New Auto Mode increases accuracy at low luminance levels

CHROMA METER
CS-200

Suitable for measurement of optical devices such as LCDs, PDPs, organic ELs, FEDs and LEDs.

High-Accuracy Luminance & Chromaticity Measurement Comparable to Many Spectroradiometers
Features and Benefits

Performance Comparable to Many Spectroradiometers
Ease of Use and Simplicity Equal to Tristimulus Meters

The technological innovation of displays such as FPDs and LCDs as well as LED products in recent years requires high-quality production, resulting in the need for accurate measuring instruments. The CS-200 is a new type of colorimeter achieving high accuracy while maintaining the simple operation of tristimulus-type colorimeters.

Three selectable angles of 1, 0.2, and 0.1 make it easy to measure large and very small objects in a wide measuring range from low luminance of 0.01 cd/m² to high luminance of 20,000,000 cd/m² (with a measuring angle of 0.1).

The CS-200 can be used for luminance and chromaticity measurement of various optical devices such as displays like LCDs, PDPs, organic ELs and FEDs, as well as light sources such as LEDs and lamps.

New Auto Mode

Wide measuring range from low to high luminance
- The new Auto Mode adjusts the measurement speed according to the luminance of the measurement subject.
- Measurement is available from a low luminance of 0.01 cd/m² to a high luminance of 20,000,000 cd/m² (with a measuring angle of 0.1).
- Use of the spectral fitting method and precise analog circuitry achieves stable measurement even for low luminance.

Compact and lightweight. Battery power is also possible.
- The compact, lightweight and stylish body allows hand-held operation. The CS-200 can be operated with either four AA batteries (battery indicator function provided) or a special AC adapter.

Additional Functions
- Measurements can be synchronized with the display device by numerical input of the frequency.
- Selectable measurement speed (AUTO, LTD. AUTO, MANU, superFAST, FAST, SLOW and superSLOW)
- Large LCD display with backlight
- USB 1.1 communication
- Data storage: 101 measured values (9-letter ID assignment possible) and 20 reference values
- User calibration: 20 channels

Selectable measuring angle
- While checking the actual subject, you can select the measuring angle easily according to the application (1, 0.2 and 0.1).
- The aperture mirror eliminates misalignment between the finder target and the actual measuring spot, ensuring accurate aiming.
"Spectral fitting method" for accurate luminance & chromaticity measurement.

Konica Minolta’s newly-developed spectral fitting method provides tristimulus values (XYZ = red, green, blue) with significantly higher accuracy than that of conventional tristimulus colorimeters. This is achieved by using the output from 40 sensors to calculate the spectral response corresponding to human eye sensitivity (CIE 1931 color-matching functions).

- The CS-200 uses 40 sensors for sensitivity covering the entire visible region and multiplies each sensor output by appropriate coefficients. This adjusts the spectral response of the instrument to close to the CIE 1931 color-matching functions.

- In addition to the 2 Standard Observer, the 10 Standard Observer (for object-color measurements) can also be selected, which is impossible with conventional tristimulus colorimeters.

KONICA MINOLTA’s Chroma Meter for accurate light-source measurement allows building of a color management network both internally and externally.

In R&D and design departments
There is no need for calibration work to determine a value of each light source by using a reference spectroradiometer. For displays like LCDs or organic ELs in particular, user calibration for the reference panel using a spectroradiometer can be eliminated.*1.

*1 If higher accuracy is required, user calibration can be used.

In quality management and incoming inspection departments
Since individual errors are minimized compared to conventional tristimulus colorimeters, the inspection of various devices such as panels does not require individual error correction.
1 aperture
For measurement of general-size areas such as medium and large displays
- LCD, PDP, or EL display panels
- LCD panels of mobile phones or digital cameras
- Light sources such as lamps or fluorescent-tube backlights
- Radar or other instrument panels in aircraft cockpits
- Large outdoor display screens

0.2 aperture
For measurement of small areas such as product LEDs
- Sub-display of mobile phones
- Car audio equipment
- Automobile instrument panels

0.1 aperture
For measurement of very small areas or of a distant light source
- Pixels of a PDP or LCD
- Cold cathode tube
- Automobile lamps
- Signal lights

Evaluation applications
Evaluation of the luminance and chromaticity of light sources
Evaluation of luminance and chromaticity uniformity
Contrast evaluation
γ-characteristic evaluation
Simple measurement of object colors
(The optional white calibration plate is required.)

Measuring distance and measuring area
(Unit: mm)

<table>
<thead>
<tr>
<th>(Measuring angle)</th>
<th>Minimum measuring area</th>
<th>Maximum measuring area</th>
<th>Minimum measuring distance</th>
<th>Maximum measuring distance</th>
<th>Measuring area at 500 mm</th>
<th>Measuring area at 1000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without a Close-Up Lens</td>
<td>4.7 1.0 0.5 296</td>
<td>296 1.0 0.5</td>
<td>296 1.0 0.5</td>
<td>296 1.0 0.5</td>
<td>296 1.0 0.5</td>
<td>296 1.0 0.5</td>
</tr>
<tr>
<td>Close-up lens No. 122</td>
<td>2.2 0.5 0.3 46.0</td>
<td>46.0 1.0 0.5</td>
<td>128 1.0 0.5</td>
<td>240 1.0 0.5</td>
<td>128 1.0 0.5</td>
<td>240 1.0 0.5</td>
</tr>
<tr>
<td>Close-up lens No. 107</td>
<td>0.8 0.2 0.1 1.1</td>
<td>1.1 0.3 0.2</td>
<td>43 1.0 0.5</td>
<td>52 1.0 0.5</td>
<td>43 1.0 0.5</td>
<td>52 1.0 0.5</td>
</tr>
</tbody>
</table>

* Measuring distance is the distance from the front edge of the metal lens barrel or close-up lens ring.
Data Management Software CS-S10w Standard (Standard accessory)

CS-S10w Standard Edition allows users to control the CS-200 with a PC to display the list of measured data or to transfer the data to spreadsheet software.

<Functions common to Standard and Professional Editions>

- **Color space**: \( L_u x y, L_u u' v', L_u \Delta Luv \)  
- **Mode selection**: Normal mode, Object color mode, XYZ, dominant wavelength
- **Instrument control**: Average measurement, Interval measurement, User calibration
- **Data management**: Reading and saving files, Data management with folders
- **Data evaluation**: Observer/Immunifant settings, Statistics display for each folder, Box tolerance setting

Data Management Software CS-S10w Professional (Optional accessory)

In addition to the functions of Standard Edition, optional CS-S10w Professional Edition enables various data management, analysis and evaluation functions useful for R&D or quality control.

<Functions available only with Professional Edition>

- **Mode selection**: Contrast mode, RGB mode, RGB & contrast mode
- **Data management**: Creating, saving and loading templates (customizable design/layouts for various graphs), Various graph displays

System requirements (common to Standard and Professional Editions)

<table>
<thead>
<tr>
<th>OS</th>
<th>Windows® XP Professional 32-bit SP3, 64-bit SP2, Windows® Vista Business 32-bit, 64-bit, Windows® 7 Professional 32-bit, 64-bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Pentium® III 600 MHz equivalent or higher</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB min. (256 MB or more recommended)</td>
</tr>
<tr>
<td>Hard disk</td>
<td>60 MB or more space required for installation</td>
</tr>
<tr>
<td>Display</td>
<td>1024 X 768, 256 colors or more</td>
</tr>
<tr>
<td>Other</td>
<td>CD-ROM drive, USB port</td>
</tr>
</tbody>
</table>

* Windows® is a trademark of Microsoft Corporation in the USA and other countries.
* Pentium® is a trademark of Intel Corporation in the USA and other countries.
CS-200 specifications

**Item** CS-200

**Measurement range**
- 0.01 - 200,000 cd/m² (Measuring angle 1°)
- 0.01 - 5,000,000 cd/m² (Measuring angle 0.2°)
- 0.01 - 20,000,000 cd/m² (Measuring angle 0.1°)

**Accuracy**
- 150 cd/m² Lx = 2 ± 1 digit xy ± 0.002
- 0.01-0.5 cd/m² Lx = ± 0.02 cd/m² ± 1 digit xy ± 0.007
- 0.5-1 cd/m² Lx = ± 0.02 cd/m² ± 1 digit xy ± 0.004
- 10-100 cd/m² Lx = ± 0.1 ± 1 digit xy ± 0.003
- 100-10,000 cd/m² Lx = ± 0.5 ± 1 digit xy ± 0.002
- Light source at 5000 cd/m² + color filter (R, G, B) xy ± 0.006

**Repeatability**
- 0.01-1 cd/m² Lx = 0.01 cd/m² ± 1 digit xy ± 0.001
- 1-2 cd/m² Lx = 0.5 ± 1 digit xy ± 0.002
- 2-4 cd/m² Lx = 0.5 ± 1 digit xy ± 0.001
- 4-8 cd/m² Lx = 0.5 ± 1 digit xy ± 0.0005
- 8-300,000 cd/m² Lx = 1 ± 1 digit xy ± 0.0004

**Measurement time**
- AUTO (Automatically set between approx. 1s and 60s)
- LTD.AUTO (Automatically set to approx. 1s or 3s)
- Super-FAST (approx. 0.5 sec/meas.)
- FAST (approx. 1 sec/meas.)
- SLOW (approx. 3 sec/meas.)
- Super-SLOW (approx. 12 sec/meas.)

**Measurement method**
- Spectral method, Grating + linear photo diode array

**Measuring angle**
- 1°, 0.2°, 0.1° (switchable)

**Minimum measuring area**
- 0.5 mm

**Minimum measuring distance**
- 296 mm (Distance from front edge of metal lens barrel)

**Observer**
- 2/10 degrees

**Color space**
- Lx y x, Lx u' v', Lx T

**Color space**
- (Standard Illuminant A) (2ºC)
- (Standard Illuminant A) (1º)

**Measurement distance**
- 0.1 mm (close up lens)

**Measuring distance**
- 0.5 mm

**Minimum measuring diameter**
- ø40.5 mm

**Measurement synchronization setting range**
- Vertical synchronization frequency : 40.00 to 200.00Hz

**Interface**
- USB 1.1

**Power source**
- AC adapter or 4 AA-Size Batteries

**Battery life**
- Approx. 3 hours (continuous measurement / Fast mode / AA-size alkaline cells)

**Size**
- 95 mm (W) x 127 mm (H) x 334 mm (L)

**Weight**
- 1.8 kg (without battery)

**Operating temperature**
- 0°C to 40°C, relative humidity 85% or less (at 35°C) with no condensation

**Storage temperature**
- 0°C to 45°C, relative humidity 85% or less (at 35°C) with no condensation

- ± 2°C
- ± 2%
- ± 0.02 cd/m²
- ± 0.02 cd/m²
- ± 0.02 cd/m²
- ± 0.007
- ± 0.004
- ± 0.003
- ± 0.002
- ± 0.002
- ± 0.001
- ± 0.001
- ± 0.0005
- ± 0.0005
- ± 0.0004
- ± 0.0004

**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.
- Be sure to use the specified batteries. Using improper batteries may cause a fire or electric shock.

**System configuration**

**Outer dimensions (Unit: mm)**

Cloud Service

**Customization service**
In order to meet customer needs even more fully, Konica Minolta offers a customization service for modifying products currently being sold. Customized products will have specifications (such as accuracy and repeatability) different from those of our normal products. Please ask your nearest Konica Minolta dealer for details.