Display Color Analyzer

CA-410

Broad measurement support for today's ever-evolving displays. CA-310 successor with major improvements
1 **Accuracy guaranteed from ultra-low to high luminance**

By using new sensors and circuitry, the CA-410 realizes a 25x wider accuracy-guaranteed luminance range (compared to the CA-310 when using the CA-P427 normal probe). This gives users the means to accurately measure and adjust the chromaticity and gamma characteristics of HDR displays across a wide luminance range from ultra-low to high. Moreover, a high luminance probe for measuring backlight modules and other high-luminance sources is available.

![Measurable display luminance range example](image)

CA-310 (Using CA-P32 probe)
- Accuracy guaranteed range for luminance: 0.005 to 1,000 cd/m²

CA-410
- CA-410 high luminance probe ø27 CA-P427 high luminance probe
- Accuracy guaranteed range for luminance: 0.01 to 30,000 cd/m²

2 **Improved chromaticity measurement accuracy**

Thanks to the enhanced accuracy of the XYZ filters, the CA-410 pushes its spectral sensitivity even closer to the color-matching functions of CIE 1931 (compared to the CA-310).

Moreover, the accuracy of chromaticity measurements has been further improved by using a calibration light source that replicates the optical spectrum of an LED display.

![CA-410/CA-310 spectral sensitivity vs. CIE 1931 color-matching functions](image)

3 **Improved productivity thanks to faster measurement**

Owing to improved low-luminance performance and faster computing, the CA-410 conducts gamma measurements much more quickly than its CA-310 predecessor. Even higher speeds are available in the LTD. AUTO mode, which ensures the same or better accuracy as the CA-310, or by freely setting the measurement integration time. Faster measurement translates into improved productivity in operations where time is of the essence, such as display driver development and gamma tuning on OLED production.

![Measurement time simulation for gamma measurement](image)

Probe used: CA-310: CA-P32; CA-410: CA-P427
- Measurement sync mode: NTSC, MANU* (16.7 ms)
- For 64-step gamma measurement at 0.01 - 500 cd/m²
- Not including wait time or display drive time.

4 **Optimized specifications for integration into automated systems**

The CA-410 uses the same basic communication commands as its CA-210/CA-310 predecessors, so users can continue using the systems they already built. A COM registration tool that makes it possible to use the CA-SDK2* with programs for predecessor models is available. Moreover, the CA-410 is optimized for system integration with specifications like automatic control support via a motorized zero-calibration shutter, and minimal space requirement as the probe can be directly connected to a PC.

![Example system configuration](image)
High Sensitivity Probes
- CA-VP410 (Measurement area: ø10 mm)
  - This model is suited for measuring high-end OLED displays across a wide luminance range from ultra-low to high at high speed.
  - Use for measuring, inspecting and adjusting chromaticity and gamma characteristics of OLED displays for TVs and smartphones across a wide luminance range from ultra-low to high.

Normal Probes
- CA-P410 (Measurement area: ø10 mm)
  - Standard model with a wide accuracy-guaranteed luminance range, suited for high-speed measurement of a variety of displays.
  - Use for luminance, chromaticity, white balance, gamma, and flicker measurement, evaluation and adjustment of various displays in general.
  - High luminance probe capable of measurements up to 30,000 cd/m² (CA-P410H: ø10 mm measurement area; CA-P427H: ø27 mm measurement area).

Mini Probe
- CA-MP410 (Measurement area: ø10 mm)
  - Compact model designed for greater cost-performance.
  - Use for applications that require small-sized probes or portability, i.e., integration in automatic measurement systems used in small display production processes, calibration of professional monitors and other applications that require space-saving design.
  - A high luminance probe capable of measurements up to 30,000 cd/m² (CA-MP410H: ø10 mm measurement area) is also available.

Software for Color Analyzer included as a standard feature

CA-DP40 Software for Color Analyzer
- Probes for the CA-410 come with the CA-S40 Software for Color Analyzer as a standard accessory. CA-S40 supports both Windows®7/10 and MacOS® allowing the probe to connect directly to a computer to conduct measurements, so users can introduce just the probe.
- The software can measure luminance, chromaticity and flicker, save data and log/live data of flash fluctuations via a waveform function.
- Moreover, it incorporates other features that give users greater breadth with their measurement needs, like SYNC Assist that fine-tunes internal synchronization settings.

Easy-to-operate CA-DP40 data processor
- The CA-DP40 data processor takes the “easy-to-operate” feature of the CA Series to new heights.
- With automatic zero calibration that allows measurement to start immediately after the power is turned ON, an easy-to-view 7-inch color display, multilingual support and a lithium ion battery (sold separately) that makes the unit portable, the CA-DP40 obtains measurement data quickly and reliably, making it convenient for on-the-spot measurements for R&D applications.
- Moreover, a maximum of 10 probes can be connected, which gives users the support for multi probe measurements.
### Probe specifications (Main lineup)

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<td>±6°</td>
<td>±6°</td>
</tr>
<tr>
<td>Repeatability (±1σ)</td>
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<td>Display range</td>
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<td>USB 2.0, RS-232C</td>
<td>USB 2.0, RS-232C</td>
<td>USB 2.0, RS-232C</td>
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<tr>
<td>Interface</td>
<td>USB (for USB communication)</td>
<td>USB (for USB communication)</td>
<td>USB (for USB communication)</td>
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### Main Specifications of PC Software CA-S40

**System requirement:**

- **Windows® 7 Professional 64-bit (requires KB125375 program update)**
- **Windows® 7 Professional 32-bit (requires KB125375 program update)**
- **Windows® 10 Pro 64-bit**
- **macOS® Sierra**

**For the KB125375 Program update for Windows® 7, visit the Microsoft® website.**

The hardware of the computer system to be used must exceed or exceed the greater of the required system requirements for the compatible OS being used or the following specifications.

**CPU**

- Intel® Core™ i series or equivalent

**Memory**

- 4 GB or more

**Hard disk drive**

- Free space of at least 100 MB, and at least 50 MB on system drive where OS is installed

**Display**

- Capable of display with 1,024 x 768 dots (high color, 16-bit)

**Others**

- USB port for installing from flash drive

**Display language**

- English

**Battery life**

- 3 hours (when one probe is connected)

### Main Specifications of Data Processor CA-DP40

**Battery life**

- 3 hours (when one probe is connected)

**Display range**

- ±0.0001 to ±3.0000 cd/m²

**Measurement data storage channels**

- 100

**Data logging function**

- Available

**Display language**

- English, Simplified Chinese, Traditional Chinese, Korean, Japanese
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.

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**System Diagram**

- **Normal Probe**
  - CA-P427
  - CA-P440

- **Mini Probe**
  - CA-MP410

- **High Sensitivity Probe**
  - CA-VP427
  - CA-VP440

- **Detection probe stand accessory**
  - Carrying Case CA-A01

- **Computer (Commercially available)**

- **PC Software for Color Analyzer CA-S40**
  - SDK for Color Analyzer CA-SDK2

- **AC Adapter AC-A312F**

- **USB Cable for Probe-PC (2 m) IF-A28**

- **Data Processor CA-DP40**

- **Carrying Case CA-A01**

- **USB Cable for DP-PC (2 m) IF-A34**

- **Bluetooth Module CM-A219**

- **RS Cable for Probe-DP (2 m) IF-A30**

- **Conversion Cable IF-A29**

- **RS Cable for Probe-DP IF-A31 (5 m) IF-A32 (10 m)**

- **BNC Conversion Cable IF-A35**

- **RS-232C cable (Commercially available)**

- **Conversion Cable IF-A35**

- **D-sub 9-pin (Power Cable)**

- **(mini-DIN) (BNC)**

- **USB Cable for Probe-PD (2 m) IF-A28**

- **Lithium-Ion Battery CM-A223**

- **Carrying Case CA-A01**

- **AC Adapter AC-A312F**

- **RS Cable for Probe-DP**

- **IF-A30**

- **IF-A31 (5 m)**

- **IF-A32 (10 m)**

- **USB Cable for DP-PC**

- **IF-A34**

- **Bluetooth Module CM-A219**

- **Data Processor standard accessory**

- **Probe standard accessory**

- **Optional accessory**

- **A lens hood and lens cap are included as standard with all probes.**

- **Computer**

- **(Commercially available)**

- **Screen shown are for illustration purposes only.**

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