

DMS 505

Goniometer System

for complete display characterization

Product highlights

- 3 motorized axes for directional scanning and motorized height adjustment
- Comprising electrical driving, illumination, computer and software
- Fast photometer for analysis of temporal luminance variations
- DMSControl software for automated measurement sequences
- ViPer software for analysis, evaluation and visualization of measurement data



The DMS 505 is based on a 6-axis goniometer with 3 motorized axes. The measurement system permits angle-dependent analysis of all electro-optical characteristics of displays, including luminance, contrast, and color properties of displays at different viewing angles and variable electrical driving.

The DMS 505 is ideal for determining the characteristics of displays for mobile applications (smartphones, tablet PCs) with the comprehensive range of accessories including illumination devices and temperature-control chambers.

Options

- Spectrometer for radiometric, photometric and colorimetric analysis
- Directional light sources for measurement of reflectance factor and in-plane BRDF
- Forced air temperature control of the display under test
- Interface for various video test-pattern generators



Measurements

- Angular scan: variation of luminance, contrast and chromaticity with viewing direction for evaluation of directional uniformities and BRDF
- EOC: variation of luminance, contrast and chromaticity with electrical driving for evaluation of EOTF-characteristics (e.g. gamma)
- Transients: luminance versus time for e.g. response time evaluation
- Reflectance characteristics under diffuse and directional illumination
- Customer specific measurements defined with DCI scripting sequences

System components

The following components and accessories are included in the DMS 505 standard scope of delivery, if not explicitly marked as optional components or accessories.

Temperature control:

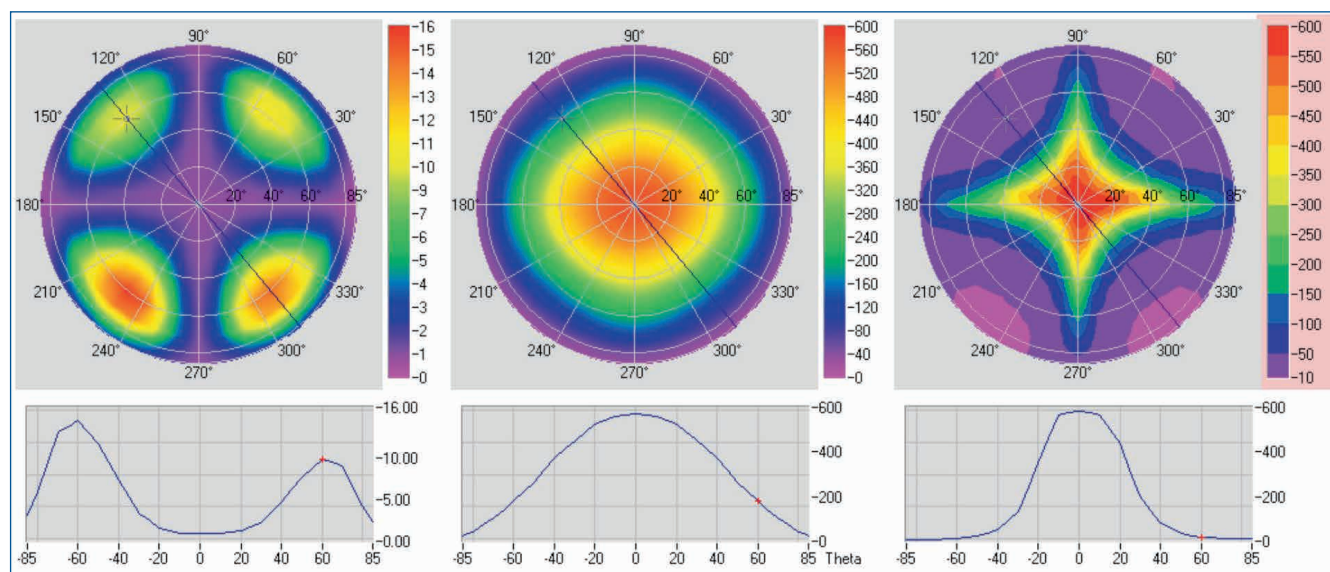
- HCS-3 (optional): forced air temperature control device, temperature range -35 °C to +85 °C, with integrated diffuse reflective illumination
- HCS-3A (optional): modified version of HCS-3 improved for easier handling, temperature range -40 °C to +85 °C, adjustable DUT fixture

Light sources and illumination systems:

- HEL-4: light source with halogenic incandescent lamp
- LC-8 (optional): xenon light source for higher light output
- DHS: diffusing hemisphere for evaluation of contrast of reflective displays
- DHS-HC (optional): diffusing hemisphere for evaluating the contrast of reflective displays; illumination geometry similar to HCS-3
- PID (optional): collimated parallel beam illumination
- VADIS (optional): variable aperture diffuse illumination source for e.g. scattering characterization of surfaces (BRDF), measurement of reflectance factor
- PLS (optional): LED point-light source for measurement of reflectance characteristics including BRDF

Light measuring devices:

- PMT 3: fast photometer with photomultiplier tube, bandwidth 100 kHz, 500 kHz or 2 MHz
- CAS 140CT (optional): Model VIS; 360 to 830 nm; 1024 pixel back-illuminated CCD detector; 2.2 nm spectral resolution (100 μm slit); 0.5 nm/pixel data point interval (CAS140CT-151)



DUT driving:

- ASG: arbitrary signal generator with 1 or 4 analog output channels (depending on basic system variant); standard and user defined signal waveforms; for direct addressing, passive matrix driving and control of TFT arrays (gate and data signals), etc.
- Source meter (optional): programmable current or voltage source with digital multimeter, in particular for current driven display devices like OLED displays; can be combined with a multiplexer (for driving and measurement of displays with multiple segments and matrix displays)
- DCI (optional): device control interface for scripting and communication with various external devices, e.g. video pattern generators, module drivers, power supplies, etc. via RS232, GPIB, USB, or TCP/IP

Software:

- DMSControl: administration, configuration and control of the instrument, definition and management of measurement sequences
- Visual performance evaluation (ViPer): evaluation and representation of measurement results (on- and off-line), data exchange with other software (e.g. spreadsheet applications) and report generation (e.g. PDF documents)
- Report generator (optional): user configurable data export from DMSControl to spreadsheet software

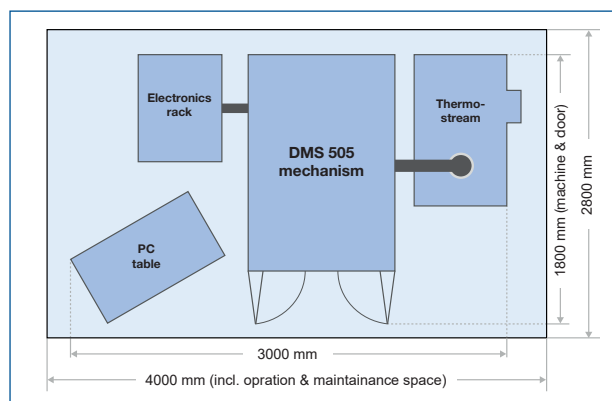
Technical data

DMS 505		
Axis	Scan range	Min. step size
Inclination Theta (motorized)	0 ... 90° ¹	0.01°
Rotation Phi (motorized)	0 ... 360°	0.01°
Reflective illumination (manual)	0 ... 90° ¹	0.01°
x translation (manual)	-10 ... +10 mm	0.01 mm
y translation (manual)	-10 ... +10 mm	0.01 mm
z translation (motorized)	0 ... 114 mm	0.01 mm
Sphere of confusion (all axes)		100 µm
DUT dimensions		
Maximum diagonal	600 mm (23" diagonal) for center measurement; 459 mm (18" diagonal) for full x-y scanning range	
Maximum thickness	114 mm	
Dimensions ²		
DMS mechanism (L x H x W)	1430 mm x 980 mm x appr. 1650 mm (H 1900 mm with light shielding box)	
Light shielding box (L x H x W)	1430 mm x 980 mm x 1050 mm	
Electronics rack (L x H x W)	700 mm x 560 mm x 1250 mm (max.)	
Mass ²		
Mechanism	320 kg	
Electronics rack	105 kg	
Light shielding box	85 kg	
Facility requirements		
Mains voltage	200 V – 240 VAC (230 V nominal), 50 Hz, 1 phase	
Max. mains current / fuse	30 A	
Power consumption	Appr. 880 W (DMS incl. PC, electronics rack, spectroradiometer and 2 x HEL-4 in operation)	

¹ 70° for all automated measurements, 90° for operator control

² All sizes and masses approximate

Footprint



Scope of delivery

The basic system comprises the following components:

- DMS 505 goniometer mechanism
- Measurement microscope with viewfinder
- Photometer PMT 3/100
- GRU with ASG-1 or ASG-4 and power amplifier PA 3/60 (DMS 505-1 or DMS 505-4)
- DHS
- 2 x HEL-4 light source for reflective and transmissive illumination
- PC with table
- Software package: DMSControl, ViPer
- Light shielding box

Ambient operating conditions	
Ambient temperature	23 °C (±5 °C)
Humidity	0 – 60 % rel. humidity
Photometer PMT 3	
Bandwidth	100 kHz (standard), 500 kHz or 2 MHz (optional)
Measurement spot diameter	0.5, 1, 3, 8 mm
Spectrometer CAS 140CT	
Spectral range ³	360 ... 830 nm (usable spectral range depending on software used)
Spectral resolution	2.2 nm
Data point interval ⁴	0.5 nm
Measurement spot diameter	0.5, 1, 3, 8 mm

³ DMSControl software range: 380 ... 800 nm

⁴ DMSControl data point interval: 1 nm

Order information

Order number	Description
Basic system	
DMS-505-1	Model DMS 505-1 comprising: Goniometer with 3 motorized and 3 manual axes; microscope viewing optics; fast photometer PMT 3/100; 2 x HEL-4 light sources; transmissive illumination; DHS diffuse-reflective source; GRU with ASG-1 (1 channel) and power amplifier PA 3/60; light shielding box; PC with table; DMSControl and ViPer software
DMS-505-4	Model DMS 505-4 comprising: Goniometer with 3 motorized and 3 manual axes; microscope viewing optics; fast photometer PMT 3/100; 2 x HEL-4 light sources; transmissive illumination; DHS diffuse-reflective source; GRU with ASG-4 (4 channels) and power amplifiers PA 3/60; light shielding box; PC with table; DMSControl and ViPer software
Options - Temperature control	
DMS-3-10	HCS-3 temperature chamber with ThermoStream control unit
DMS-3-20	HCS-3A temperature chamber with ThermoStream control unit
Options - Light sources and illumination systems	
DMS-5-10	HEL-4 light source with 150 W tungsten halogen lamp
DMS-5-12	LC-8 xenon light source for higher light output
DMS-5-20	PID-800 parallel illumination device (collimated beam)
DMS-5-30	VADIS-800 variable aperture diffuse illumination source for reflective measurement
DMS-5-41	DHS-HC diffusing hemisphere for evaluating the contrast of reflective displays; illumination geometry similar to HCS-3 source
DMS-5-60	PLS LED point-light source illumination for measurement of BRDF
Options – Light measuring devices	
DMS-1-10	CCD spectrometer set for DMS systems; incl. CAS 140CT VIS model (CAS140CT-151) 360 nm – 830 nm (usable spectral range depending on software used)
Options – DUT driving	
DMS-2-10	Keithley 2400 series source meter set for DMS, including cabling and interface
Options – Software	
DMS-SW-35	DCI device control interface for external devices (for DMSControl)
DMS-SW-40	Report generator for data export to Excel spread sheets



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