CR-400, CR-410
Технические характеристики

Chroma Meters CR-400 / CR-410

The CR-400 and CR-410 are cost effective QC color measurement instruments with 8mm and 50mm measuring apertures for either reglar or irregularly coloured or textured samples. Widely adopted in industries such as foods and building products the color data is measured as the eye sees and is reported in simple Lab format.

Introduction

The famous Chroma Meters series - more powerful and versatile then ever

The Konica Minolta Chroma Meters CR-400 series continue the heritage of the first portable colorimeters introduced in the 80ies.

The CR-400, with its 8 mm measuring area is suitable for measuring reflected colour and colour difference in a wide range of industrial fields. It is able to meet the needs of various applications, from all sorts of ingredients, foods, raw materials and finished products to pharmaceuticals and dermatological applications.

If samples are structured or uneven in surface, such as granulates, fabrics, wood, stones, bricks, then the CR-410 is the right choice. Its unique very large aperture of 50 mm is perfectly suited for such samples and thus avoids averaging of several measurements.

Features

The 400 series offer enhanced usability and functionality such as the re-designed Data Processor, featuring a large back light display for numerical or graphic display of measurement data and a built-in thermal high speed printer. The data memory now can store up to 100 target colours and up to 2000 measurements. Several new colour spaces and Pass/Fail formulas as well as indices for whiteness and yellowness enhance the usage into various fields of applications. The new "user indices" function allows the input of up to six different user or application specific equations using XYZ, Yxy or CIELAB values. Furthermore, the communication languages can be set for English, German, French, Italian, Spanish and Japanese.

For even more user flexibility the measuring head, equipped with Display, function keys and power supply, can now be used as "stand alone" or directly interfaced to the PC to run with the optional QC software SpectraMagic NX.

With all these features, the unsurpassed ease of use and the legendary ruggedness, the fourth generation of Chroma Meters is bound to continue its success throughout the world of modern colour control.

Main Features

- The measuring head can be disconnected from the Data Processor to perform measurements independently. In addition, it is also possible to link the measuring head directly to a PC, and optional software (sold separately) can then be used to allow the PC to carry out data processing in place of the Data Processor.

- Featuring a user index function for the free setting of evaluation and color-calculation

- Several application specific accessories facilitate the measurement of powder, liquid, paste, and many other types of samples.

- Compact Data Processor with integrated thermal printer

- The CR-400 series feature the same illumination/viewing optical system as the previous generation and thus data compatibility is assured.

Specifications

Principal Specifications CR-400 / CR-410

Model	CR-400	CR-410
Illumination / Viewing system	d:0° (diffuse illumination/0° viewing angle; specular component included) (compliant with JIS Z 8722; including regular reflectance)	Wide-area illumination/0° viewing angle; specular component included)
Detector	Silicon photocells (6)	
Display range	Y: 0.01% to 160.00% (reflectance)	
Light source	Pulsed xenon lamp	
Measurement time	1 sec.	
Minimum measurement interval	3 sec.	
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)	
Measurement/ illumination area	Ø 8 mm / Ø 11 mm	Ø 50 mm / Ø 53 mm
Repeatability	Within ΔE*ab 0.07 standard deviation (when the white calibration plate is measured 30 times at intervals of 10 seconds)	
Inter-instrument agreement	ΔE*ab: Within 0.6 Average of 12 BCRA Series II colours	ΔE*ab: Within 0.8 Average of 12 BCRA Series II colours
Observer condition	CIE: 2° Standard Observer	
Illuminant condition	CIE: C, D65	
Tolerance judgment*	Colour difference tolerance (box tolerance and elliptical tolerance)	
Colour spaces / colourimetric data	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 can be registered from computer)	
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese	
Storable data sets	1,000 (Measuring head and data processor save different data)	

Colour-difference target colours	100	
Calibration channels*	20 channels (ch00: White calibration; ch01 to ch19: User calibration)	
Display*	Chroma values; color difference values; PASS/WARN/FAIL display	
Interface / Baud rate*	RS-232 compliant (for data processor/PC) * Baud rate: 4,800, 9,600, 19,200 (bps); Set at 9600 when shipped from factory	
Power source	Four AAA size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 - 240 V 50/60Hz	
Dimensions (W x H x D)	102 × 244 × 63 mm	
Weight	Approximately 550 g (including 4 AAA size batteries and not including RS-232C cable)	Approximately 570 g (including 4 AAA size batteries and not including RS-232C cable)
Operating temperature/ humidity range	0 - 40°C, relative humidity 85% or less with no condensation	
Storage temperature/ humidity range	-20 - 40°C, relative humidity 85% or less with no condensation	
Other	LCD backlight ON/OFF function (When on, backlight stays ON for 30 seconds after last key or measurement operation)	
Standard accessories	White Calibration Plate CR-A43; Protective Cap CR-A72; Wrist Strap CR-A73; AC Adapter AC-A305; 4 AAA size batteries	White Calibration Plate CR-A44; Protective Cap CR-A72; Wrist Strap CR-A73; AC Adapter AC-A305; 4 AAA size batteries
Optional accessories	Hard Case CR-A103; RS-232C Cable CR-A102 (for PC); Granular Materials Attachment CR-A50; CR-400 Utility Software CR-S4w; Color Data Software SpectraMagic NX CM-S100w ; Glass Light-Projection Tube CR-A33a/f; Light-Projection Tube CR-A33c/d; Pivoting Base CR-A12	Hard Case CR-A103; RS-232C Cable CR-A102 (for PC); Granular Materials Attachment CR-A50; CR-400 Utility Software CR-S4w; Color Data Software SpectraMagic^{NX} CM-S100w ; Glass Light-Projection Tube CR-A33e

The "*" mark indicates functions available only when the Data Processor is connected or when the required settings have been made.

Name	Data Processor
Model	DP-400
Display range	Y: 0.01% to 160.00% (reflectance)

Measurement time	1 sec.
Minimum measurement interval	3 sec.
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)
Illuminant condition	C, D65
Display	Chroma values; color difference values; color difference graphs; PASS/WARN/FAIL display
Tolerance judgment*	Colour-difference tolerance (box tolerance and elliptical tolerance) Only for display function
Colour space/ colourimetric data*	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 registered in the measuring head can be used)
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese
Storable data sets	Max. 2000 pieces of data (divided into 100 pages) Deletion and Undoing of selected stored data (one or all data) are possible
Colour-difference target colours*	Only for the operating function (100 pieces of data when the measuring head is connected; input of measurement values or numeric) (Independent from page function)
Calibratiom channels*	Only for the operating function (20 channels when the measuring head is connected) (Channel 00: White calibration; Channels 01 through 19: User calibration)
Page function	100 pages
Display	Dot-matrix LCD with backlight (16 characters x 9 lines + 1 line for icon display) Contrast adjustment
Printer	384-dot line thermal printer (can also print graphs); Automatic printing for each measurement (can be set not to print)
Statistical function	Maximum, minimum, average, and standard deviation
Automatic measurement*	Date and time display: Year, month, day, hour, minute Timer: 3 seconds to 99 minutes (Some measurement modes require more than 3 seconds)
Interface	RS-232C compliant Baud rate (bps): 19200 fixed (when connected to PC); when measuring head is connected, baud rate is automatically set to that of the measuring head.
Power source	Four AA-size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 - 240 V 50/60Hz
Dimensions (W x H x D)	102 × 244 × 63 mm

Weight	Approx. 600 g (not including batteries and paper)
Operating temperature / humidity range	0 - 40°C, relative humidity 85% or less with no condensation
Storage temerature / humidity range	-20 - 40°C, relative humidity 85% or less with no condensation
Other specifications*	User calibration function (multi-calibration/manual calibration); Measurements for automatic averaging function; Print on/off function; CR-400 measurement data import function; All colour space print on/off function; Data protection on/off function; Backlight on/off function; Buzzer on/off function; Display color limit function; Remote mode (stored data output); Character input function (alphanumeric)
Standard accessories	Roll paper (1); RS-232C Cable CR-A101 (Head-DP)
Optional accessories	Shoulder Strap SS-01; Hard Case CR-A103; Roll Paper DP-A22 (5 rolls); RS-232C Cable CR-A102 (for PC); CR-400 Utility Software CR-S4w; Colour Data Software SpectraMagic^{NX} CM-S100w

The "*" mark indicates functions that can be used only when the measuring head is connected.

Specifications are subject to change without prior notice.

Optional accessories for CR-400 / CR-410

Granular Attachment CR-A50

For measurements of powders, pastes, grains or other small sized granular material. The low reflectance glass plate protects the sample surface against disorientation and prevents specimen material to enter the instrument. The set includes one retaining ring each to adjust the measuring area accordingly to either CR-400 or CR-410.

Item Order Code: 1829-751

Glass Plate for CR-A51 (for CR-A50)

Replacement low reflectance glass plate for CR-A50 Granular Attachment.

Item Order Code: 1829-752

Retaining Ring Set CR-A52

Replacement ring set for CR-A50 Granular Attachment. The set consist of one ring each for CR-400 and CR-410.

Item Order Code: 1829-753

Light Protection Tube with glass protection plate CR-A33a (only for CR-400)

Light projection tube for measurement of pasty, wet or moist samples. The convex protection glass plate prevents specimen from entering the instrument. The CR-A33a is recommended for soft specimen. The diameter of the plate is 22 mm.

Item Order Code: 1849-731

Light Protection Tube with plate 40 mm CR-A33b (only for CR-400)

Standard light projection tube with 40 mm plastic disc. Provides high stability on the sample. Recommended for all standard applications.

Order Item Code: 1849-732

Light Protection Tube without plate CR-A33c (only for CR-400)

Light projection tube without plate for measurements on small samples where the 40 mm or 22 mm plate is too large.

Item Order Code: 1849-733

Light Protection Tube with plate 22 mm CR-A33d (only for CR-400)

Light projection tube with a plate of 22 mm diameter. Allows measurements on small specimen with high stability against tilting of the measuring head.

Item Order Code: 1849-734

Light Protection Tube with Glass Protection CR-A33e (only for CR-410)

Light projection tube for measurement of pasty, wet or moist samples. The protection glass plate prevents specimen from entering the instrument.

Item Order Code: 1849-735

Light Protection Tube with Glass Protection CR-A33f (only for CR-400)

Light projection tube for measurement of soft samples. The concave protection glass plate prevents specimen from entering the instrument. The CR-A33a is recommended for flattening soft or soft and wet specimen. The diameter of the plate is 22 mm diameter.

Item Order Code: 1849-736

Specimen Holder CM-A96 (only for CR-400)

Required to fix opaque samples or the Glass or Disposal cells for measurement of opaque liquids in combination with the Sample Holder CR-A505. The clamp provides a constant pressure to the sample and the moveable side holders keep the cells in correct position.

Item Order Code: 1864-708

Glass Cell 10 mm CM-A98 (only for CR-400)

Cell made of optical glass with an optical path of 10 mm. Recommended for precise reflectance measurements of opaque liquids in combination with Sample Holder CR-A505 and Specimen Holder CM-A96.

Item Order Code: 1864-710

Glass Cell 20 mm CM-A99 (only for CR-400)

Cell with made of optical glass with an optical path of 20 mm. Suitable for precise reflectance measurements of opaque liquids with lower density in combination with Sample Holder CR-A505 and Specimen Holder CM-A96.

Item Order Code: 1864-711

Plastic Cell 10 mm CM-A131 (only for CR-400)

Disposal plastic cell with an optical path of 10 mm. Suitable for reflectance measurements of water based opaque liquids in combination with Sample Holder CR-A505 and Specimen Holder CM-A96.

Item Order Code: 1870-716

Plastic Cell 20 mm CM-A132 (only for CR-400)

Disposal plastic cell with an optical path of 20 mm. Suitable for reflectance measurements of water based opaque liquids with lower density or opaque paste in combination with Sample Holder CR-A505 and Specimen Holder CM-A96.

Item Order Code: 1870-717

Cell Holder CR-A501 (only for CR-410)

For measurements of powders, grains and granular materials in combination with the Glass Cell CR-A504. The measuring head is set to up-side down position and the Cell Holder CR-A501 precisely fixes the position of the Glass Cell CR-502.

Item Order Code: 9970-219

Glass Cell CR-A502 (only for CR-410)

Glass Cell made of optical glass for measurements of powders, pastes, grains and small granular materials. Diameter of the cell 60 mm. For precise positioning the Cell Holder CR-A501 is recommended.

Item Order Code: 9970-220

Glass Cell CR-A504 (only for CR-400)

Cell made of optical glass for measurements of powders, pastes, grains and small granular materials. Diameter of the cell 34 mm. For precise positioning the Cell Holder CR-A503 is recommended.

Item Order Code: 9970-2504

Sample Holder CR-A505 (only for CR-400)

Base holder to set the measuring head in horizontal position. Allows in combination with the Specimen Holder CM-A96 measurements of small samples up to a thickness of 22.5 mm or with the Glass- or Disposal Cells with 10 or 20 mm optical path the measurement of opaque liquids.

Item Order Code: 9970-441

Flow Cell CM-A508 (only for CR-400)

For continuous measurements of opaque liquids in reflectance mode. The optical path of the cell is 10 mm and the max. pressure is up to 2 Bar. For the positioning of the Flow Cell CM-A508 the horizontal aligned Sample Holder CR-A505 and the Sample Holder CM-A96 are required.

Item Order Code: 9970-237

Vertical Stand USD CM-A516

The CM-A516 Vertical allows aligning the instrument in Up-Side-Down position and secures that the instrument cannot get out of balance by using the Cell-Holder CR-A503 for CR-400 and CR-A501 for CR-410.

Item Order Code: B027154

Hard Case CR-A103

For comfortable hand carrying and storage of measuring head, data processor and accessories.

Item Order Code: 1878-600

Data Cable CR-A102 RS232c

Connection cable between measuring head or data processor and PC. For PC terminals with 9 pin SUB-D connecter. Length of the cable 2 m. *Item Order Code: 1878-704*

Chroma Meters CR-410C

Specially modified with accessories and firmware to provide color measurements of coffee at all stages of the production process using industry standard measurements. This portable and cost effective instrument can provide SCAA index data on whole green beans, roasted, ground and freeze dried coffee products.

Introduction

Special CR-410C version to measure the quality of coffee in various forms

The CR-410C handheld coffee colorimeter is specifically designed to measure the color of whole green beans, roasted beans, and roasted coffee using industry standard measurements.

Features

The CR-410C coffee colorimeter easily and accurately measures the color of coffee in a variety of forms: whole green beans, roasted beans, roasted and lyophilized (Freeze Dried) coffee forms.

Without a colorimeter, coffee bean color measurement is conducted either visually or with bulky, expensive instruments. The CR-410C is a low-cost, portable option that uses the Specialty Coffee Association of Americas (SCAA) specialty coffee index to calculate the color, difference from a standard, roasted level (light, medium, medium dark, dark), and pass/fail information.

- **Easy-to-use** – the CR-410C calculates measurements with the push of one button and can supply all the information needed in one printout

- **Portable** – handheld unit makes measuring effortless

- **Industry standard** – measurements are calculated based on the coffee industry standard established by the Specialty Coffee Association of America (SCAA)

- **Ability to measure multiple forms** – can measure whole coffee beans, powder, instant, and lyophilized forms

All other functions and features are identical with the standard CR-410.

Specifications

Principal Specifications of CR-410C

Model	CR-410 Head
Illuminating/viewing system	Wide-area illumination:0° viewing angle; specular component included
Detector	Silicon photocells (6)
Display range	Y: 0.01% to 160.00% (reflectance)
Light source	Pulsed xenon lamp
Measurement time	1 sec.
Minimum measurement interval	3 sec.
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)
Measurement/illumination area	Ø 50 mm/ Ø 53 mm
Repeatability	Within ΔE*ab 0.07 standard deviation (when the white calibration plate is measured 30 times at intervals of 10 seconds)
Inter-instrument agreement	ΔE*ab: within 0.8 Average of 12 BCRA Series II colors
Observer condition	CIE: 2° Standard Observer
Illuminant condition	CIE: C, D65
Tolerance judgment*	Color difference tolerance (box tolerance and elliptical tolerance)

Color space/colorimetric data*	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 can be registered from computer), SCAA scale
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese
Storable data sets	1,000 (Measuring head and data processor save different data)
Color-difference target colors	100
Calibration channels*	20 channels (ch00: White calibration; ch01 to ch19: User calibration)
Display*	Chroma values; color difference values; PASS/WARN/FAIL display
Interface / Baud rate*	RS-232 compliant (for data processor/PC) * Baud rate: 4,800, 9,600, 19,200 (bps); Set at 9600 when shipped from factory
Power source	Four AAA size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 – 240 V 50/60Hz
Dimensions (W × H × D)	102 × 244 × 63 mm
Weight	Approximately 570 g (including 4 AAA size batteries and not including RS-232C cable)
Operating temperature/humidity range	0 – 40°C, relative humidity 85% or less with no condensation
Storage temperature/humidity range	-20 – 40°C, relative humidity 85% or less with no condensation
Other	LCD backlight ON/OFF function (When on, backlight stays ON for 30 seconds after last key or measurement operation)

The "*" mark indicates functions available only when the Data Processor is connected or when the required settings have been made.

Name	Data Processor
Model	DP-400
Display range	Y: 0.01% to 160.00% (reflectance)
Measurement time	1 sec.
Minimum measurement interval	3 sec.
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)

Illuminant condition	C, D65
Display	Chroma values; color difference values; color difference graphs; PASS/WARN/FAIL display
Tolerance judgment*	Colour-difference tolerance (box tolerance and elliptical tolerance) Only for display function
Colour space/ colourimetric data*	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 registered in the measuring head can be used)
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese
Storable data sets	Max. 2000 pieces of data (divided into 100 pages) Deletion and Undoing of selected stored data (one or all data) are possible
Colour-difference target colours*	Only for the operating function (100 pieces of data when the measuring head is connected; input of measurement values or numeric) (Independent from page function)
Calibratiom channels*	Only for the operating function (20 channels when the measuring head is connected) (Channel 00: White calibration; Channels 01 through 19: User calibration)
Page function	100 pages
Display	Dot-matrix LCD with backlight (16 characters x 9 lines + 1 line for icon display) Contrast adjustment
Printer	384-dot line thermal printer (can also print graphs); Automatic printing for each measurement (can be set not to print)
Statistical function	Maximum, minimum, average, and standard deviation
Automatic measurement*	Date and time display: Year, month, day, hour, minute Timer: 3 seconds to 99 minutes (Some measurement modes require more than 3 seconds)
Interface	RS-232C compliant Baud rate (bps): 19200 fixed (when connected to PC); when measuring head is connected, baud rate is automatically set to that of the measuring head.
Power source	Four AA-size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 - 240 V 50/60Hz
Dimensions (W x H x D)	102 × 244 × 63 mm
Weight	Approx. 600 g (not including batteries and paper)
Operating temperature / humidity range	0 - 40°C, relative humidity 85% or less with no condensation
Storage temerature / humidity range	-20 - 40°C, relative humidity 85% or less with no condensation

Other specifications*	User calibration function (multi-calibration/manual calibration); Measurements for automatic averaging function; Print on/off function; CR-400 measurement data import function; All colour space print on/off function; Data protection on/off function; Backlight on/off function; Buzzer on/off function; Display color limit function; Remote mode (stored data output); Character input function (alphanumeric)
Standard accessories	Roll paper (1); RS-232C Cable CR-A101 (Head-DP)
Optional accessories	Shoulder Strap SS-01; Hard Case CR-A103; Roll Paper DP-A22 (5 rolls); RS-232C Cable CR-A102 (for PC); CR-400 Utility Software CR-S4w; Colour Data Software SpectraMagic^{NX} CM-S100w

The "*" mark indicates functions that can be used only when the measuring head is connected.

Specifications are subject to change without prior notice.

Optional accessories for CR-410C

Powder Sample Holder with Three Cup Holder

This sample holder enables the instrument to be held in position during powder sample measurement. Powdery samples are placed in the cups that are held in a sliding tray with three cups. This holder is best suited for fine powders although granular materials can be used in it as well. Enables the quick, easy, and precise measurement of powder with a CR-410.

Item comes with three cups and is not recommended for liquids.

Item Order Code: B027057

Cup for Powder Sample Holder

Spare cups for B027057 and B027058

Item Order Code

Granular Attachment CR-A50

For measurements of powders, pastes, grains or other small sized granular material. The low reflectance glass plate protects the sample surface against disorientation and prevents specimen material to enter the instrument. The set includes one retaining ring each to adjust the measuring area accordingly to either CR-400 or CR-410.

Item Order Code: 1829-751

Glass Plate for CR-A51 (for CR-A50)

Replacement low reflectance glass plate for CR-A50 Granular Attachment.

Item Order Code: 1829-752

Retaining Ring Set CR-A52

Replacement ring set for CR-A50 Granular Attachment. The set consist of one ring each for CR-400 and CR-410.

Item Order Code: 1829-753

Light Protection Tube with Glass Protection CR-A33e (only for CR-410)

Light projection tube for measurement of pasty, wet or moist samples. The protection glass plate prevents specimen from entering the instrument.

Item Order Code: 1849-735

Cell Holder CR-A501 (only for CR-410)

For measurements of powders, grains and granular materials in combination with the Glass Cell CR-A504. The measuring head is set to up-side down position and the Cell Holder CR-A501 precisely fixes the position of the Glass Cell CR-502.

Item Order Code: 9970-219

Glass Cell CR-A502 (only for CR-410)

Glass Cell made of optical glass for measurements of powders, pastes, grains and small granular materials. Diameter of the cell 60 mm. For precise positioning the Cell Holder CR-A501 is recommended.

Item Order Code: 9970-220

Vertical Stand USD CM-A516

The CM-A516 Vertical allows aligning the instrument in Up-Side-Down position and secures that the instrument cannot get out of balance by using the Cell-Holder CR-A503 for CR-400 and CR-A501 for CR-410.

Item Order Code: B027154

Hard Case CR-A103

For comfortable hand carrying and storage of measuring head, data processor and accessories.

Item Order Code: 1878-600

Data Cable CR-A102 RS232c

Connection cable between measuring head or data processor and PC. For PC terminals with 9 pin SUB-D connecter. Length of the cable 2 m.

Item Order Code: 1878-704

Chroma Meters CR-410T

The CR-410T is specially modified with firmware designed to provide data on tomato products including the specific USDA color index. The instrument can provide reliable color data on raw tomato, sauce, paste, juice, ketchup etc. making it ideal for procurement, goods in, production or the lab. A vital tool in achieving a consistent and appealing color for retail shelves.

Introduction

Special version to measure the quality of tomato based products

The CR-410T handheld tomato colorimeter is a specialty color measuring instrument used to determine the color and quality of tomato products such as sauce, paste, juice, and ketchup. This instrument uses a specific color index that follows USDA standards.

Features

The CR-410T handheld tomato colorimeter uses an index approved by the USDA to measure and grade the color of processed tomato products. This index simplifies color readings by presenting the user with one number to determine quality and grade. It allows uniformity and consistency of color from batch to batch.

The CR-410T measures the color of various forms of tomatoes such as sauce, paste, juice, and ketchup. This instrument is easy-to-use, affordable, hand-held, and can interface with SpectraMagic NX to edit and manage data collected.

- **Easy to use** – press one button to measure the application

- **Portable** – hand-held design in order to simplify measuring targets on-site

- **USDA Approved** – index is approved by USDA standards

- **Accurate** – highly accurate, saves time and money (prevents off-color rejects) than visual evaluation

- **PC data management** – can interface with SpectraMagic NX software for data management

All other functions and features are identical with the standard CR-410.

Specifications

Principal Specifications of CR-410T

Model	CR-410 Head
Illuminating/viewing system	Wide-area illumination:0° viewing angle; specular component included
Detector	Silicon photocells (6)
Display range	Y: 0.01% to 160.00% (reflectance)
Light source	Pulsed xenon lamp
Measurement time	1 sec.
Minimum measurement interval	3 sec.
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)
Measurement/illumination area	Ø 50 mm/ Ø 53 mm
Repeatability	Within ΔE*ab 0.07 standard deviation (when the white calibration plate is measured 30 times at intervals of 10 seconds)
Inter-instrument agreement	ΔE*ab: within 0.8 Average of 12 BCRA Series II colors
Observer condition	CIE: 2° Standard Observer
Illuminant condition	CIE: C, D65
Tolerance judgment*	Color difference tolerance (box tolerance and elliptical tolerance)
Color space/colorimetric data*	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 can be registered from computer), SCAA scale
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese
Storable data sets	1,000 (Measuring head and data processor save different data)
Color-difference target colors	100
Calibration channels*	20 channels (ch00: White calibration; ch01 to ch19: User calibration)

Display*	Chroma values; color difference values; PASS/WARN/FAIL display
Interface / Baud rate*	RS-232 compliant (for data processor/PC) * Baud rate: 4,800, 9,600, 19,200 (bps); Set at 9600 when shipped from factory
Power source	Four AAA size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 – 240 V 50/60Hz
Dimensions (W × H × D)	102 × 244 × 63 mm
Weight	Approximately 570 g (including 4 AAA size batteries and not including RS-232C cable)
Operating temperature/humidity range	0 – 40°C, relative humidity 85% or less with no condensation
Storage temperature/humidity range	-20 – 40°C, relative humidity 85% or less with no condensation
Other	LCD backlight ON/OFF function (When on, backlight stays ON for 30 seconds after last key or measurement operation)

The "*" mark indicates functions available only when the Data Processor is connected or when the required settings have been made.

Name	Data Processor
Model	DP-400
Display range	Y: 0.01% to 160.00% (reflectance)
Measurement time	1 sec.
Minimum measurement interval	3 sec.
Battery performance	Approx. 800 measurements (when using batteries under Konica Minolta's testing conditions)
Illuminant condition	C, D65
Display	Chroma values; color difference values; color difference graphs; PASS/WARN/FAIL display
Tolerance judgment*	Colour-difference tolerance (box tolerance and elliptical tolerance) Only for display function
Colour space/ colourimetric data*	XYZ, Yxy, L*a*b*, Hunter Lab, L*C*h, Munsell (Illuminant C only), CMC (l:c), CIE1994, Lab99, LCh99, CIE2000, CIE WI/Tw (Illuminant D65 only), WI ASTM E313 (Illuminant C only), YI ASTM D1925 (Illuminant C only), YI ASTM E313 (Illuminant C only), User index (Up to 6 registered in the measuring head can be used)
Languages* (Display)	LCD: English (default), German, French, Italian, Spanish, Japanese

Storable data sets	Max. 2000 pieces of data (divided into 100 pages) Deletion and Undoing of selected stored data (one or all data) are possible
Colour-difference target colours*	Only for the operating function (100 pieces of data when the measuring head is connected; input of measurement values or numeric) (Independent from page function)
Calibratiom channels*	Only for the operating function (20 channels when the measuring head is connected) (Channel 00: White calibration; Channels 01 through 19: User calibration)
Page function	100 pages
Display	Dot-matrix LCD with backlight (16 characters x 9 lines + 1 line for icon display) Contrast adjustment
Printer	384-dot line thermal printer (can also print graphs); Automatic printing for each measurement (can be set not to print)
Statistical function	Maximum, minimum, average, and standard deviation
Automatic measurement*	Date and time display: Year, month, day, hour, minute Timer: 3 seconds to 99 minutes (Some measurement modes require more than 3 seconds)
Interface	RS-232C compliant Baud rate (bps): 19200 fixed (when connected to PC); when measuring head is connected, baud rate is automatically set to that of the measuring head.
Power source	Four AA-size alkaline or Ni-MH batteries AC Adapter AC-A305 AC100 - 240 V 50/60Hz
Dimensions (W x H x D)	102 × 244 × 63 mm
Weight	Approx. 600 g (not including batteries and paper)
Operating temperature / humidity range	0 - 40°C, relative humidity 85% or less with no condensation
Storage temerature / humidity range	-20 - 40°C, relative humidity 85% or less with no condensation
Other specifications*	User calibration function (multi-calibration/manual calibration); Measurements for automatic averaging function; Print on/off function; CR-400 measurement data import function; All colour space print on/off function; Data protection on/off function; Backlight on/off function; Buzzer on/off function; Display color limit function; Remote mode (stored data output); Character input function (alphanumeric)
Standard accessories	Roll paper (1); RS-232C Cable CR-A101 (Head-DP)
Optional accessories	Shoulder Strap SS-01; Hard Case CR-A103; Roll Paper DP-A22 (5 rolls); RS-232C Cable CR-A102 (for PC); CR-400 Utility Software CR-S4w; Colour Data Software SpectraMagic^{NX} CM-S100w

The "*" mark indicates functions that can be used only when the measuring head is connected.

Specifications are subject to change without prior notice.

Optional accessories for CR-410T

Granular Attachment CR-A50

For measurements of powders, pastes, grains or other small sized granular material. The low reflectance glass plate protects the sample surface against disorientation and prevents specimen material to enter the instrument. The set includes one retaining ring each to adjust the measuring area accordingly to either CR-400 or CR-410.

Item Order Code: 1829-751

Glass Plate for CR-A51 (for CR-A50)

Replacement low reflectance glass plate for CR-A50 Granular Attachment.

Item Order Code: 1829-752

Retaining Ring Set CR-A52

Replacement ring set for CR-A50 Granular Attachment. The set consist of one ring each for CR-400 and CR-410.

Item Order Code: 1829-753

Light Protection Tube with Glass Protection CR-A33e (only for CR-410)

Light projection tube for measurement of pasty, wet or moist samples. The protection glass plate prevents specimen from entering the instrument.

Item Order Code: 1849-735

Cell Holder CR-A501 (only for CR-410)

For measurements of powders, grains and granular materials in combination with the Glass Cell CR-A504. The measuring head is set to up-side down position and the Cell Holder CR-A501 precisely fixes the position of the Glass Cell CR-502.

Item Order Code: 9970-219

Glass Cell CR-A502 (only for CR-410)

Glass Cell made of optical glass for measurements of powders, pastes, grains and small granular materials. Diameter of the cell 60 mm. For precise positioning the Cell Holder CR-A501 is recommended.

Item Order Code: 9970-220

Vertical Stand USD CM-A516

The CM-A516 Vertical allows aligning the instrument in Up-Side-Down position and secures that the instrument cannot get out of balance by using the Cell-Holder CR-A503 for CR-400 and CR-A501 for CR-410.

Item Order Code: B027154

Hard Case CR-A103

For comfortable hand carrying and storage of measuring head, data processor and accessories.

Item Order Code: 1878-600

Data Cable CR-A102 RS232c

Connection cable between measuring head or data processor and PC. For PC terminals with 9 pin SUB-D connecter. Length of the cable 2 m.

Item Order Code: 1878-704