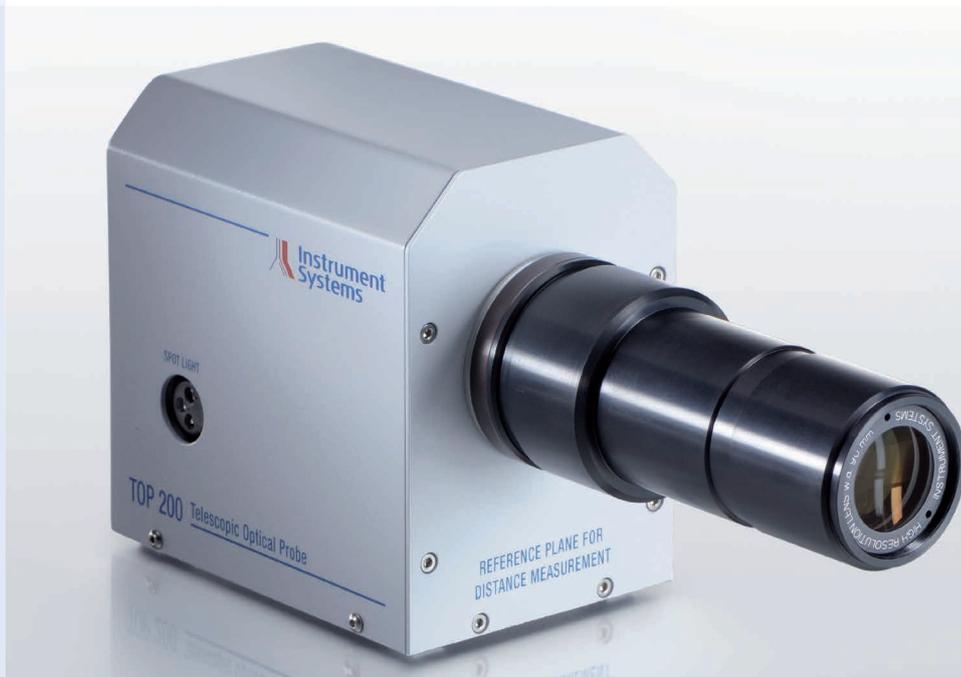


TOP 200

Telescopic Optical Probe for radiance and luminance measurements

Product Highlights

- Perfectly round and sharp measuring spot with optimized Pritchard style optical system
- Convenient focusing by internal view-finder camera
- Large number of lenses for wide range of measuring-spot sizes and distances to test samples
- The software allows 4 different measuring-spot sizes to be selected
- Flexible fiber connection with patented mode mixer for accurate measurements



In combination with a spectrometer, the TOP 200 Telescopic Optical Probe permits precise measurement of radiance and luminance, as well as the chromaticity of displays, panel graphics and other light sources. The TOP 200 is a completely new development that is based on an optimized Pritchard style optical system with integrated view-finder camera. This allows users to visualize the field of view on a computer screen and to monitor the measuring spot position while measurements are being taken.

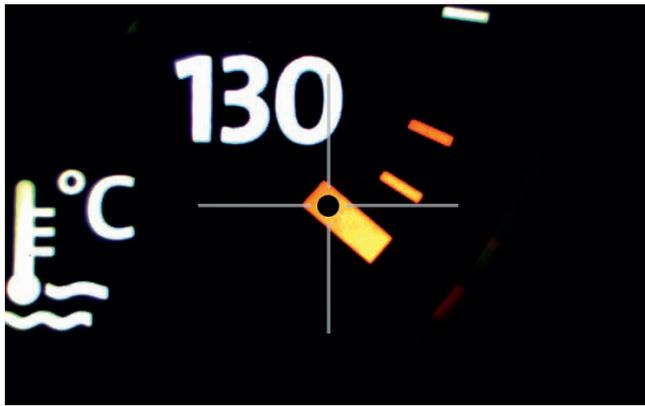
Compared with the previous TOP 100 model, all functions can now be controlled by software so that manual operation is no longer necessary apart from focusing the lens. Different lenses can be mounted easily and quickly using a bayonet connection compatible with an F-mount.

A multimode fiber is used to guide the light radiation from the TOP 200 to the spectrometer. The patented mode mixer from Instrument Systems delivers uniform light transmission into the fiber and hence reproducible measurements even if the position of the fiber is changed.

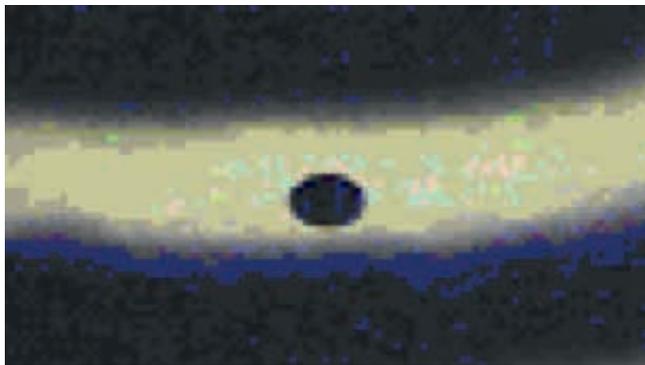
The TOP 200 can be operated with all spectroradiometers in the CAS 140 Series as well as the DTS 500 Display Test System from Instrument Systems with SpecWin Pro software. Remote control for the TOP 200 is provided via a USB port.

Optimized Pritchard style optical system

An innovative optical concept was implemented in the TOP 200. The aperture mirror is inclined at an angle of 15° to the plane of the image and this creates a sharply defined measuring spot. The standard inclination angle of 45° used in competing products leads to unfocused edges because parts of the measuring spot are significantly displaced from the plane of the image. The holes drilled in the aperture mirror of the TOP 200 are also designed to be slightly elliptical in order to compensate for the 15° angle and guarantee a perfectly round measuring spot.



Perfectly sharp and round measuring spot with the TOP 200

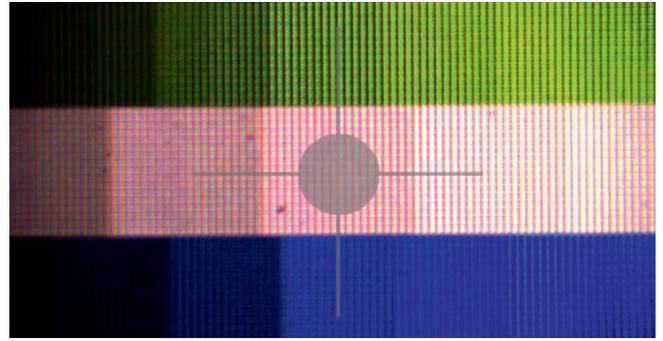


Unfocused and elliptical measuring spot in competing products

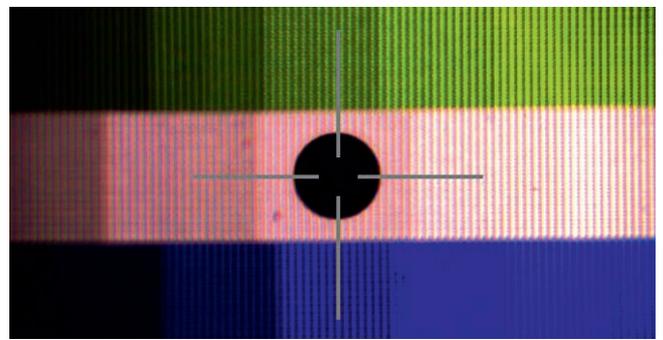
View-finder camera

The internal view-finder camera permits exceptionally convenient control and focusing of the desired measuring spot. The entire field of view of the view-finder camera is some 20 times bigger than the measuring spot in aperture position 2 and still nearly twice as big in aperture position 6. The image generated by the view-finder camera is automatically stored in the measurement file and printed out in the reports. The position and size of the measuring spot is thereby explicitly documented.

When the aperture is closed, the measuring location of the sample is visible, and software superimposes a reticle to mark the position of the measuring spot. As soon as the aperture port has been selected, the physical measuring spot, i.e. the aperture port is visible as a black circle.



View-finder image with closed aperture



View-finder image with selected aperture

Two alternative view-finder cameras are offered. They vary in resolution and sensitivity. The standard configuration of the TOP 200 has a resolution of 752×480 pixels and features a high sensitivity. It is also suited for test objects with lower brightness. The alternative view-finder camera has a resolution of 1600×1200 pixels, but is slightly less sensitive.

A large number of lenses

A large number of lenses can be flange-mounted securely and quickly on the TOP 200 using the F-mount bayonet connector from Nikon. This system covers a large range of different measuring-spot diameters and object distances.

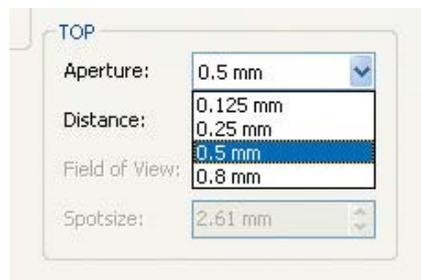
Most lenses are suitable for the visible and near infrared spectral range. A special lens with a focal length of 105 mm and close-up lenses with 2-fold or 4-fold distance reduction can be supplied for measurements in the UV/VIS range. A collision guard for operation with the DTS 500 positioning system has been developed for the HRL 90 high-resolution lens.

Choice of measuring-spot sizes

The size of the measuring spot depends on the lens used, the aperture port selected, and the distance to the sample. If the HRL 90 high-resolution lens is used, measuring-spot sizes as low as 0.075 mm are achieved allowing even very small features of panel graphics in the passenger cell of a car or an aircraft cockpit to be analyzed with sufficient resolution.

Lens		TOP100-311 with 60 mm focal length			HRL90
Measuring distance ^{*1}		180 mm	500 mm	1 m	230 mm
Aperture	Diameter	Measuring-spot diameter [mm]			
1	0.125 mm	0.16	0.9	2.0	0.075
2	0.25 mm	0.34	1.9	4.2	0.15
3	0.5 mm	0.66	3.7	8.2	0.3
4	0.8 mm	1.0	5.8	13	0.5
Field of view of the view-finder camera [mm]					
Width [mm]		7.8	44	98	3.7
Height [mm]		5.0	28	62	2.3

*1 Distance between test sample and TOP 200 front panel



4 measuring-spot sizes are software selectable

The optical fiber connection with patented mode mixer

The light radiation is launched into the spectrometer via an optical fiber that uncouples the aperture size from the entrance slit and hence the spectral resolution of the spectrometer. Spectroradiometers without optical fiber coupling are significantly flawed because the spectral resolution changes if there are any changes in the diameter of the measuring spot.

The patented mode mixer compensates for changes in position and hence changes in transmission properties of the multimode fiber. The measuring error with mode mixer is less than 1% compared with up to 20% without mode mixer. The mode mixer also offers another significant advantage because mixing the light results in polarization scrambling which reduces the polarization error to approximately 0.4%. LCD displays can therefore be measured very accurately.



Optical fiber with mode mixer

LED spot light

Locating the desired measuring point and focusing on it is often very difficult with unilluminated test samples in a dark room. This is why an LED spot light is supplied as standard with each TOP 200. The LED spot light can be connected to the TOP 200 as necessary and the flexible swan-neck attachment guarantees convenient and reliable illumination of the test sample at distances up to half a meter.



TOP 200 with LED spot light

Technical data and specifications

Model	TOP200-100	TOP200-100-2
Spectral range	Is determined by the lens (see ordering information)	
View-finder camera	752 x 480 pixel, RGB	1600 x 1200 pixel, RGB
View-finder camera sensitivity	approx. 1.5 – 100,000 cd/m ²	approx. 3 – 1,200,000 cd/m ²
Aperture diameter	0.125 / 0.25 / 0.5 / 0.8 mm	
Dimensions basic unit (L x H x W)	141.5 mm x 136 mm x 98.3 mm	
Dimensions with fiber TOP200-101 (L x H x W)	300 mm x 136 mm x 98.3 mm	
Weight	2.2 kg	
PC connection	USB 2.0	
Power supply	100 VAC to 240 VAC, 50/60 Hz	
Operating temperature range	+10° C to +35° C	
Relative humidity	< 70% non-condensing	

Ordering information

Order numbers	Description
TOP200 basic unit and optical fibers with mode mixer	
TOP200-100	Basic unit with Pritchard-style optics and view-finder camera with 752 x 480 pixels; (without fiber, without lens)
TOP200-100-2	Basic unit with Pritchard-style optics and view-finder camera with 1600 x 1200 pixels; (without fiber, without lens)
TOP200-101	Multimode fiber (diameter 1 mm) with mode mixer and PLG adapter; spectral range 300 to 2200 nm
TOP200-102	Quartz fiber (diameter 1 mm) with mode mixer and PLG adapter; spectral range 190 to 1350 nm
TOP200-104	Adapter for connecting a fiber bundle to the TOP 200
TOP200 lenses and close-up lenses for visible and near infrared spectral range	
TOP100-308	28 mm fixed focal length; F/2.8; 370-1100 nm
TOP100-310	70-300 mm zoom; F/4.2-5.8; 370-1100 nm
TOP100-311	60 mm fixed focal length; F/2.8; 370-1100 nm
TOP100-312	100 mm fixed focal length; F/2.8; 370-1100 nm
TOP100-313	200 mm fixed focal length; F/4.0; 370-1100 nm
TOP100-316	200-500 mm zoom; F/5.0-6.3; 370-1100 nm
TOP100-319	90 mm fixed focus (HRL 90); high resolution; 370-1100 nm
TOP100-319-2	Collision guard for HRL 90 high-resolution lens when using the TOP 200 with the DTS 500
TOP100-350	Close-up lens; 4-fold; 370-1100 nm
TOP100-351	Close-up lens; 2-fold; 370-1100 nm
TOP200 lenses and close-up lenses for UV and visible spectral range	
TOP100-322	UV lens; 105 mm fixed focal length; F/4.0; 200-800 nm
TOP100-360	UV close-up lens; 4-fold; 200-800 nm
TOP100-361	UV close-up lens; 2-fold; 200-800 nm
TOP200 accessories	
TOP100-400	Tripod stand with tilting head for TOP 200



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