KONICA MINOLTA

Multi-Angle Spectrophotometer

CM-512m3A

Ideal for On-Site Operation with High Measurement Stability!

Makes color inspection of metallic/pearl coatings easy.

Full data compatibility with CM-512m3

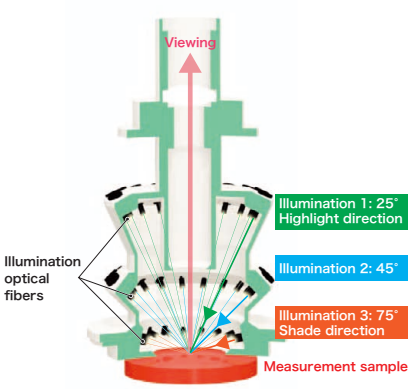
The essentials of imaging

Ideal for color control of metallic/pearlescent

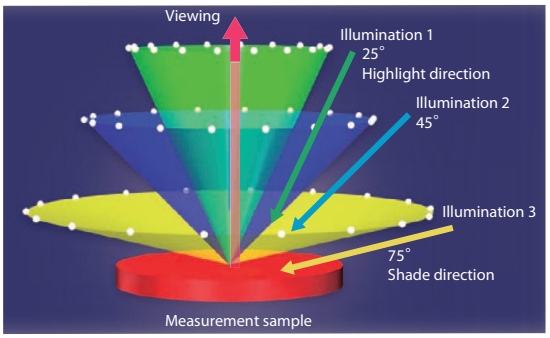
Coatings such as automotive metallic and pearlescent coatings change color according to the angles at which they are illuminated and viewed. This contributes greatly to their beauty, but it also makes them difficult to measure accurately with conventional spectrophotometers. The multi-angle CM-512m3A is up to the task.
The CM-512m3A illuminates object surfaces from 3 angles and measures light reflected perpendicular to the surface for measurement results which more closely match visual evaluation. Plus, its ring illumination minimizes the influence of instrument orientation (rotation around the surface perpendicular) to provide stable results.

Geometry measures color effect at multiple angles, similar to visual evaluation

Since the color of metallic or pearlescent coatings changes according to the angles at which the surface is illuminated and viewed, visual evaluation of such samples is normally performed by illuminating and viewing the sample from multiple angles. In the same way, the CM-512m3A illuminates the sample surface at 3 angles (25°, 45°, and 75° from the perpendicular to the surface) and measures the light reflected perpendicular to the sample surface. This makes the CM-512m3A ideal for evaluating metallic and pearlescent coatings.



Illumination optical fibers inside measurement aperture



Illumination angles (from perpendicular to surface):
- 25° (Corresponds to visual evaluation highlight direction)
- 45°
- 75° (Corresponds to visual evaluation shade direction)

Viewing angle:
- 0° (Perpendicular to surface)

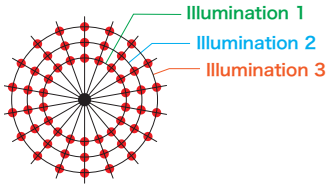
Ring illumination minimizes rotational effects

Illumination at each of the 3 angles is provided by a ring of 18 optical fibers. The illumination system thus creates cones of light at 25°, 45°, and 75° from the perpendicular to the surface to minimize the effects of instrument rotation around the measurement axis (perpendicular to the sample surface), a problem with instruments that provide single-plane illumination.

With CM-512m3A's ring illumination, even if instrument is rotated, the difference between measurements of same point is minimal.

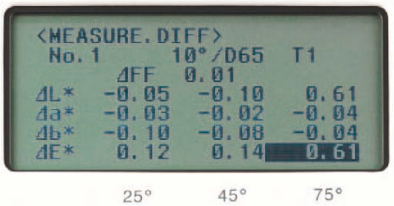
With single-plane illumination, rotating the instrument can result in large differences between measurements of same point.

Layout of illumination optical fibers

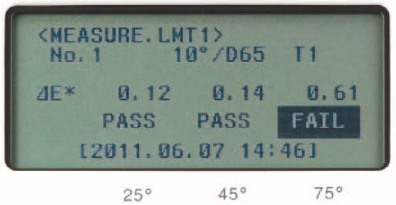


Large easy-to-read LCD

The large 240×96-dot high-resolution LCD shows the results for each angle together on the screen, as numerical values, with a PASS/FAIL display, or on graphs to enable results to be checked at a glance. Display can be shown in English or Chinese, and characters can even be inverted for viewing from the top.



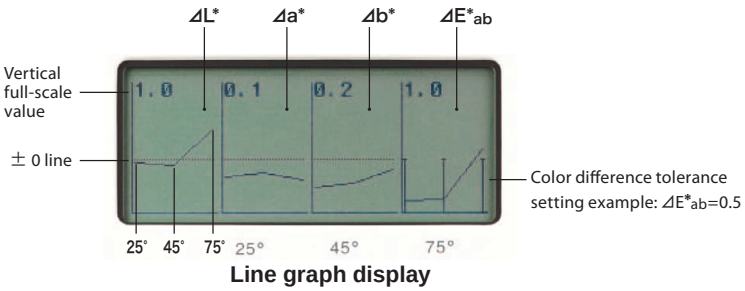
Color difference display



PASS/FAIL display

Color-difference equation CIEDE2000 optimized to correlate well with visual evaluation

To provide measurement results that correlate even more closely with visual results, the CIEDE2000 color-difference equation parameters used for each measurement angle on the CM-512m3A have been specifically optimized for measurements of metallic or pearlescent coatings.

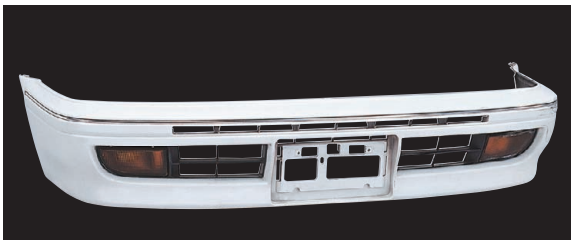


Line graph display

coatings on production lines or in laboratories

Compact body is easy to position at desired measurement points.

The CM-512m3A can be used to measure the main body and various parts such as bumpers, door mirrors, etc. to ensure color uniformity in the final assembled vehicle.



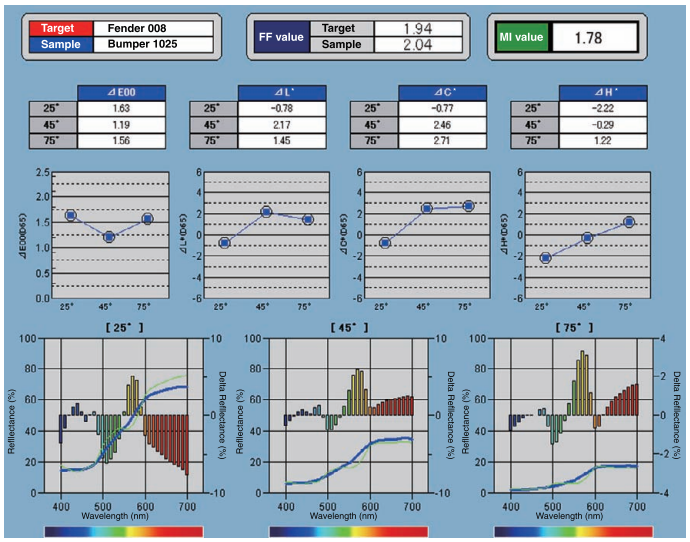
Optional Grip CM-A43 with additional conveniently located measuring button helps make positioning the CM-512m3A even easier.

Battery or AC Powered

The CM-512m3A can be powered by 4 AA-size batteries (either alkaline or rechargeable Ni-MH batteries can be used) for on-site use and easy maneuverability, or by the included AC adapter.

SpectraMagic™ *NX* (Optional)

(Supports Windows® XP/Vista/7)



SpectraMagic NX™ (optional accessory) is the ideal partner for color quality control with the CM-512m3A. It enables data for all 3 illumination angles to be shown simultaneously on the screen, and line graphs to visually show the per-angle characteristics specific to multi-angle measurements can also be created.

OS: Windows® XP Professional 32-bit SP3, 64-bit SP2; Windows® Vista Business 32-bit, 64-bit; Windows® 7 Professional 32-bit, 64-bit (English, Japanese, German, French, Spanish, Italian, Traditional Chinese, Simplified Chinese, and Hangul versions)

· 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.

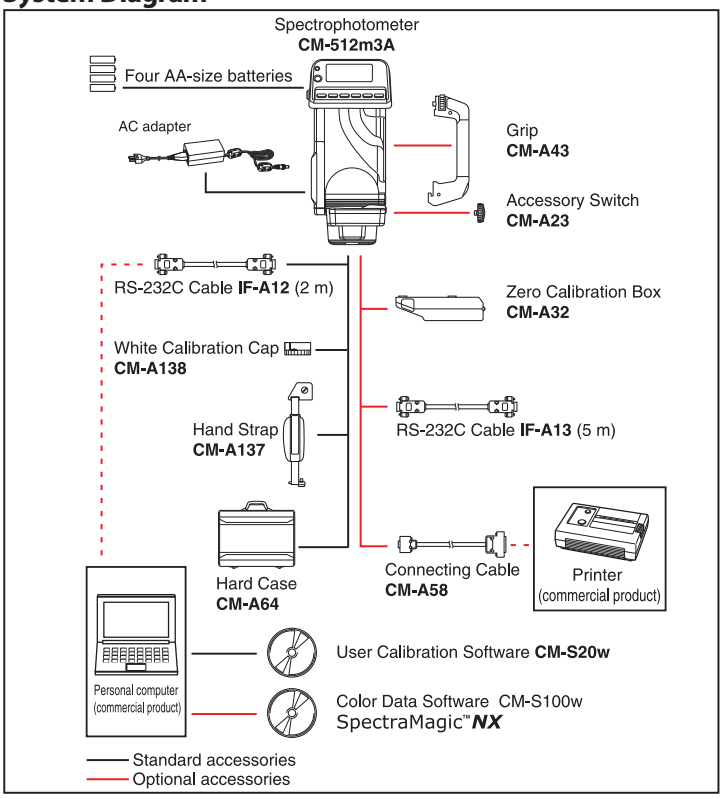
CPU: Pentium® III 600 MHz or higher (recommended)
Memory: 128 MB (256 MB recommended)
Hard disk: 450 MB of available disk space (Minimum 400 MB available space on system drive.)
Display: Display unit capable of showing at least 1024 x 768 dots/16-bit colors
Other: DVD-ROM drive (required for installation); one free USB port for protection key; one free port (serial port or additional USB port) for connection to instrument (connection type depends on instrument); Internet Explorer Ver. 5.01 or later

Major specifications

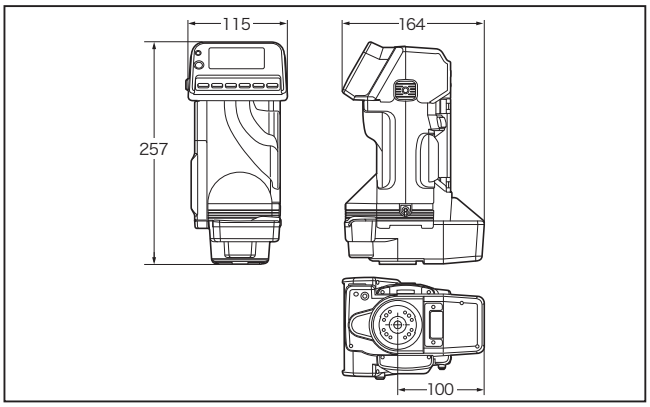
Illumination/viewing system	3-angle circumferential illumination / 1-angle perpendicular viewing: 25°c: 0°, 45°c: 0°, 75°c: 0°
Detector	Silicon photodiode array with continuous interference filter
Wavelength range	400 to 700 nm
Wavelength pitch	20 nm
Reflectance range	25°: 0% to 300%, 45° and 75°: 0% to 200% (Resolution: 0.01%)
Light source	3 pulsed xenon lamps
Minimum measurement interval	7 seconds (when measuring a white calibration plate at 23°C)
Battery life	Approx. 400 measurements at 10-second intervals (when a dark color is measured with alkaline batteries at 23°C)
Measurement / Illumination area	ø12 mm /ø20 mm
Repeatability	Spectral reflectance: Within 0.3% (standard deviation) Chromaticity value: Within ΔE^*_{ab} 0.05 (standard deviation) (When a white calibration plate is measured 30 times at 10-second intervals after white calibration) ; When AC adapter is used
Interface	RS-232C; Terminal: D-Sub 9-pin (female)
Display	Dot-matrix reflective LCD with 26 characters x 7 lines (240 x 96 dots) with adjustable contrast
Displayed data	Colorimetric data: L*a*b*, L*C*h Color difference data: Δ(L*a*b*), Δ(L*C*H*), ΔE^*_{ab}, CMC(l:c), ΔE_{00}(CIEDE2000) Other data display: FF value, line graph
Display languages	English, Chinese (Simplified)
Storable data sets	440 data sets max. (total of sample and target data)
Illuminant /Observer conditions	Light source: A, C, D50, D65, F2, F6, F7, F8, F10, F11, F12 Observer: 2°, 10°
Operating temperature /humidity range (*1)	0°C to 40°C, relative humidity 85% or less (at 35°C) with no condensation
Storage temperature /humidity range	-20°C to 45°C, relative humidity 85% or less (at 35°C) with no condensation
Power	4 AA-size alkaline or Ni-MH batteries or special AC adapter
Size	115 (W) x 257 (H) x 164 (D) mm
Weight	Approx. 1.4 kg (without batteries)

*1 Operating temperature/humidity range of products for North America : 5 to 40°C, relative humidity 80% or less (at 31°C) with no condensation

System Diagram



Outer dimensions (Unit: 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.
- Be sure to use the specified batteries. Using improper batteries may cause a fire or electric shock.

- Displays shown are for illustration purposes only.
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Registration Date : March 12, 1997

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