



KONICA MINOLTA

SPECTRORADIOMETER CS-1000A (STANDARD MODEL) CS-1000S (SMALL MEASURING AREA MODEL) CS-1000T (SMALL MEASURING ANGLE MODEL)

Macro Lens

Small Measuring Angle Lens

Small Measuring Area Lens



Standard Lens

The essentials of imaging

Konica Minolta manufactures

reliable optical lens

via integrated

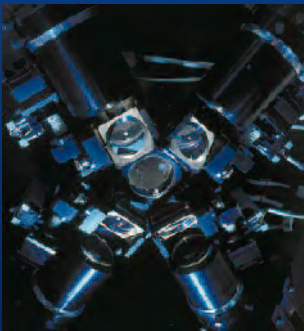
production system



starting from R&D

and melting glass

to the final production.



High Performance Spectroradiometer

With the increased emphasis on ISO 9001, product quality has become a focal point in many companies. At the same time, in-house production departments are requiring systems that calibrate their measurement instruments. CS-1000 series Spectroradiometer supports these activities.

High-Speed

- Use of polychromator enables high-speed measurements. ↪1
- Fast measurement for the low luminance target. ↪2

↪1 Measurement speed varies depending on the luminance of the light source.

↪2 Fast Mode. Using CS-S10w Professional

High-Accuracy

- Repeatability of 0.1%+1 digit for Luminance, 0.0002 ↪3 for Chromaticity.

↪3 Normal Mode. Using Standard Lens.

The other measurement conditions : based on Minolta standard test method.

- Measurements can be synchronized with a display device.
- Low polarization error-ideal for measuring LCD's.
- Aperture mirror eliminates misalignment between the finder target and actual measuring spot.

Low Luminance

- Specifications are guaranteed even at 1 cd/m^2 . (Repeatability for illuminant A)
- Sensor cooling improves S/N ratio, enabling measurement of low-luminance subjects.

Display Examples

AUTO Lv = 13550cd/m ² x = 0.4264 y = 0.4091	AUTO Lv = 13550cd/m ² T = 3214K Δuv = +0.0036
AUTO Lv = 13550cd/m ² U = 0.2417 V = 0.5218	AUTO Le = 9.393e+1 W/sr/m ²



Measuring distance (from front end of the lens)	Standard Lens	Macro Lens	Small Measuring Area Lens	Small Measuring Angle Lens
25mm (At 3X zoom for Small Measuring Area model)	---	---	ø0.45mm	---
40mm (At 1X zoom for Small Measuring Area model)	---	---	ø1.1mm	---
94mm (Minimum distance for macro lens)	---	ø1.15mm	---	---
254mm (Minimum distance for Small Measuring Angle model)	---	---	---	ø1.2mm
362mm (Minimum distance for Standard model)	ø7.9mm	---	---	---
500mm	ø11.1mm	ø11.2mm	---	ø2.5mm
1000mm	ø22.3mm	ø22.4mm	---	ø5.3mm

Integral time(second)		60	30	15	1	0.5	0.1	0.04
Luminance	Standard Lens	7	14	27	409	817	4,086	10,215
(cd/m ²)	Macro Lens	70	139	278	4,174	8,348	41,742	104,355
	Small Measuring Area Lens	62	124	248	3,720	7,440	37,200	93,000
	Small Measuring Angle Lens	71	142	284	4,260	8,520	42,600	106,500

3 Different Models for the various applications

3 different optics achieved precise measurement for the various applications. Optical design technique is developed under the photographic camera engineering.

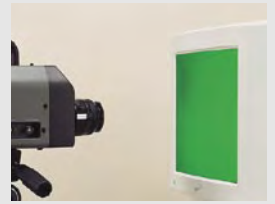
Standard Model CS-1000A

Measuring area : 1.15mm~ (with macro lens)
7.9mm~(with standard lens)
Measuring angle : 1°
Measuring distance : 94mm~ (with macro lens)
362mm~ (with standard lens)
(distance from front end the lens)

<Applications>

General application for the medium or large measuring size

- Display monitor such as LCD, CRT and OLED.
- Illumination light source and lamps.



Small Measuring Area Model CS-1000S

Measuring area : 0.45mm (by 3 times zoom)
1.10mm (by 1 time zoom)
Measuring distance : 25mm (by 3 times zoom)
40mm (by 1 time zoom)
(distance from front end the lens)

<Applications>

Very small measuring size.

- Car audio indication lamp
- Indicator panel of the vehicle



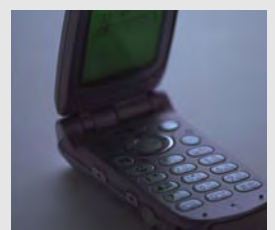
Small Measuring Angle Model CS-1000T

Measuring area : 1.2mm~
Measuring angle : 0.14° (in the minimum distance 254mm)
(Measuring angle depends on measuring distance)
Measuring distance : 254mm~ (distance from front end of the lens)

<Applications>

Device with strong directivity

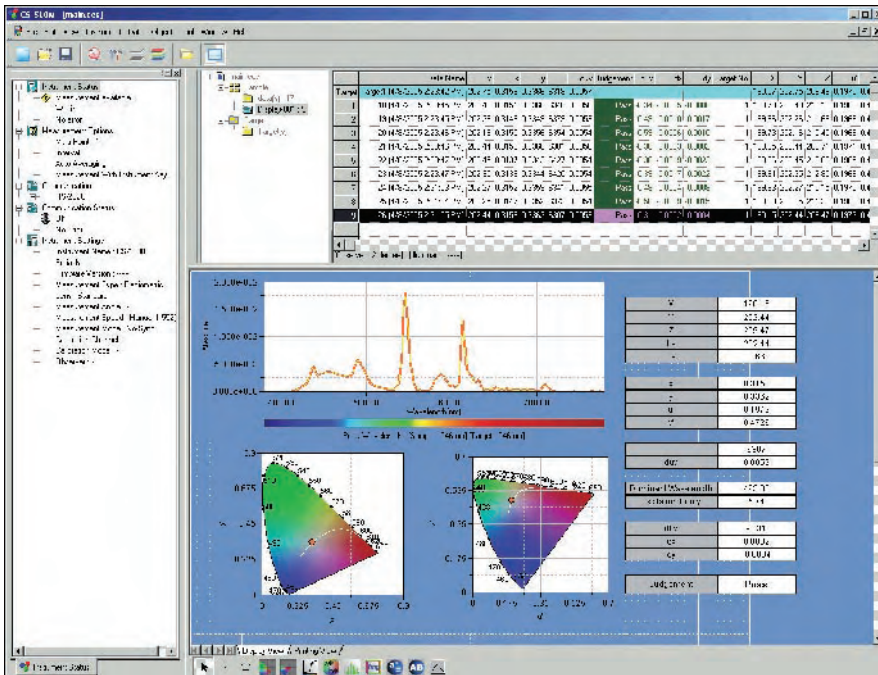
- Small LCD for cellular phone



Data Management Software

CS-S10w Professional (Standard accessory)

This software allows users to control the instrument with a PC and display measured data in various graphs or lists, and transfer or copy/paste data to spreadsheet software. It provides a variety of data management, analysis, and evaluation functions which are useful for research and development or quality control.



Display

Spectral graph, Spectral data list, Chromaticity diagram, etc.

Color space

$L_v \times y$, $L_v \cdot u' \cdot v'$, $L_v \cdot T \Delta uv$, XYZ, dominant wavelength, excitation purity, etc.

Calculation Functions

Use of spectral data for mathematical operations, functional processing, etc.

Mode selection

Normal mode, Contrast mode, RGB mode, RGB & contrast mode, Object color mode

Instrument control

Average measurement, Interval measurement, User calibration

Data management

Reading and saving files, Data management with folders, Creating, saving and loading templates (customizable design/layouts for various graphs) Various graph displays

Data evaluation

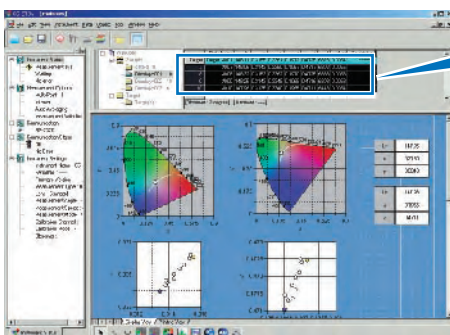
Observer/Illuminant settings, Color rendering evaluation, Statistics display for each folder, Box tolerance setting, Multiple-point measurement, uniformity display, contrast display and polygon tolerance setting for display evaluation

Other

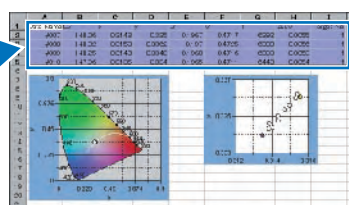
Creating reports in customizable screen layouts

* Data files containing measurement data lists and target data lists created with the previous Data Management Software CS-S1w can be opened.

Screen layout can be freely changed.



Templates including xy and u'v' chromaticity diagrams provided.



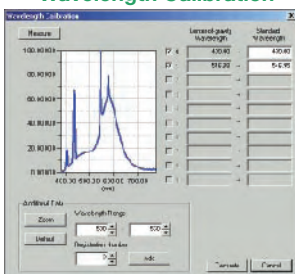
Multiple data can be copied and pasted to spreadsheet software.

Spectral data list

Wavelength (nm)	Intensity	Colorimetric values
380	0.0000	0.0000, 0.0000, 0.0000
390	0.0000	0.0000, 0.0000, 0.0000
400	0.0000	0.0000, 0.0000, 0.0000
410	0.0000	0.0000, 0.0000, 0.0000
420	0.0000	0.0000, 0.0000, 0.0000
430	0.0000	0.0000, 0.0000, 0.0000
440	0.0000	0.0000, 0.0000, 0.0000
450	0.0000	0.0000, 0.0000, 0.0000
460	0.0000	0.0000, 0.0000, 0.0000
470	0.0000	0.0000, 0.0000, 0.0000
480	0.0000	0.0000, 0.0000, 0.0000
490	0.0000	0.0000, 0.0000, 0.0000
500	0.0000	0.0000, 0.0000, 0.0000
510	0.0000	0.0000, 0.0000, 0.0000
520	0.0000	0.0000, 0.0000, 0.0000
530	0.0000	0.0000, 0.0000, 0.0000
540	0.0000	0.0000, 0.0000, 0.0000
550	0.0000	0.0000, 0.0000, 0.0000
560	0.0000	0.0000, 0.0000, 0.0000
570	0.0000	0.0000, 0.0000, 0.0000
580	0.0000	0.0000, 0.0000, 0.0000
590	0.0000	0.0000, 0.0000, 0.0000
600	0.0000	0.0000, 0.0000, 0.0000
610	0.0000	0.0000, 0.0000, 0.0000
620	0.0000	0.0000, 0.0000, 0.0000
630	0.0000	0.0000, 0.0000, 0.0000
640	0.0000	0.0000, 0.0000, 0.0000
650	0.0000	0.0000, 0.0000, 0.0000
660	0.0000	0.0000, 0.0000, 0.0000
670	0.0000	0.0000, 0.0000, 0.0000
680	0.0000	0.0000, 0.0000, 0.0000
690	0.0000	0.0000, 0.0000, 0.0000
700	0.0000	0.0000, 0.0000, 0.0000

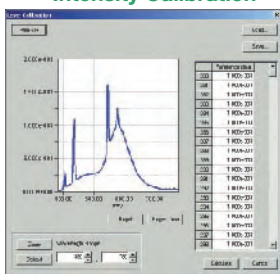
User Calibration

Wavelength Calibration



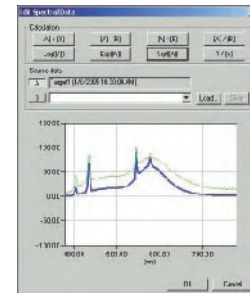
Calibration of the instrument's wavelength can be performed. For example, when measuring line spectra, the wavelength axis can be shifted so that the peak wavelength or center-of-gravity wavelength matches the user's set value.

Intensity Calibration



Calibration of the instrument's spectral sensitivity can be performed. For example, the instrument's spectral sensitivity can be adjusted so that the measured spectral waveform matches the waveform set by the user.

Calculation



A variety of calculations can be performed on measured data and the results stored in data lists, displayed on graphs, used to determine colorimetric values, etc.

System requirements

OS

Windows®2000 Professional SP4, Windows®XP Professional SP2, Windows®XP Professional x64 Edition

CPU

Pentium®III 600 MHz equivalent or higher

(recommended)

Memory

128 MB min. (256 MB or more

recommended)

Hard disk

60 MB or more space required for installation

Display

1024 X 768, 256 colors or more

Other

CD-ROM drive, RS-232C port

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* Pentium® is a trademarks of Intel Corporation in the USA and other countries.

Specifications

Model	CS-1000A	CS-1000S	CS-1000T
Wavelength range	380 to 780nm		
Spectral bandwidth	5nm		
Wavelength resolution	0.9nm/pixel		
Display wavelength bandwidth	1nm		
Spectral accuracy	±0.3nm(mean wavelength:546.1nm Hg lamp)		
Measuring angle	1° (standard and macro lens)	--- (standard lens : 1°)	0.14°*1 (standard lens : 1°)
Display	Lvxy, ΔLvxy, LvUv, ΔLvUv, LvTuv, Le (Observer can be switched between 2° and 10°)		
Data memory	Measurement data : 30 sets, Target data : 20 sets		
Minimum measuring distance	362mm (standard lens)	25mm (standard lens : 362mm)	254mm (standard lens : 362mm)
	94mm (macro lens)		
Minimum measuring area	7.9mm (standard lens)	0.45mm (standard lens : 7.9mm)	1.2mm (standard lens : 7.9mm)
	1.15mm (macro lens)		
Luminance display range	0.01 to 80000cd/m ² (for Illuminant A)		
Accuracy (for Illuminant A, Normal Mode)	±2.5%±1digit x : ±0.0015 y : ±0.001 (standard and macro lens)	±2.5%±1digit x : ±0.002 y : ±0.0015 (small measuring area lens)	±2.5%±1digit x : ±0.002 y : ±0.0015 (small measuring angle lens)
	Luminance range (Standard lens : 1 to 8000cd/m ² Other lens : 10 to 8000cd/m ²)		
Repeatability (σ) (for Illuminant A)	Normal Mode xy : 0.0002	Luminance range (Standard lens : 1 to 8000cd/m ² Other lens : 10 to 8000cd/m ²)	
	Fast Mode xy : 0.0004		
	Normal Mode xy : 0.0003	Luminance range (Standard lens : 0.5 to 1cd/m ² Other lens : 5 to 10 cd/m ²)	
	Fast Mode xy : 0.0006		
Polarisation error	Less than 5% (400nm to 780nm)		
Integration time	Fast : 40msec to 15sec, Normal : 40msec to 60sec		
Power	120V~ 50Hz Type or 230V~ 60Hz Type (using AC adapter AC-A12)		
Operating temperature /humidity range	5 to 35°C relative humidity 80% or less (at 35°C) with no condensation		
Storage temperature /humidity range	0 to 45°C relative humidity 80% or less (at 35°C) with no condensation		
Interface	RS-232C		
Size (body)	146 × 148 × 256mm (5-3/4 × 5-13/16 × 10-1/16 in.)		
Weight	4.9kg (10.38 lb.) (with standard lens)	5.8kg (12.79 lb.) (with small measuring area lens)	5.9kg (13.01 lb.) (with small measuring angle lens)
	Standard Lens	Standard Lens	Standard Lens
Standard accessories	Macro Lens	Small Measuring Area Lens	Small Measuring Angle Lens
	Data Management Software CS-S10w Professional, ND Eyepiece Filter (for finder) CS-A1, AC Adapter, RS-232C Cable (for IBM PC/AT 2m, 9-pin) IF-A12		
Optional accessories	Tripod CS-A3, Panhead CS-A4, White Calibration Plate CS-A5, ND Filter CS-A6 (10% / for macro lens), ND Filter CS-A7 (1% / for macro lens), RS-232C Cable (for IBM PC/AT 5m pin) IF-A13, Hard Case CS-A2 (Not for small measuring area lens and small measuring angle lens)		

- *1 Minimum measuring distance.
- *2 Distance from front end of the lens.
- *3 Measurement time is twice integral time plus approx 3 seconds.
- Specifications subject to change without notice.
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Enables matrix calibration of CA-210/CA-100Plus using the CS-1000A/S/T as the standard instrument.

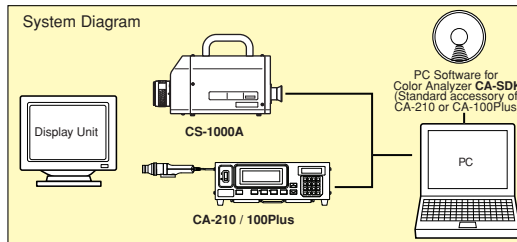
PC Software for Color Analyzer CA-SDK

(Standard accessory of DISPLAY COLOR ANALYZER CA-210/CRT COLOR ANALYZER CA-100Plus)

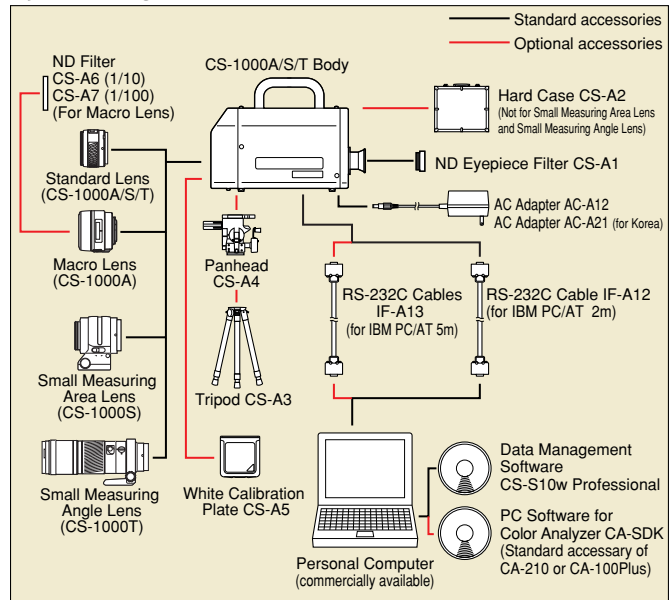
Using the PC Software for Color Analyzer CA-SDK (included with the CA-210/CA-100Plus as a standard accessory), you can easily create your own special software for CA-210/CA-100Plus to meet various needs. The CA-SDK also includes some sample software. With the "Cal" sample software, you can perform matrix calibration of the CA-210/CA-100Plus using the CS-1000A/S/T as the standard instrument.

Required system
OS : Windows®98, Windows®2000, Windows®ME, Windows®XP (x64 Edition not supported)

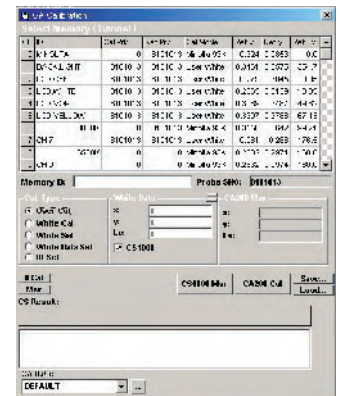
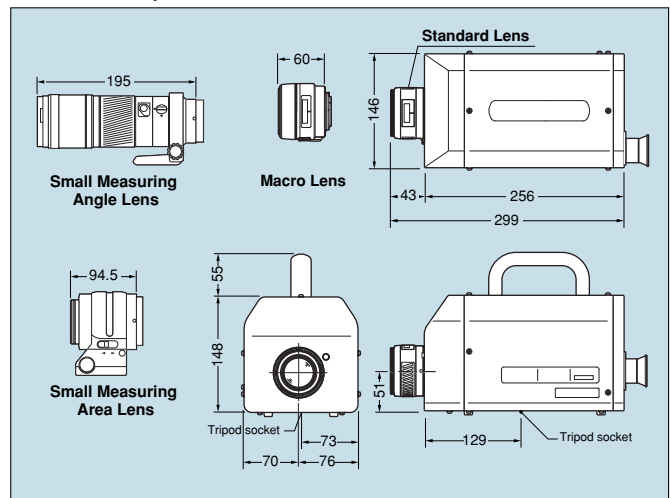
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System Diagram



Dimensions (Units : mm)



SAFETY PRECAUTIONS

For correct use and for your safety, be sure to read the instruction manual before using the instrument.

- Always connect the instrument to the specified power supply voltage.
- Improper connection may cause a fire or electric shock.

KONICA MINOLTA SENSING, INC.
Konica Minolta Sensing Americas, Inc
Konica Minolta Sensing Europe B.V.

Osaka, Japan
New Jersey, U.S.A.
European Headquarter /BENELUX
German Office (International)
German Office (Germany)
French Office
UK Office
Italian Office
Swiss Office
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Phone : 888-473-2656(in USA), 201-236-4300(outside USA)
Nieuwegein, Netherland
Langenhagen, Germany
München, Germany
Roissy CDG, France
Milton Keynes, United Kingdom
Milan, Italy
Dietikon, Switzerland
Västra Frölunda, Sweden
Wien, Austria
Warszawa, Poland
Shanghai, China
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Guangzhou, China
Singapore
Seoul, Korea

Fax : 201-785-2480
Fax : +31(0)30 248-1211
Fax : +49(0)511 7404-807
Fax : +49(0)89 630267-67
Fax : +33(0)1 493-84771
Fax : +44(0)1908 540-629
Fax : +39(0)23 9011219
Fax : +41(0)43 322-9809
Fax : +46(0)31 474945
Fax : +43(0)1 87882-431
Fax : +48(0)22 56033-01
Fax : +86-021-5489 0005
Fax : +86-010-8522 1241
Fax : +86-020-3826 4223
Fax : +65 6560-9721
Fax : 02-523-9729

Konica Minolta (CHINA) Investment Ltd. SE Sales Division
SE Beijing Office
SE Guangzhou Office

Konica Minolta Sensing Singapore Pte Ltd.
KONICA MINOLTA SENSING, INC. Seoul Office

Addresses and telephone/fax numbers are subject to change without notice. For the latest contact information, please refer to the KONICA MINOLTA SENSING Worldwide Offices web page (link below).

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