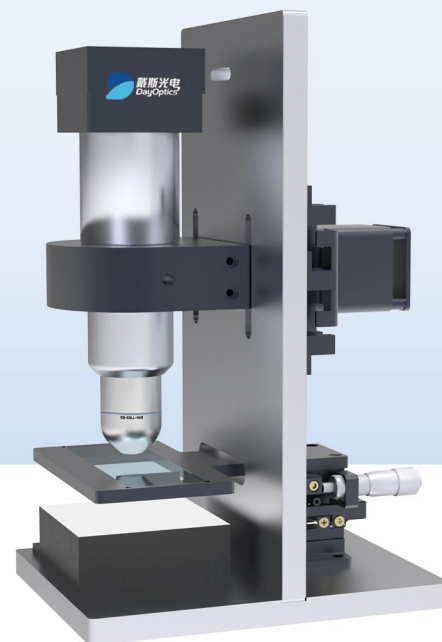


Strategic Layout

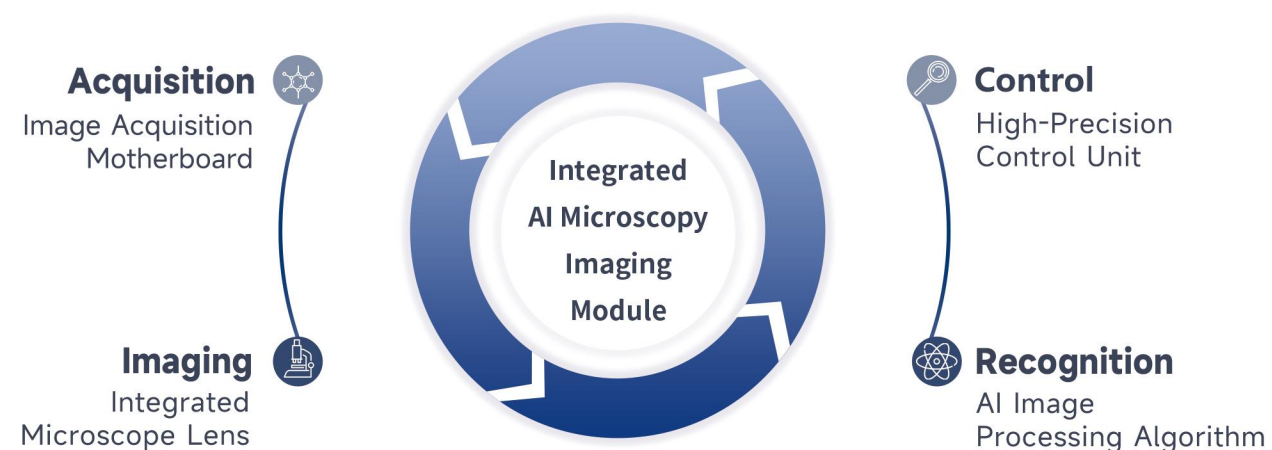
Business coverage operations span

50+ countries and regions worldwide

Integrated AI Microscopy Imaging Module



> Product Module



> Technical Features

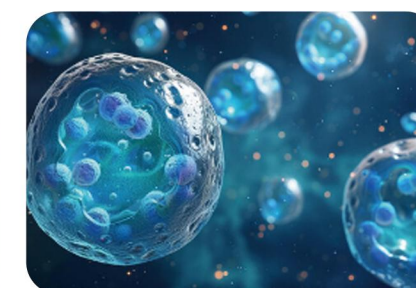
Automation and Efficiency: Designed for in vitro diagnostic (IVD) devices, replacing traditional microscopic examination methods to **achieve automated, high-precision fluid analysis**. This significantly enhances manual inspection efficiency and labor productivity while reducing overall user costs.

Customization and Flexibility: Tailored to customer needs, with flexible integration of various functional modules to shorten development cycles and deliver cost-effective, compact solutions.

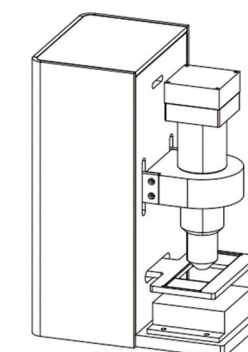
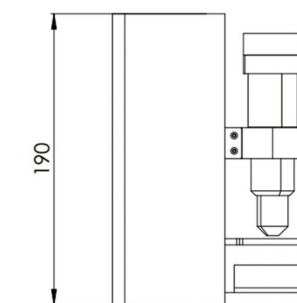
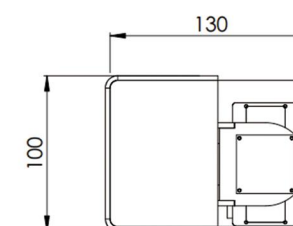


> Typical Applications

- Analysis of blood and urine in smears or blood flow
- Early screening for disease-related cells
- Automation replacement for traditional microscopic examination
- Complete blood count (CBC)
- Cell staining detection



> Mechanical Dimensions(mm)



Integrated Microscope Lens



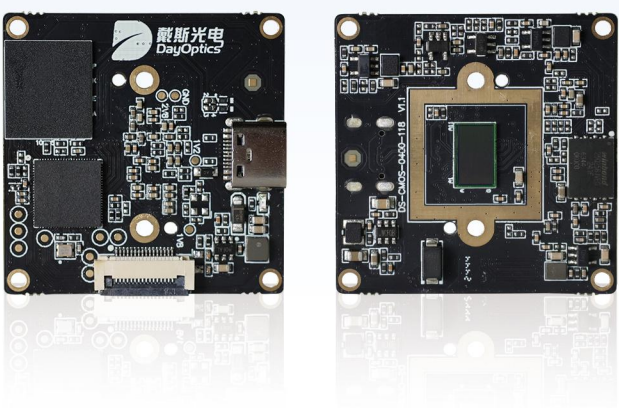
> Technical Features

- Customizable optical parameters such as depth of field, NA (numerical aperture), and resolution to meet diverse application requirements
- Integrated design combining objective and tube lenses, replacing the traditional multi-module microscope structure for easier user operation and learning
- Standard C/CS-mount interface (customizable)
- In-house research, production, and manufacturing of core optical lenses

> Specifications

Magnification	Distortion	Object-Side Resolution	Depth of Field (DOF)
20x, 30x, 40x	≤0.3%	≤1μm	≥2μm

Image acquisition motherboard



> Technical Features

- Integrated architecture features highly modular and flexible configuration capabilities, enabling the customization and combination of various functional modules according to specific requirements
- Supports a wide selection of CMOS sensors to meet the demands of different application scenarios
- Offers robust scalability with standardized interfaces and protocols, as well as open hardware and software interfaces, allowing seamless integration and optimization of functional modules such as light source, motors, and environmental parameter monitoring
- Provides a low-code development environment, simplifying the application development and customization process. Built-in debugging programs enable developers to quickly deploy, debug, and maintain applications without requiring extensive programming knowledge, significantly enhancing development efficiency and application flexibility

> Specifications

Sensor Manufacturers	Target Size	Resolution (px)	Pixel Size (μm)	Transmission Rate (fps)
SONY	1/1.8"	2M	2.9 μm × 2.9 μm	30 fps
Omnivision	1/2.7"	4M	3.75 μm × 3.75 μm	60 fps
Smartsens	1/2.3"	8M	1.85 μm × 1.85 μm	90 fps
		12M		120 fps
			

High-precision control unit



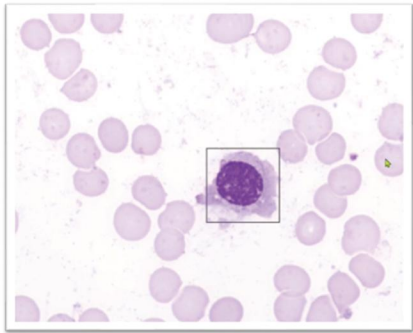
> Technical Features

- Continuously adjustable brightness flicker-free LED backlight module, utilizing PWM (Pulse Width Modulation) technology to enable digital dimming control via upper computer software
- Supports X, Y, Z three-axis adjustment: X/Y with high-precision stages for field selection; Z with motor-driven closed-loop control and 1 μm accuracy
- Integrated motion control algorithms enable automatic focusing for microscopy systems

> Specifications

Autofocus Time (s)	Autofocus Accuracy (μm)	Manual Adjustment Accuracy (mm)
≤ 1	≤ 1.2	0.01

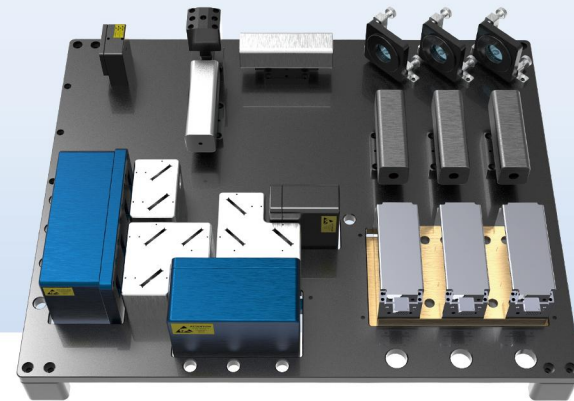
AI Image Processing Algorithm



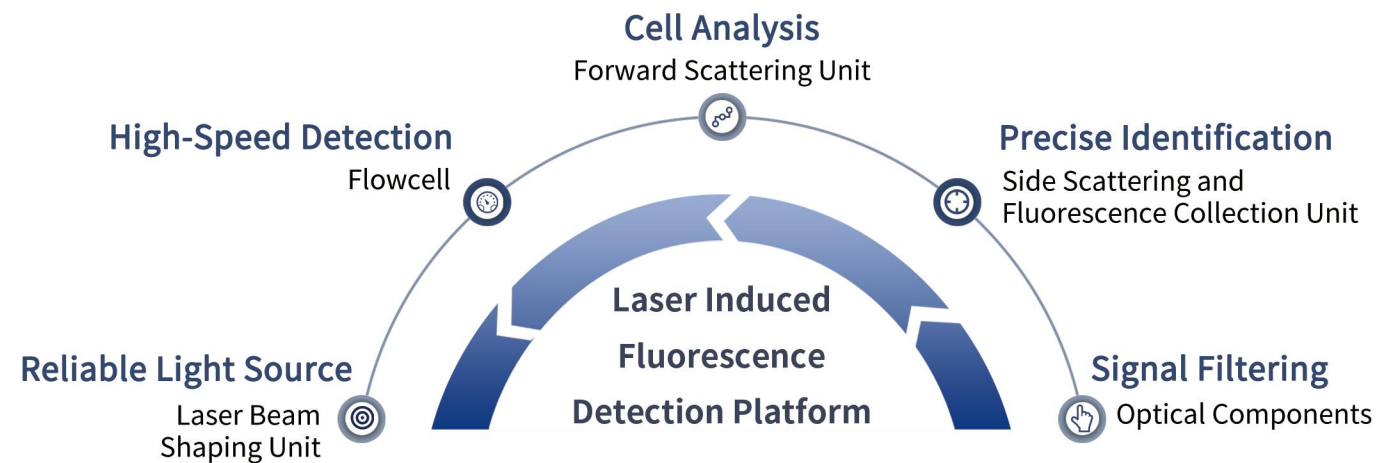
> Technical Features

- Using the edge-gradient-based Tenengrad algorithm, the Sobel algorithm is employed to extract gradient values in both horizontal and vertical directions. By identifying the minimum gradient value, the system can quickly and accurately assess image sharpness, effectively guiding the autofocus process
- Applying deep learning in microscopy, the system can quickly and accurately autofocuses a single-shot image, improving image processing efficiency and quality, while enhancing autofocus precision and system robustness
- OpenCV algorithms enable fast and efficient image preprocessing in computer vision, significantly reducing subjectivity and errors from manual operations
- SOTA models in image segmentation, such as SegmentAnything, YOLOv8, and Transformer, enable low-data, rapid fine-tuning for automated cell recognition, allowing quick analysis of large datasets with high sensitivity and specificity

Laser Induced Fluorescence Detection Platform



> Composition Unit



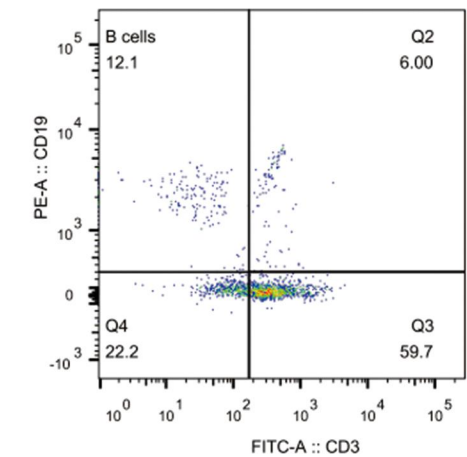
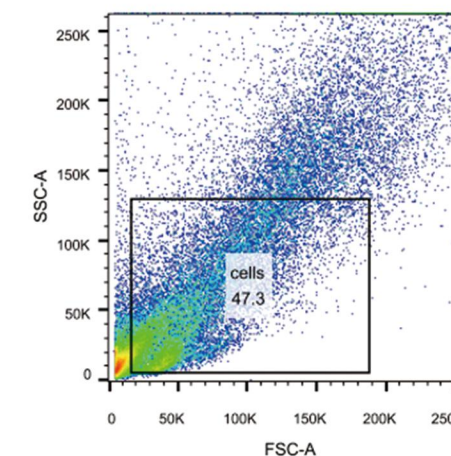
> Technical Features

With outstanding reliability and high consistency, it provides solid support for life science, medical, and scientific instrument applications. The flow cytometry optical platform features a stable and reliable laser source and optical system design, high-throughput, high-sensitivity measurements, and independent fluorescence signal excitation and collection, minimizing signal crosstalk.

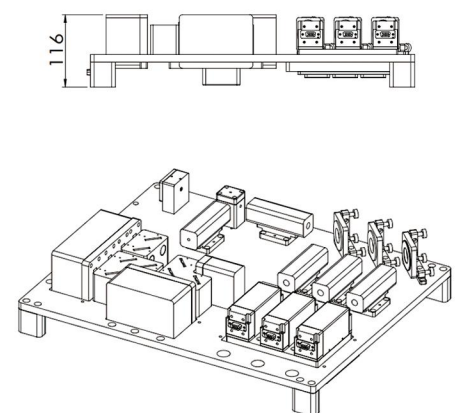
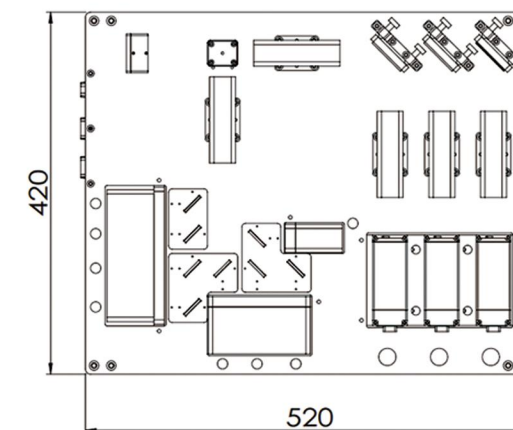


> Typical Applications

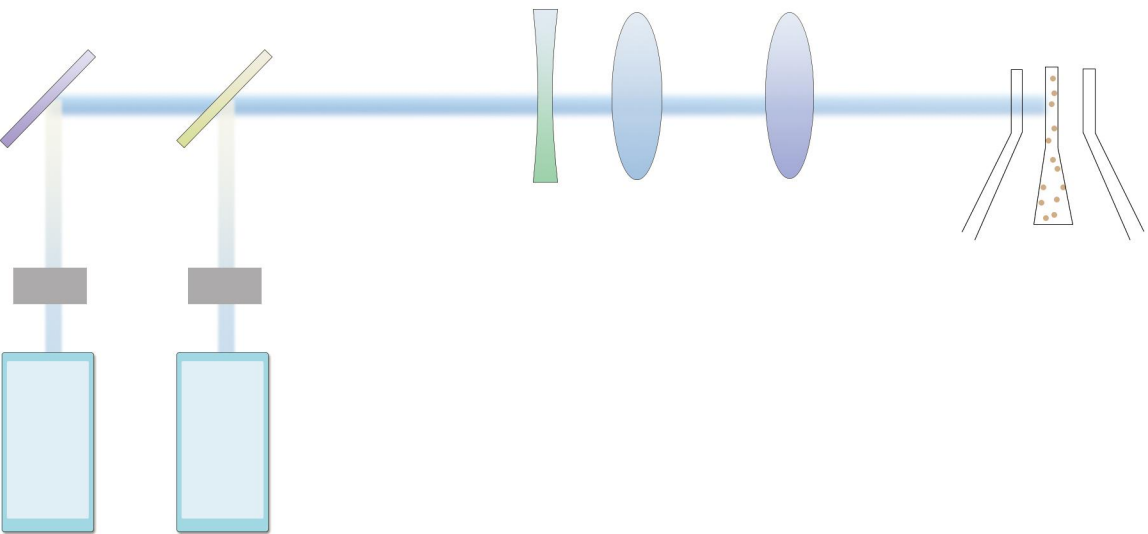
- Blood testing
- Immune system status detection
- Stem cell and oncology research
- Cell cycle analysis, apoptosis and proliferation assays, and cell population analysis
- Other laser-induced fluorescence applications



> Mechanical Dimensions(mm)



Laser Beam Shaping Unit



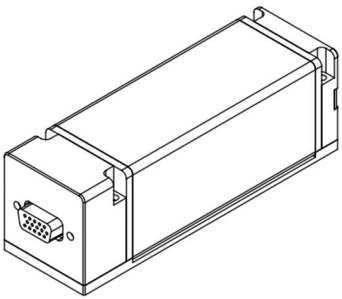
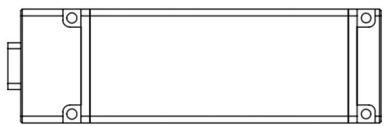
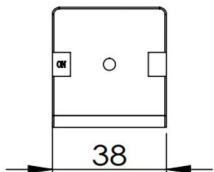
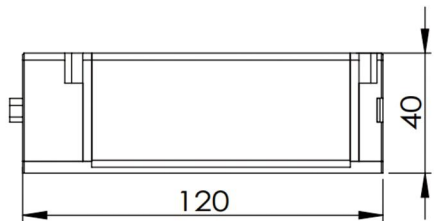
> Technical Features

- Achieves the functions of flat-top beam shaping and focusing
- Supports single or multi-channel combined laser output with configurable multi-wavelength and multi-power options, featuring high beam quality, low noise, and excellent stability
- Incorporates achromatic flat-top beam shaping design for multi-color lasers, meeting customer-specific requirements for laser spot size, energy distribution, and spot spacing

> Technical Features

Item	Specifications
Laser Wavelength (nm)	405nm~800nm, 2~3paths
Laser Power (mW)	20~50mW
Beam Quality (M2)	<1.2
RMS Noise (20Hz~20MHz)	<0.1%
Power Stability (8h, ±3°C)	<2%
Pointing Stability	<5μrad/°C
Beam Height (μm)	10
Beam Width (μm)	70~100
Plateau Uniformity	>90%

> Mechanical Dimensions(mm)



Flowcell



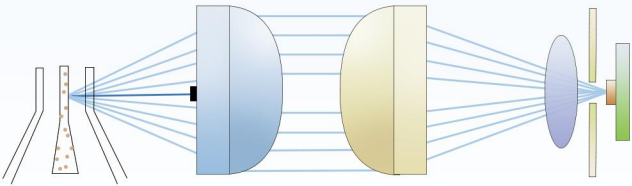
Technical Features

- High-purity fused silica glass, resistant to acid and alkali corrosion
- Adopting optical bonding technology provides high flatness
- Ultra-clean surface and channels, with a polished surface smoothness up to 5-0
- AR coating design, providing excellent conditions for weak signal detection
- Supports customization of outer shape and inner hole dimensions
- Can be extended to 5-differential hematology analyzer, molecular cell analyzers, particle counters, bacterial separators, and other equipment

Specifications

Item	Specifictions
Materials	High-Quality Fused Silica
Laminar Flow Channels (mm)	0.1×0.1~0.4×0.4
Dimensional Tolerance (mm)	±0.01
Hole Diameter (mm)	Φ1.0~Φ5.0
Length (mm)	10~30
AR Coating (nm)	400~900

Forward Scattering Collection Unit



Technical Features

- The optical signal collection system with a high numerical aperture ($NA \geq 0.65$) has lower loss for small-angle scattering signals
- High-speed, high signal-to-noise ratio preamplifier circuit ensures more stable detection signals
- Can be extended to 5-differential hematology analyzer and other equipment

Specifications

Optimal Photodiode Detection Area (mm)	Photodiode Responsivity (A/W)	Signal Noise (% FS)	Cell Size (μm)
>1×1	>0.28@488nm	<±0.1	1~50

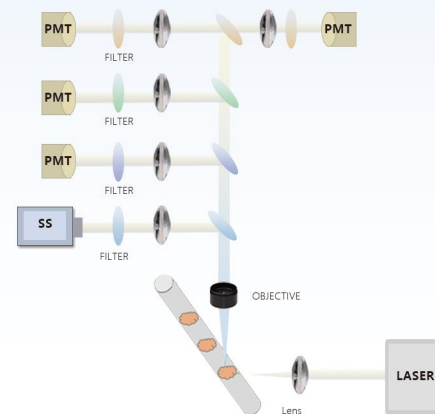
Side Scattering Collection Unit

> Technical Features

- Spatial separation of fluorescence induced by different lasers reduces crosstalk in downstream detection channels
- The optical signal collection system with a high numerical aperture ($NA \geq 0.95$) improves the efficiency of weak signal collection
- Combines the advantages of free-space collection and independent fiber collection, compatible with various configurations of spectroscopic detection units
- Can be extended to chip-based liquid chromatography analyzers, 5-differential hematology analyzer, and other equipments

> Technical Features

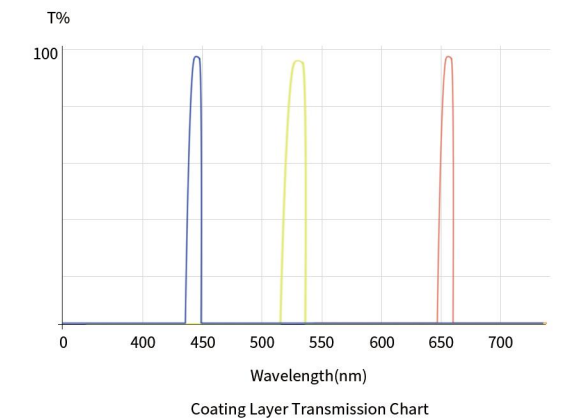
Overall Parameters		PMT With Built-In Preamplifier Circuit (Optional)	
Fluorescence Detection Channels	4~14ch	Spectral Response Range (nm)	165~900
Fluorescence Resolution	<5%	Radiant Sensitivity Peak Wavelength (nm)	420
Fluorescence Collection Efficiency	$NA \geq 0.95$	Effective Area (mm)	8×24
		Controlled Voltage (V)	+2~+4.5 (Input Impedance 10KΩ)
		Maximum Input Current (mA)	100
		Maximum Linear Output Voltage (V)	5
		Radiant Output Sensitivity (V/W)	3×10^{10}



Biomedical Filter

> Technical Features

- Based on the specific needs of biological spectra and user application scenarios, various types of optical filters can be customized, including long-pass filters, short-pass filters, narrowband filters, dichroic mirrors, and more for wavelength transmission, reflection, cutoff, and attenuation
- DayOptics has been deeply engaged in optical component manufacturing for decades, with end-to-end capabilities from design to prototyping and mass-standard production. The self-developed filters feature deep cutoff, high transmittance, and steep transition slopes
- Can be extended to PCR analyzers, fluorescence microscopes, and other biological analysis instruments



> Specifications

Filter		Dichroic Mirror	
Operating Wavelength Range	266-1800nm	Transmittance	$T_{avg} > 94\%$
Transmittance	$T_{avg} > 95\%$	Reflectance	$T_{avg} > 94\%$
Cutoff Depth	OD6	Material	UV Fused Silica
Material	UV Fused Silica	Size Range	$\Phi 2-\Phi 100\text{mm}$
Size Range	$\Phi 2-\Phi 100\text{mm}$	Clear Aperture	$> 95\%$
Clear Aperture	$> 95\%$	Surface Quality	20-10
Surface Quality	20-10		