CHROMA METER
CR-400/410
Portable Colorimeter with unmatched ruggedness and application flexibility
Introducing the successor to the Konica Minolta CR-300/310, our best-selling colorimeter globally accepted as the standard in a wide range of industries.

CR-400
Measurement area ø8mm

CR-410
Measurement area ø50mm

The measuring head can perform measurement alone
The measuring head is detachable from the data processor. Now, you can take measurements directly with the head alone. What's more, you can connect the measuring head directly to a PC. Simply install our optional software, and your PC can function as the data processor.

User-defined evaluation formulas freely set up
The CR-400 Series features a User Index function that allows you to configure the evaluation formula and color calculation formula as desired. This feature is intended to meet the needs of color-control applications in which industry-specific or customized evaluation formulas are used instead of the versatile color system and standard evaluation formula such as L*a*b*.

Abundant accessories applicable to various materials
A varied selection of accessories is available to accommodate various types of targets including powder, paste and opaque liquids.

Compact data processor incorporates a high-speed printer.
The compact, lightweight data processor is battery operated* and features a built-in high-speed printer. Its size and weight are approximately one-half those of the conventional DP-300 Series. In addition, the CR-400 Series is designed with a detachable shoulder strap for easier portability.

Full data compatibility with the CR-300/310 series
To ensure data compatibility, the CR-400 Series utilizes the same illumination-viewing optical system as the conventional CR-300/310 Series. As a result, those upgrading from the preceding model can make full use of their existing data.

Easy-to-understand the name on the buttons, ensure smooth measurement and setting operations

Achieves exceptional accuracy
Inter-instrument agreement: CR-400: ΔE*ab within 0.6
CR-410: ΔE*ab within 0.8
Repeatability: within ΔE*ab 0.07

User calibration function ensures higher accuracy
(Setting can be configured with the data processor or via a PC with optional software installed.)

Color difference tolerance can be set to perform PASS/WARN/FAIL
(Setting can be configured with the data processor or via a PC with optional software installed.)

The measuring head alone can store up to 1,000 measurements. When the data processor is connected, up to 2,000 measurements can be stored. (The measuring head can store up to 100 color-difference target colors with or without the data processor connected.)

Capable of displaying color-difference graphs that provide a visual representation of the color difference.
(When connected to data processor)

A simple, cellular-phone-type text entry system is provided for entering the names of color-difference target colors and calibration channels.
(When connected to data processor)

Features a large, easy-to-see LCD with a built-in backlight.
The LCD offers six user-selectable languages for the display mode, including English and Japanese.
(When connected to data processor)

Can be powered with rechargeable batteries for reduced operating costs.
* Denotes a new feature not available with the previous CR-300/310 Series
The CR-400/410 Series really shows its abilities in these applications.

When measuring powders or pastes

With the varied accessories, you can measure targets with diverse profiles.

When color control is performed with a customized evaluation formula, instead of the versatile colour system

User-defined evaluation formulas can be entered as desired. Now, you can control colour with customized evaluation formulas.

When a compact colorimeter is needed in the field

The measuring head can be used independently of the data processor. This is advantageous when portability is required or limited space is available.

When measurements need to be printed on-site for labeling of samples

The compact data processor features a built-in printer for superior mobility.

User index function

Example:

Evaluation of tomato ripeness = a*/b* + 0.3a*/L*

Note: The evaluation formula and grade indicated above are hypothetical examples used only to demonstrate the user index function.
SpectraMagic™ NX (optional) Supports Windows® XP/Vista/7

SpectraMagic™ NX enables you to perform comprehensive color inspection and analysis of incoming raw materials, in-process production, and outbound color critical goods and materials in virtually any industry. With SpectraMagic™ NX you can insert digital images with measured data. Measure samples in any of 8 universally accepted color spaces. Select from 16 illuminants, and up to 40 indices to determine specific color and appearance properties, such as brightness, haze, yellowness, opacity and strength. You can even configure up to 8 customized color equations. Reports range from simple Pass/Fail to trend charts, histograms, color plots, and spectral graphs. SpectraMagic™ NX comes with predefined templates, or you can create your own templates.

For illustrations and explanations to understanding color and color measurement technology, there is a link to Konica Minolta’s well known and respected “Precise Color Communication.”

**System Diagram**

**Optional Accessories**

**Glass Light-Projection Tube**
CR-A33f (For CR-400) and CR-A33e (For CR-410)
Glass Light-Projection Tube CR-A33f and CR-A33e have a glass plate at the tip and can be used for measuring wet surfaces or for ensuring that materials such as textiles are flat during measurements.

**CR-400 Utility Software CR-S4w**
- To take measurements or change the measurement parameters of the CR-400/410 Series, you can control the unit with a PC.
- Measurement data can be transferred directly to a Microsoft Excel® file by means of the OLE function.
- Calibration data and color-difference reference color data can be uploaded or modified.

**System requirements**

<table>
<thead>
<tr>
<th>OS</th>
<th>Windows® XP Professional 32-bit/SP3, 64-bit/SP2</th>
<th>Windows® Vista Business 32-bit, 64-bit</th>
<th>Windows® XP Professional 32-bit, 64-bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows® 7 Professional 32-bit, 64-bit</td>
<td><em>The hardware of the computer system to be used must meet or exceed the greater of the recommended system requirements for the compatible OS being used or the following specifications.</em></td>
<td></td>
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<tr>
<td>CPU</td>
<td>Pentium® III 600 MHz equivalent or faster</td>
<td>128 MB or more (256 MB or more recommended)</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Pentium® II 660 MHz or higher</td>
<td>400 MB or more of free space for installation</td>
<td></td>
</tr>
</tbody>
</table>

- *Windows® is a trademark or registered trademark of Microsoft Corporation in the USA and other countries.
- *Pentium® is a trademark of Intel Corporation in the USA and other countries.
- *Bluetooth® is a registered trademark of Bluetooth SIG, Inc. and is used under license agreement.
- *The specifications given here are subject to change without prior notice.*
**Specifications**

<table>
<thead>
<tr>
<th>Name</th>
<th>Chrome Meter Measuring Head</th>
<th>CR-400 Head</th>
<th>CR-410 Head</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illumination / viewing systems</strong></td>
<td>Diffuse illumination / viewing angle (Specular component included)</td>
<td>Conforms to JIS Z 8722 conditions (Standard)</td>
<td>Conforms to JIS Z 8722 conditions (Standard)</td>
</tr>
<tr>
<td><strong>Detector</strong></td>
<td>Silicone photo cells (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display range</strong></td>
<td>Y: 0.01 to 160.00% (reflectance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Light source</strong></td>
<td>Pulsed Xenon lamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement time</strong></td>
<td>3 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum measurement interval</strong></td>
<td>3 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Battery performance</strong></td>
<td>300 measurements (when using batteries under company testing Konica Minolta’s conditions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement / illumination area</strong></td>
<td>ø42 (with CR-400 Head)</td>
<td>ø48 (ø28 in ø48)</td>
<td>ø38 (ø28 in ø38)</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>Within ±2ΔE*ab standard deviation (when the white calibration plate is measured 30 times at intervals of 10 seconds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>RJ-45 for RS-232C, USB, Ethernet (CR-410 only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Chroma values, color difference values, PASI/WARN/FAIL display</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tolerance judgment</strong></td>
<td>Color difference tolerances (box tolerances and elliptical tolerances)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Colorimetric data, indexes</strong></td>
<td>Y’X’Z’, Y’Y<em>X’<em>Y’<em>Z’</em>, Y’Y’X’’X’’X’y’’y’’Y’’Z’</em>, Y’Y’X’’X’’X’y’’y’’Y’’Z’</em> (only Y’Y’X’’X’’X’y’’y’’Y’’Z’<em>), Y’Y’X’’X’y’’y’’Z’</em>, Y’X’’Y’’Z’<em>, Y’Y’X’’Z’</em>, Y’X’’Y’’Z’* (only Y’Y’X’’X’y’’y’’Z’<em>), Y’X’’Y’’Z’</em> (only Y’Y’X’’Z’<em>), Y’X’’Y’’Z’</em> (only Y’X’’Y’’Z’<em>), Y’X’’Y’’Z’</em> (only Y’X’’Y’’Z’*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>Operating keys: English LD: English (default), Japanese, German, French, Italian, Spanish, Japanese</td>
<td></td>
<td></td>
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<tr>
<td><strong>Data memory</strong></td>
<td>1,000 (measuring head and data processor save different data)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Color difference target colors</strong></td>
<td>500</td>
<td></td>
<td></td>
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<tr>
<td><strong>Calibration channels</strong></td>
<td>20 channels (CR-410: white calibration, ch1 to ch19: user calibration)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Cone-simulated color difference values color difference graphs, PASI/WARN/WARN display</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>RS-232C compliant for file processing / PC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power source</strong></td>
<td>4 AAA size alkaline or Ni-MH batteries, AC Adapter</td>
<td>AC120V ~ 50-60Hz for N.America and Japan</td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>102 x 73 x 63 mm</td>
<td>102 x 44 x 63 mm</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 550 g (excluding AAA size batteries and not including RS-232C cable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature / humidity range</strong></td>
<td>23°C ± 5°C (Specular component included)</td>
<td>40 to 40°C, relative humidity 85% or less at 37°C with no condensation</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Data back light ON/OFF function (when ON, back light stays ON for 3 seconds after last key or measurement operation)</td>
<td></td>
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</tbody>
</table>

**Dimensions (Units: mm)**

<table>
<thead>
<tr>
<th>Measuring Head</th>
<th>CR-400</th>
<th>CR-410</th>
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<tbody>
<tr>
<td>Height (mm)</td>
<td>81</td>
<td>102</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>102</td>
<td>102</td>
</tr>
<tr>
<td>Depth (mm)</td>
<td>63</td>
<td>63</td>
</tr>
</tbody>
</table>

**Standard / Optional accessories**

- Color Data Software CM-5100a
- SpectraMagic™ NX
- CR-400 Utility Software CR-410
- White Calibration Plate CA-43
- White Calibration Plate CA-44
- Protective Cap CR-472
- Protective Cap CA-410
- RS-232C cable CR-1001 (Head-DP)
- AC Adapter
- Wire Strip CR-A73
- Shoulder Strap SS-01
- Hand Case CR-A103
- Roll Paper (slit edge) CR-A22
- Roll Paper (5 ply) CR-A22
- 4AAA Size Batteries
- Glass Light-Projection Tube CR-A33/E
- Light-Projection Tube CR-A33/E (for PC)
- Color Material Attachment CR-A50
- Plotting Base
- Color Tiles

**FYI**

- Operating temperature / humidity range of products for North America: 0 to 40°C, relative humidity 85% or less at 35°C with no condensation
- New Jersey, U.S.A.

**SAFETY PRECAUTIONS**

- For your safety, please read the instruction manual before using the instrument.
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