KONICA MINOLTA

# Spectrophotometer

# CM-5

16

## An advanced all-in-one spectrophotometer with innovative operation to let anyone take measurements easily anytime





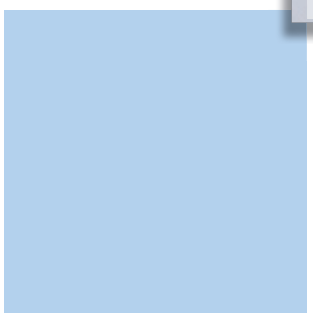




Mini Petri Dish (optional accessory) enables measurements of small sample amounts.

- Automatic white calibration compatible.



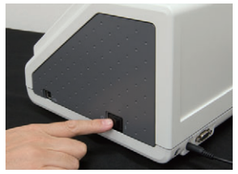

The CM-5 makes color measurements simple. Just switch it on and start taking measurements. No need to bother with a computer; the CM-5 has a full range of advanced functions including specialized indices for a variety of applications and a large color display that makes results easy to read.

Finally, high accuracy and ease of use in a compact top-port spectrophotometer!

The Standard in Measuring Color & Light

Giving Shape to Ideas

# Measurements as simple as 1-2-3!



## 1 Switch on power.

The CM-5 starts up and ***automatically performs white/100% calibration**** using an internal white calibration plate behind the shutter.

* Not applicable to liquid transmittance measurements using cells.

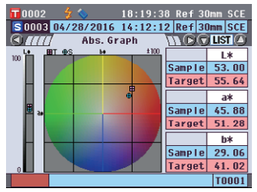
## 2 Position sample.

For reflectance, the ***top port*** makes measuring samples of various shapes and sizes easy. For transmittance, sliding open the CM-5 reveals a ***large transmittance chamber***. Liquids can be measured using optional cells.

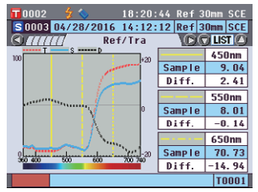
## 3 Press MEAS.

The measurement is taken and the results appear in the display. The ***large color LCD*** enables data to be shown not only numerically, but also on the colorimetric plots and spectral graphs that normally require a computer to display.

**Actual CM-5 screens!**



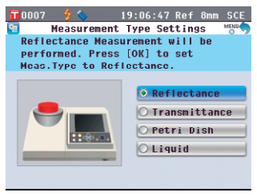

Colorimetric plot




Spectral reflectance graph

Screens can be shown in any of ***8 languages:*** English, Japanese, German, French, Italian, Spanish, Simplified Chinese, and Portuguese.

# Just follow the wizard!




***Even beginners can take measurements easily without mistakes.***

The CM-5's ***wizard mode*** guides users through each step, helping users to make settings and take measurements without having to get out the instruction manual each time.

# Avoid multi-user confusion with USB!

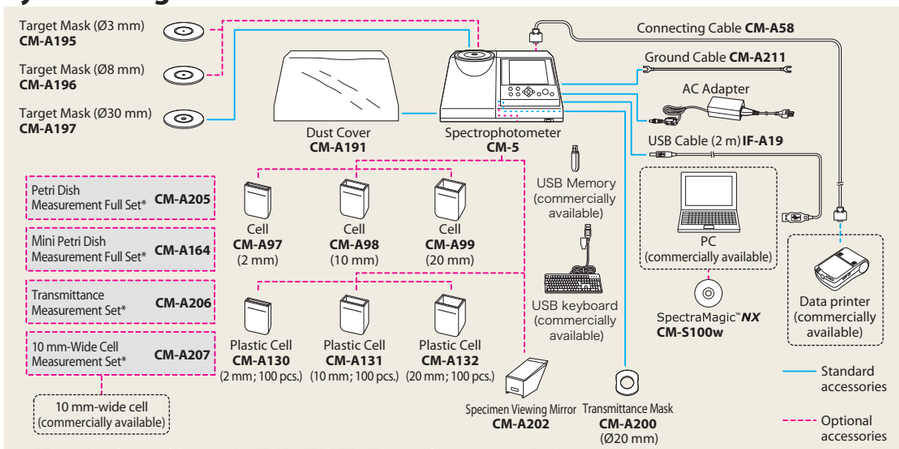
The CM-5 lets users store their own settings on their own USB memory stick, so they can restore the settings they need by simply reading them from the memory stick instead of redoing settings individually.

# Enter text directly with a USB keyboard *

You can connect a USB keyboard * to the CM-5 to enter text directly when editing data names and comments.

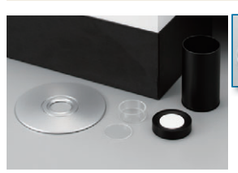
*Keyboard layout: US keyboard layout

## System Diagram




* For details, refer to the following table. Mini Petri Dish CM-157 requires firmware version 1.2 or later.

| | | Petri Dish Measurement Full Set CM-A205 | Mini Petri Dish Measurement Full Set CM-A164 | Transmittance Measurement Set CM-A206 | 10 mm-Wide Cell Measurement Set CM-A207 |
|---|---|---|---|---|---|
| White Calibration Plate (with CD-ROM containing calibration data and data-setting software) | CM-A210 | ○ | ○ | | |
| Zero Calibration Box | CM-A124 | ○ | ○ | | |
| Target Mask (for Petri Dish) | CM-A203 | ○ | | | |
| Petri Dish | CM-A128 | ○ | | | |
| Calibration Glass (for Petri Dish) | CM-A212 | ○ | | | |
| Target Mask (for Mini Petri Dish) | CM-A158 | | ○ | | |
| Mini Petri Dish | CM-A157 | | ○ | | |
| Calibration Glass (for Mini Petri Dish) | CM-A159 | | ○ | | |
| Transmittance Zero Calibration Plate | CM-A213 | | | ○ | |
| Transmittance Specimen Holder | CM-A96 | | | ○ | |
| Transmittance Specimen Holder Attachment | CM-A199 | | | ○ | |
| Transmittance Specimen Holder (10 mm-wide cells) | CM-A198 | | | | ○ |
| Transmittance Zero Calibration Plate (10 mm-wide cells) | CM-A204 | | | | ○ |
| Accessory Case | CM-A193 | ○ | ○ | ○ | |



Petri Dish Measurement Full Set **CM-A205**

Mini Petri Dish Measurement Full Set **CM-A164**

Transmittance Measurement Set **CM-A206**

10 mm-Wide Cell Measurement Set **CM-A207**

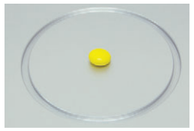
# Compact, versatile color instrument

## Reflectance measurements

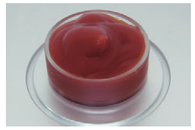
The measuring port of the CM-5 is on top, so users can just place a solid object on the port and press the MEAS. button. There's no need to clamp the sample in a sample holder, and there's no worry about the sample shifting position.
And, by using a Petri dish (optional accessory), liquids, pastes, and powders can also be measured easily.

Samples are just placed on top, so even large samples can be measured.

By using the Ø3 mm target mask (optional accessory), even small samples can be measured.

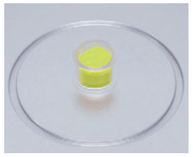


Pastes can also be measured using a Petri dish (optional accessory).



Colorant pellets can be measured in raw form using a Petri dish (optional accessory).

## Ø16 mm Mini Petri Dish for small sample amounts* (Optional accessory)

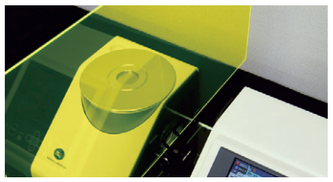


The optional Mini Petri Dish enables measurements of costly powder samples such as rare-earth metals, organic EL materials, pharmaceuticals, etc. to be taken using much less sample material (approximately 1/20 of amounts required using our conventional Petri Dish CM-A128). In addition, the automatic white calibration function also works with the Mini Petri Dish, so measurements can be taken shortly after switching the instrument on without performing calibration manually.

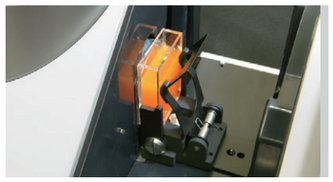
* This optional accessory can be used with firmware version 1.2 or later.

## Transmittance measurements

The CM-5's transmittance chamber is large and sideless, enabling measurements of even large sample sheets with thicknesses up to 60 mm.



For liquids, optional cells with 3 optical path lengths for different sample densities are available, and commercial 10 mm-wide cells can also be used.



## Internal calibration curves for measuring standard chemical/pharmaceutical indices

The CM-5 can measure several of the standard color indices commonly used in the chemical and pharmaceutical field: Gardner, Platinum-Cobalt Color Scale (Hazen/ APHA), Iodine Color Number, European Pharmacopoeia and US Pharmacopeia (equivalent to Japanese Pharmacopoeia color indices). Calibration curves for these indices are stored in the CM-5, so measurements of samples based on these indices can be performed quickly and easily by anyone.

* Index calibration curves were measured using 10 mm-Wide Cell Measurement Set CM-A207 and commercially available 10 mm-wide cells with 10 mm-wide cells with 10 mm optional path length.
* APHA display range: 0 to 1000; Gardner display range: 0 to 18

## Spectral absorbance measurements

Spectral absorbance can now be measured and displayed numerically or graphically, enabling evaluation of spectral absorbance for checking absorbance wavelengths, evaluating colorants, calculating K/S, determining components, etc.

# Main Specifications

| | | |
|---|---|---|
| **Model** | Spectrophotometer CM-5 | |
| **Illumination/viewing system** | Reflectance: | di:8°, de:8° (diffuse illumination: 8° viewing) |
| | | SCI (specular component included)/SCE (specular component excluded) switchable |
| | | Conforms to CIE No. 15, ISO 7724/1, ASTM E 1164, DIN 5033 Teil 7, and JIS Z 8722 condition c standard. |
| | Transmittance: | di:0°, de:0° (diffuse illumination: 0° viewing) |
| | | Conforms to CIE No. 15, ASTM E 1164, DIN 5033 Teil 7, and JIS Z 8722 condition g standard. |
| **Integrating sphere size** | Ø152 mm | |
| **Detector** | Dual 40-element silicon photodiode arrays | |
| **Spectral separation device** | Planar diffraction grating | |
| **Wavelength range** | 360 nm to 740 nm | |
| **Wavelength pitch** | 10 nm | |
| **Half bandwidth** | Approx. 10 nm | |
| **Measurement range** | 0 to 175 % (Reflectance or transmittance); Output/display resolution: 0.01% | |
| **Light source** | Pulsed xenon lamp | |
| **Measurement time** | Approx. 1 s (to data display/output); Minimum measurement interval: Approx. 3 s | |
| **Measurement/Illumination area** | Reflectance: | Changeable by changing mask and settings.<br>LAV: Ø30 mm/Ø36 mm; MAV (optional): Ø8 mm/Ø11 mm; SAV (optional): Ø3 mm/Ø6 mm |
| | Transmittance: | Approx. Ø20 mm/ Ø26 mm |
| **Repeatability** | Spectral reflectance: Standard deviation within 0.1% (400 nm to 740 nm)<br>Chromaticity value: Standard deviation within ΔE*ab 0.04<br>( When a white calibration plate is measured 30 times at 10-second intervals after white calibration) | |
| **Inter-instrument agreement** | Within ΔE*ab 0.15 (Typical) (LAV/SCI)<br>(Based on 12 BCRA Series II color tiles compared to values measured with a master body under Konica Minolta standard conditions) | |
| **Transmittance chamber** | No sides (unlimited sample length); Depth (maximum sample thickness): 60 mm<br>Sample holders (optional) for holding sheet samples or containers of liquid samples can be installed/removed | |
| **Display** | 5.7-inch TFT color LCD | |
| **Display languages** | English, Japanese, German, French, Italian, Spanish, Simplified Chinese, Portuguese | |
| **White/100% calibration** | Automatic white (reflectance)/100% (transmittance) calibration using internal white calibration plate<br>(Not applicable to 100% calibration when using cells for transmittance measurements of liquids.) | |
| **Interfaces** | USB 1.1(Connection to PC, USB memory *1, USB keyboard *2); RS-232C standard (Connection to serial printer) | |
| **Observer** | 2° or 10° Standard Observer | |
| **Illuminant** | A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12, ID50, ID65 (simultaneous evaluation with two light sources possible) | |
| **Displayed data** | Spectral values/graph (reflectance, transmittance, absorbance) , colorimetric values/graph, color-difference values/graph, pass/fail judgment, pseudocolor, color assessment | |
| **Colorimetric data** | L*a*b*, L*C*h, Hunter Lab, Yxy, XYZ, and color differences in these spaces; Munsell | |
| **Indexes** | Reflectance: | MI; WI (ASTM E 313-73, ASTM E 313-96, Hunter); YI (ASTM E 313-73, ASTM E 313-96, ASTM D 1925);<br>WB (ASTM E 313-73); ISO Brightness |
| | Transmittance: | Gardner; Iodine Color Number; Platinum-Cobalt Color Scale (Hazen/ APHA); European Pharmacopoeia; US Pharmacopeia |
| **User index** | User-defined index (Optional Data Management Software SpectraMagic™ NX required for setting user index.) | |
| **Color-difference equation** | ΔE*ab (CIE 1976), ΔE*94 (CIE 1994), ΔE00 (CIE DE2000), ΔE (Hunter), CMC (l: c) | |
| **Pass/Fail judgment** | Tolerances can be set to colorimetric values (except Munsell), color-difference values, or reflectance index values | |
| **Data memory** | Measurement data: 4,000 measurements; Target color data: 1,000 measurements | |
| **USB memory*1 storage** | Storage of measurement data and target color data. Storage/reading of measurement condition settings | |
| **Power** | AC 100 to 240 V, 50/60 Hz (using exclusive AC Adapter) | |
| **Size (W × H × D)** | Slide cover closed: 385 × 192 × 261mm<br>Slide cover open: 475 × 192 × 261 mm | |
| **Weight** | Approx. 5.8 kg | |
| **Operation temperature/ humidity range** | 13 to 33°C, relative humidity 80 % or less (at 33°C) with no condensation | |
| **Storage temperature/ humidity range** | 0 to 40°C, relative humidity 80 % or less (at 35°C) with no condensation | |

*1 USB memory devices with no security features are supported.
*2 USB human interface device class US layout keyboards are supported.
(Operation is not guaranteed for all of the above supported USB memories and keyboards.)

## 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.

- The specifications and appearance shown herein are subject to change without notice.
- If you have any questions about specifications, please contact your Konica Minolta representative.
- Konica Minolta, the Konica Minolta logo and symbol mark, and "Giving Shape to Ideas" are registered trademarks or trademarks of KONICA MINOLTA, INC.

Certificate No.: JQA-QMA15888
Registration Date : October 26, 2018
KONICA MINOLTA, Inc., Sakai Site
Product design, manufacture/manufacturing management, calibration, and service

Certificate No : JQA-E-80027
Registration Date : March 12, 1997
KONICA MINOLTA, Inc., Sakai Site


| | | | | |
|---|---|---|---|---|
| **KONICA MINOLTA, INC.** | Osaka, Japan | | | |
| **Konica Minolta Sensing Americas, Inc.** | New Jersey, U.S.A. | **Phone :** 888-473-2656 (in USA), 201-236-4300 (outside USA) | | **Fax :** 201-785-2482 |
| **Konica Minolta Sensing Europe B.V.** | European Headquarter /BENELUX | Nieuwegein, Netherlands | **Phone :** +31 (0) 30 248-1193 | **Fax :** +31 (0) 30 24 81 211 |
| | German Office | München, Germany | **Phone :** +49 (0) 89 4357 156 0 | **Fax :** +49 (0) 89 4357 156 99 |
| | French Office | Roissy CDG, France | **Phone :** +33 (0) 1 80 11 10 70 | **Fax :** +33 (0) 1 80 11 10 82 |
| | UK Office | Warrington, United Kingdom | **Phone :** +44 (0) 1925 467300 | **Fax :** +44 (0) 1925 711143 |
| | Italian Office | Cinisello Balsamo, Italy | **Phone :** +39 02849488.00 | **Fax :** +39 02849488.30 |
| | Swiss Office | Dietikon, Switzerland | **Phone :** +41 (0) 43 322-9800 | **Fax :** +41 (0) 43 322-9809 |
| | Nordic Office | Västra Frölunda, Sweden | **Phone :** +46 (0) 31 7099464 | |
| | Polish Office | Wroclaw, Poland | **Phone :** +48 (0) 71 73452-11 | **Fax :** +48 (0)71 734 52 10 |
| | Turkish Office | Istanbul, Turkey | **Phone :** +90 (0) 216-528 56 56 | **Fax :** +90 (0) 212-253 49 69 |
| **Konica Minolta (CHINA) Investment Ltd.** | SE Sales Division | Shanghai, China | **Phone :** +86- (0)21-5489 0202 | **Fax :** +86- (0)21-5489 0005 |
| | Beijing Office | Beijing, China | **Phone :** +86- (0)10-8522 1551 | **Fax :** +86- (0)10-8522 1241 |
| | Guangzhou Office | Guangdong, China | **Phone :** +86- (0)20-3826 4220 | **Fax :** +86- (0)20-3826 4223 |
| | Chongqing Office | Chongqing, China | **Phone :** +86- (0)23-6773 4988 | **Fax :** +86- (0)23-6773 4799 |
| | Qingdao Office | Shandong, China | **Phone :** +86- (0)532-8079 1871 | **Fax :** +86- (0)532-8079 1873 |
| | Wuhan Office | Hubei, China | **Phone :** +86- (0)27-8544 9942 | **Fax :** +86- (0)27-8544 9991 |
| **Konica Minolta Sensing Singapore Pte Ltd.** | | Singapore | **Phone :** +65 6563-5533 | **Fax :** +65 6560-9721 |
| **Konica Minolta Sensing Korea Co., Ltd.** | | Goyang-si, Korea | **Phone :** +82 (0) 2-523-9726 | **Fax :** +82 (0)31-995-6511 |

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

**https://konicaminolta.com/instruments/network**




9242-4858-10 BIMPK Printed in Japan