



DTS140 NVIS

Luminance and spectral NVIS Radiance
MIL-L-85762A / MIL-STD-3009 NVIS-A/-B/-C



KONICA MINOLTA
SENSING AMERICAS

Two Global Leaders.
One Complete Solution.

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Konica Minolta Sensing Americas provides advanced optical technology that precisely measures the elements of color and light. Their products have become a staple in research and manufacturing environments, helping organizations to meet product quality and operational goals with less waste, time, and effort. This commitment to creating value for customers is the core principle behind the Konica Minolta brand, and has led them to develop the world's first portable spectrophotometer and the first light meter used on board a spacecraft (Apollo 8). It's also the driving force behind the high level of quality and precision built into each of their products. These are some of the reasons why Konica Minolta is regarded as the technological leader in color and light measurement solutions today.

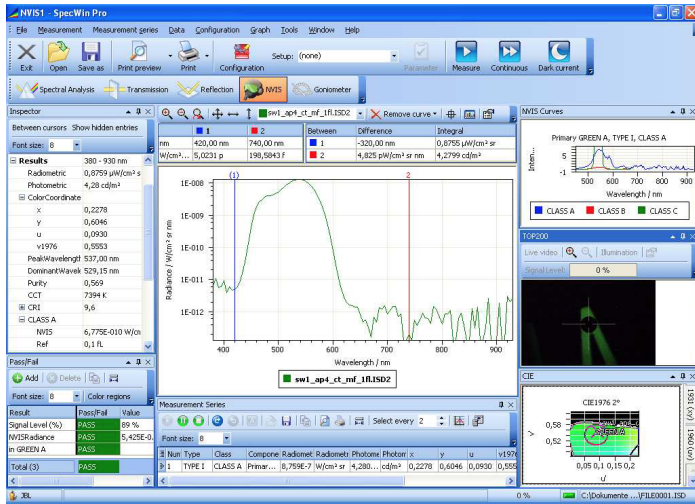
Based in Germany, Instrument Systems develops and produces high-quality optical test and measurement instruments for a broad spectrum of applications. Their extensive product range includes spectrometers, imaging photometers and colorimeters, goniophotometers, integrating spheres, and turnkey system solutions. Instrument Systems is dedicated to working with standardization committees and associations such as ICDM and CIE. They also cooperate with leading national metrology institutes.

Now, these two experts have combined their knowledge and tools together to offer the complete solution for the most accurate measurement of light and color available in the market today.

Your total light and display sensing solution.

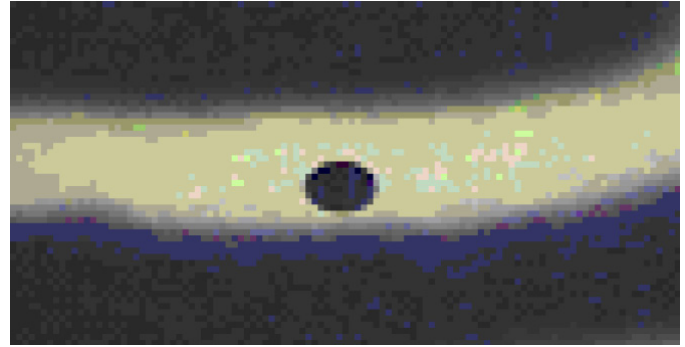
Product Highlights

- Pritchard optics with circular and sharp measurement spot
- 75µm / 0.003in. minimum spot
- Viewfinder camera plus LED target illumination
- Correlates with scanning systems
- Also suitable for exterior lighting / flash lamps



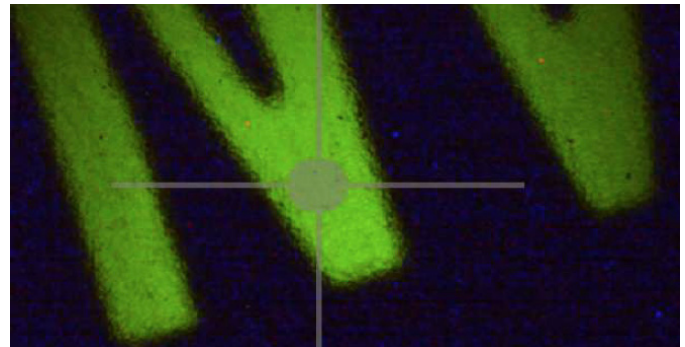
Feature List DTS140

- Four selectable apertures / different fields of view, software controlled
- Pritchard optics with only 15° tilted aperture mirror provide perfectly round and sharp measurement spots. An oval spot with diffuse borders can be seen with other typical 45° tilt designs:



Typical "oval" 45° tilt Pritchard spot

- Measurement spot decoupled from the entrance slit / band pass function. Therefore consistent results for all spot sizes
- Large dynamic range, extended with fully automatic filter wheel
- Polarization is scrambled by the fiber coupling, therefore no negative effects from LCDs / polarized light sources (polarization error <0.4%)
- 75µm smallest spot with HRL90
- Large viewfinder's field of view allows easy orientation on the sample. Image can be displayed in the software and saved with the measurement results.



Target Illumination

- Target illumination is provided through a gooseneck mounted LED spot light illumination on the TOP200.
- Fully compatible with positioner systems (e.g. DTS500 family). Optional collision protection with HRL90
- Noise floor below $1 \cdot 10^{-12} \text{ W/m}^2 \cdot \text{sr}$

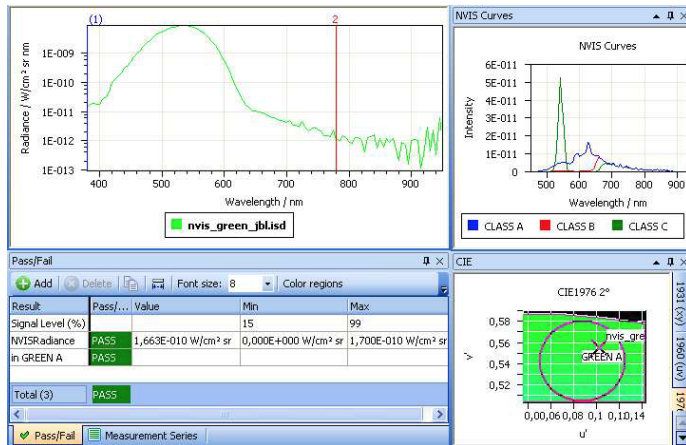
Fields of Application for the DTS140 NVIS

- Measurement of luminance and spectral NVIS radiance according to MIL-L-85762A / MIL-STD-3009 (including NVIS-C)
- Optional NVIS irradiance measurements
- Push button Pass / Fail testing and reporting
- Supports contrast / sun light readability measurement
- Emission pattern / viewing angle measurement with the DTS500
- Smallest spot size 75µm / 0.003 in.
- Fiber coupled telescope probe allows cockpit / limited space measurements

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Software

Software includes pass / fail criteria as defined in the MIL standards plus standard colorimetric and spectroradiometric results. Simple push button operation including data export and reporting.



System Configuration

The NVIS display test system DTS140 NVIS consists of a special version of the high-end array spectroradiometer CAS140CT-153 (VIS-NIR model) and the fiber coupled telescope probe TOP200. The band pass / spectral resolution is adapted to the MIL requirements. System is calibrated with a MIL-L-85762A / MIL-STD-3009 compliant certificate. Different lenses allow the measurement of fine structures on switches and larger areas on display panels.

A wide range of accessories allows many additional applications such as NVIS filter transmission measurements, NVIS irradiance measurements, LED measurements, reflection measurements, etc. Accessories can be swapped without influencing the calibration of the system.

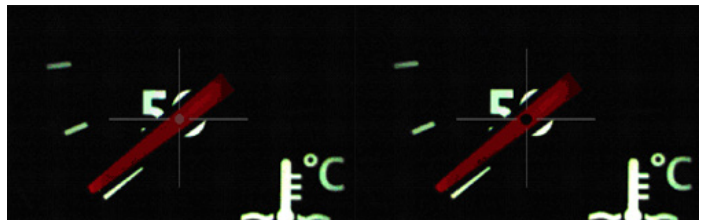
Measuring Spot Sizes

Measurement spot and view finder picture sizes / field of view in [mm] depending on aperture and measurement distance:

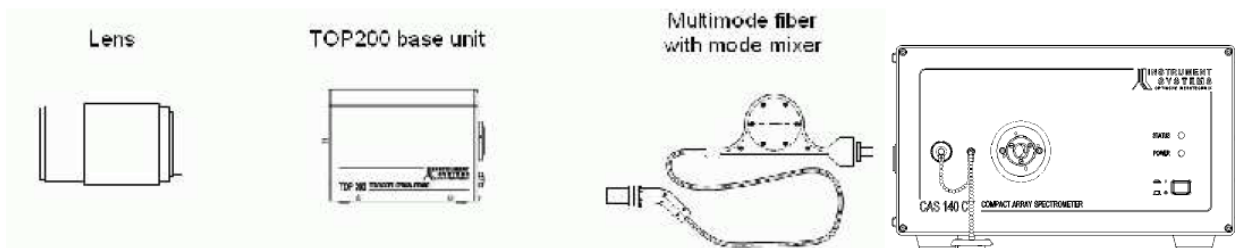
Lens Distance	60mm		HRL90	60mm		60mm	
	180mm (min.)	500mm (typ.)	230mm (fixed)				
Aperture	Spot size [mm]			Field of view [°]		Minimum luminance [cd/m²], illuminant A, 10:1 S/N	
Number							
1	0.16	0.9	0.075	0.1	0.019	0.08	0.23
2	0.34	1.9	0.15	0.22	0.037	0.02	0.05
3	0.7	3.7	0.3	0.42	0.075	0.005	0.02
4	1.0	5.8	0.5	0.66	0.12	0.0013	0.003
View finder picture/field of view size [mm]				HRL90 min. radiance: 1*10 ⁻¹¹ W/m² sr nm			
f.o.v. width	7.0	40	3.4				
f.o.v. height	4.4	26	2.2				

The lens choice determines the field of view / possible measuring spot sizes for corresponding working distances.

As a software feature, a reticle is imaged onto the sample in the closed aperture position. If an aperture is selected, the exact measurement spot can be seen.



The DTS140 NVIS is supplied with a multimode fiber and mode mixer. The patent pending mode mixer compensates for changes in the transmission caused by fiber movement. With it, the error is below 1% as compared to up to 20% without.



Instrument Systems - Operating Globally, Acting Locally

Instrument Systems is the premier company for light measurement. As a subsidiary company of Konica Minolta we have access to resources over the long term and to a global network – our mission is your solution, anytime and anywhere.

World-class customer support is rewarded with customer loyalty - a top priority at Instrument Systems.

Neumarkter Str. 83
D-81673 München, Germany

Phone: +49 (089) 45 49 43 - 0
Fax: +49 (089) 45 49 43 - 11
webinfo@instrumentsystems.com
www.instrumentsystems.com

Konica Minolta Sensing Americas

Konica Minolta Sensing, Americas represents Instrument Systems in North America and Canada with a high level of expertise in marketing optical measuring instruments. High-quality customer support is based on a track record of close cooperation and constant exchange of information and know-how.

101 Williams Drive
Ramsey, NJ 07446 USA

Phone: 201-236-4300
Toll Free: 888-473-2656
Fax: 201-785-2480
marketing.sus@konicaminolta.com
sensing.konicaminolta.us

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Ordering Information

Order Number.	Description
Spectroradiometer	
DTS140-235	CAS140CT VIS-NIR version (380nm – 1040nm). Includes NVIS modifications and 250µm slit. TOP200 with HRL90 lens, multimode fiber and mode mixer. SpecWin Pro software with NVIS implementation. Calibration according to MIL-L-85762A / MILSTD-3009
TOP200 options:	
TOP100-311 + CAL-130	60mm lens with calibration

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Data and Technical Specifications

DTS140-235 NVIS	CAS140CT NVIS-NIR and TOP200
Spectral range	380nm – 1040nm
Detector	BT-CCD, 1024 x 128 pixels
AD converter	15 bit
Spectral resolution	7nm
Data point interval / resolution	0.65nm
Wavelength accuracy	+/-0.5nm
Stray light (broadband ill. A)	3*10E-4
Stray light (for LEDs)	5*10E-5
Integration time	9 ms – 65sec
Linearity	+/-0.5%
Detector cooling temperature	-10°C
PC interface	USB 2.0, optional PCI bus plug-in card
Slit	250µm
Filter wheel	Density filters OD1 to OD4, NVIS filters
Accuracy DTS140 NVIS	
Luminance (ill. A, after cal)	+/-3%
Radiance (ill. A, after cal)	+/-4%
Chromaticity (x,y)	+/-0.002
Dominant wavelength	+/-0.5nm
Polarization sensitivity	<0.4%
TOP200	
Spot sizes with std. HRL90	75µm, 0.15mm, 0.3mm, 0.5mm
Lens stray light at smallest spot:	
HRL90 lens	0.1%
60mm lens	1%
Outside dimensions TOP200-100 with TOP200-101 and HRL90 lens	300mm x 136mm x 98,3mm (LxHxW), 2.3kg
Optical axis from base plate (incl. feet)	76mm (79mm)

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