Product Manual



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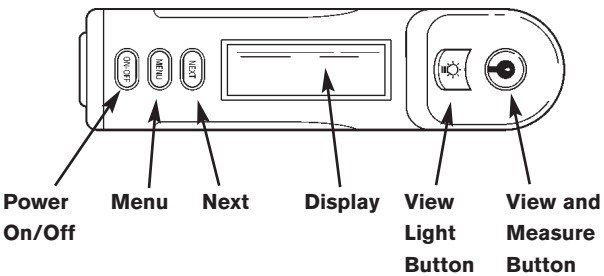
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INTRODUCTION

The PANTONE® Color Cue™ is a spectro-colorimeter designed to help you identify colors using a variety of color conversion lists such as PANTONE Color ink formulas, CMYK, RGB, sRGB, HTML, Lab and Hexachrome® values in a single device that fits in the palm of your hand. Using the PANTONE Color Cue, you will be able to swiftly identify the closest PANTONE Color for any item that you point and click to, providing an invaluable tool to enhance your color work flow. The PANTONE Color Cue is an intelligent spectro-colorimeter preprogrammed with PANTONE MATCHING SYSTEM® Color data. Once a color is identified, the data is made available to you through a simple scrolling feature.

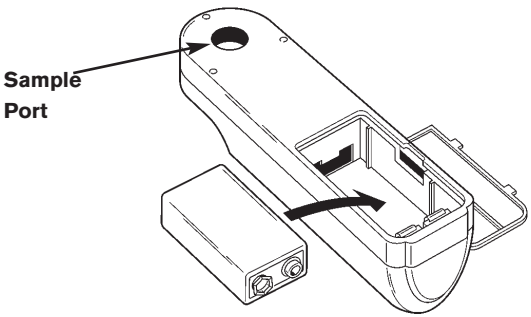
Physical Features

Top View



- The **On/Off** button turns power on and off.
- The clear **View and Measure** button is used to initiate a measurement or as a selection button in menu operations.
- The **Next** button is used to cycle through additional information about the identified color and cycle back to top in menu operations.
- The **Menu** button is used to initiate a menu operation and cycle through menu items.
- The **Light Switch** may be used to illuminate the sample for alignment.
- The **RS232 Jack** is for external communications; this manual does not cover external operations.
- The **liquid crystal display** has two rows of 16 characters each. It is the primary means to communicate menu choices and answers. Measurement information, menu selections, sample names or codes, and instrument status are all indicated on the display.

Bottom View



Unpacking the instrument

The package contains:

1 PANTONE Color Cue
1 9-volt battery
1 soft case
1 Quick Start Guide
1 Manual

The PANTONE Color Cue is powered by a single nine-volt “transistor type” battery.

Installing the Battery

First remove the battery compartment cover. There is a slot inside the latch on one side. Compress the slot toward the opposite side and the cover will release.

Inside the cover there is a black and white target. This is a calibration check target. Do not damage this target, get it dirty or leave it in direct sunlight.

To remove an old battery, turn the unit over and the battery should fall out, or push the battery into the terminals and pry up from the end away from the battery terminals. Used batteries should be disposed of in a safe manner that complies with all applicable laws.

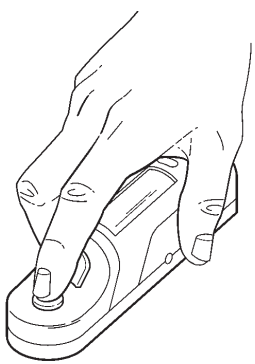
To install a new battery, examine the diagram in the bottom of the battery compartment. Determine the proper terminal alignment, align the terminals and insert the battery terminal end first.

If the unit is new, a sealed battery may be shipped in the battery compartment. In this case, remove the battery, remove the plastic seal from the battery and reinstall the battery.

Using the PANTONE Color Cue

The PANTONE Color Cue is designed for one-handed operation. Set the instrument on a table and press the On/Off button until characters appear in the display. If no characters appear, replace or install the battery. Holding the instrument by its sides, you should find that it is easy to press the **View and Measure** button with your index finger.

Point the **View and Measure** button at a color by placing it on top of the sample and press the button. The closest PANTONE Color for that sample will appear in the display window. If the sample is small, it may be desirable to view the sample through the clear button for alignment. In this case, the **View Light Button** can be used to turn on a green LED to help illuminate the sample.



Turning on the PANTONE Color Cue

To turn the power on, press the ON/OFF button until characters appear in the display. To turn the power off, press this button until the characters in the display disappear. If the unit is not operated for 20 minutes, power will turn off automatically.

Power Quality

The PANTONE Color Cue is battery operated. The unit checks the voltage level of the battery during the measurement and if the voltage is low enough to affect the measurement, the message LOW BATTERY will appear below the color name.

STANDARD OPERATIONS

Power reset

When the PANTONE Color Cue is turned on, it will perform a series of Power Reset Operations and the following screens will appear. The **Next** key will abort this sequence and display the name of the first color in the selected search list.

Instrument ID Guide Name	The Instrument ID is a character string unique to this instrument. The Guide Name is the name of the currently selected search list.
PANTONE® AND HEXACHROME® ARE	
THE PROPERTY OF PANTONE, INC.	
©PANTONE INC. 2001	
Cover Window and Press to Measure	

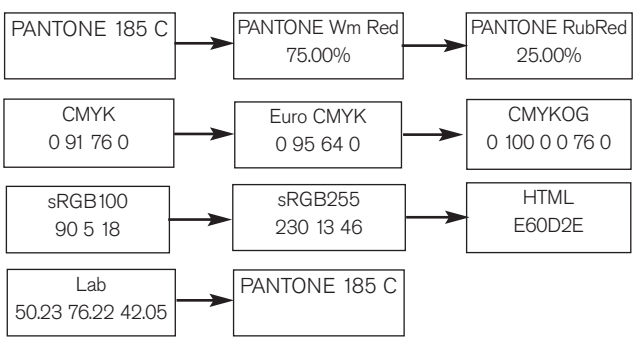
Measurement

With power on and the PANTONE Color Cue displaying color data or displaying

Cover Window and Press to Measure

place the measurement port flat against the color sample and press the **View and Measure** button to measure a sample. The measurement time is one millisecond and measurement will seem instantaneous.

When the measurement is complete, the instrument will display the name of the closest PANTONE Color in the selected search list. If there is no color close enough to the measured color, the message **Unknown Color** will appear. There is a collection of data associated with each search list which may include a PANTONE Number from the PANTONE formula guide on coated, uncoated or matte stocks, CMYK values for coated stock, CMYKOG values from PANTONE solid in Hexachrome on coated stock, sRGB100 and sRGB255 values on coated, uncoated and matte stocks, HTML codes and Lab color coordinates for PANTONE Colors on coated, uncoated and matte stocks. If these items are available and if they have been enabled for display, the **Next** button will sequence the display of these values. The following screens are an example of this sequence.



SAMPLE TYPES

The PANTONE Color Cue is calibrated for samples that are flat and fill the aperture of the measurement port. Samples should be presented in such a way that they contact the entire circumference of the measurement port.

Homogenous Samples

The PANTONE Color Cue will center-average the amount of light it collects from the sample, meaning that the center of the sample will count the most. A homogenous sample is one in which the sample has the same appearance over the entire aperture. If possible, try to find a flat homogenous area of the sample to measure. If this is not possible, use the largest, flattest homogenous area and measure several times. Using this technique, several measurements will agree; use the measurements that agree and ignore the others. In all cases, it is important to keep the measurement port flat against the unit during the measurement.

If the sample is thin, it should be placed on a flat surface. If the sample is not opaque, a light (unprinted paper) backing should be used.

If the sample is curved, you should attempt to get as much of the sample in contact with the circumference of the measurement port. In this case, you should perform multiple measurements at different presentations and keep the measurements that agree.

When the sample is not flat enough to form a good light block or the PANTONE Color Cue is operated in high light (direct sunlight), results may be improved by reducing external light with a dark cloth or simply shadowing the **View and Measure** button.

Problem samples

Samples that appear unusually bright may contain fluorescence. In some cases, the PANTONE Color Cue will be able to make repeatable measurements on this type of sample, but most search results will be unsatisfactory.

Samples which change appearance as a function of point of view may contain metallic, flake or pearlescent colorants. In some cases, the instrument will be able to make repeatable measurements on this type of sample, but most search results will be unsatisfactory.

Note: PANTONE Fluorescent and metallic colors are not listed in the PANTONE Color Cue.

PICKING COLORS FROM A SEARCH LIST

The PANTONE Color Cue contains at least one set of standard colors and color names. These color names are significant and copyrighted and can be used to communicate or specify color to anyone else who has access to the same PANTONE or commercial color classification set. There are also physical samples available in PANTONE Guides and PANTONE Books representing the target colors of the color set.

A set of color names and color coordinates is called a "Search list" that is used to identify the color that is "closest" to a measured color. As color coordinates represent colors as points in a three-dimensional space, a measured color will almost always be "between" the colors of the Search list. To help understand the relation of the measured color to the Search list colors, it displays a "distance" called Delta E or DE, from the measured color to the Search list color. Delta E is scaled so that a difference of 1.00 is the limit where the average person is most likely to decide that two colors are different.

Search performance

Search lists are intended to be used as an aid to visual color judgment and a number of conditions affect the performance of the search process. In addition to the effects of sample type, sample presentation and power quality which affect the measurement process as discussed earlier in this manual, there are several effects related specifically to search lists.

- Search lists are constructed for the standard condition of daylight viewing (D65). The instrument finds the "closest" color in the search list assuming that the search target is viewed in daylight and to the extent that the material and/or the search target would appear to shift their relative color under other lighting conditions, visual judgment will differ from the PANTONE Color Cue results.
- Search lists are constructed from target color reflectance spectra. Ideally these are the same targets used in the production of materials. In any measurement and manufacturing process there

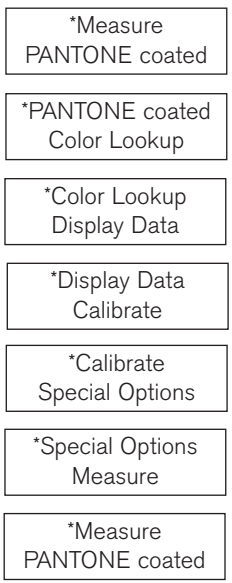
are expected variances and the target spectra represents the center of the production variance. The physical materials of color systems are subject to pigment fading, vehicle discoloration and substrate aging, thus the physical condition of color materials, including age, will affect visual judgment.

- The PANTONE Color Cue is factory calibrated to a specific gray scale and is tested against specific performance requirements at the time of shipment. After shipment, the instrument may have its gray scale decalibrated or have optical changes that affect its grayscale. This type of change, along with gloss variation in materials, will lead to variation in measured and apparent lightness. The default instrument set-up chooses the "closest" color, giving equal weight to lightness and chroma variations. In some applications, visual judgement may tend to give lower weight to lightness variations and higher weight to chroma variations.

THE INSTRUMENT COLOR MENU

In prior sections, the **View and Measure** button is used to initiate measurements and the **Next** button is used to sequence through displays.

There are a group of additional operations that may be accessed through the instrument control menu. Starting from the **Measure display** state, you will be able to view a sequence of different options by depressing the **Menu** button. You may exit the sequence back to the **Measure display** either by depressing the **Next** button or by completing an operation. All options will be displayed two at a time, one on each display line. The top choice will have the symbol "*" next to it. This symbol marks the selected item that will be used if you press the **View and Measure** button. Consecutive presses of the **Menu** button will sequence through the top of the menu as follows:



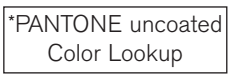
Note that the last display is the same as the first display. This is because the **Menu** button sequences the display messages from the start to the end. Some options select an operation while others lead to a new selection of display items.

Library Selection

To see the different library options, press the **View and Measure** button when the second item on the **Menu** has an "*" on the left side. The following sequence selects the guide or library type:





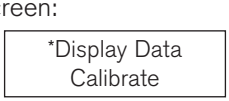


When the desired library is selected, press the **Next** button and it will return to the top of the **Menu**. Press the **View and Measure** button on top of a new sample to get a PANTONE Number for that specific color using the new selection, i.e., C, M and U for coated, matte and uncoated, respectively.

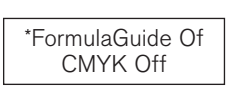
DISPLAY CONTROL

Enabling or disabling the Display Options

To enable or disable the display of formula guide, CMYK, EuroCMYK, CMYKOG, sRGB100, sRGB255, HTML, Lab and Hexachrome values, press the **Menu** key several times until you see the display data screen:



Then press the **View and Measure** button to get the display data screen:



To enable the formula guide values, press the **View and Measure** button to change the display to ***FormulaGuide On**:



If you want the formula display disabled and the screen reads **FormulaGuide On,** press the **View and Measure** button to change the display to ***FormulaGuide Of**.

To see the next display, press the **Menu** button and again press the **View and Measure** button to enable or disable the display:





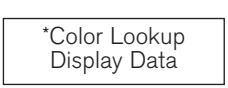
If you only need to enable or disable a specific option on the menu, keep pressing the **Menu** button until you reach the desired display option.
When you are done enabling or disabling all the display options following the same steps listed above, press the **Next** button to get the display data screen:



and either the **Next** key again or the **View and Measure** button to exit menu operations.

Selecting A Known Color

The PANTONE Color Cue has name selection capabilities that you will be able to see by pressing the **Menu** button until you see the ***Color Lookup Display Data** in the display data screen:



Press the **View and Measure** button to select the Color Lookup option. The Color Lookup option allows you to search for a desired PANTONE Color from a search list that will be presented to you in alphanumerical order. Alphabetic names will follow numeric names.

To start, you will be presented with a PANTONE Color and you will have to press the **Menu** button or the **View and Measure** button a number of times until you select the PANTONE Color for which you are looking. It should be apparent if your desired PANTONE Color is less than, greater than or equal to the PANTONE Color presented.

To go back and forth from a higher PANTONE Color to a lower PANTONE Color, you must press the **View and Measure** button or the **Menu** button to go higher.

Example: We want to look for PANTONE 331 C.

For the PANTONE formula guide coated, the first screen will be:

SEL.< or MENU>=
PANTONE 660 C

Press the **View and Measure** button because you are looking for 331, which is less than 660:

SEL.< or MENU>=
PANTONE 374 C

Press the **View and Measure** button again to look for 331, which is still less than 374:

SEL.< or MENU>=
PANTONE 237 C

Press the **Menu** button because you want 331, which is greater than 237:

SEL.< or MENU>=
PANTONE 306 C

Press the **Menu** button again because you want 331, which is still greater than 306:

SEL.< or MENU>=
PANTONE 340 C

Press the **View and Measure** button because you want 331, which is less than 340:

SEL.< or MENU>=
PANTONE 323 C

Press the **Menu** button again because you want 331, which is greater than 323:

SEL.< or MENU>=
PANTONE 332 C

Press the **View and Measure** button because you want 331, which is less than 332:

SEL.< or MENU>=
PANTONE 328 C

Press the **Menu** button again because you want 331, which is greater than 328:

SEL.< or MENU>=

PANTONE 330 C

Press the **Menu** button again because we want 331, which is greater than 330:

SEL.< or MENU>=
PANTONE 331 C

Although our target color appears in the display, for the PANTONE Color Cue to register the target color, you will need to press the **Menu** button one more time:

SEL.< or MENU>=
PANTONE 332 C

The number on your display will change; all you need to do is click the **View and Measure** button for the target color to be registered:

PANTONE 331 C

Your color is now selected and you may use the **Next** key to display data.

CHECKING THE INSTRUMENT

Determining the unit ID

Each unit is assigned a unique 16-character ID. This ID defines the information on the unit configuration, micro code ID, etc. You may need this ID especially when you contact your dealer or the manufacturer with any questions. To determine the unit ID, turn power off and back on. The unit ID will appear in the first screen after the unit is turned on:

EZCOLOR 02POCT16V

Cleaning the sample port

With normal use these instruments should not require calibration for months and possibly years. If a unit requires calibration more than once every few weeks, every effort should be made to identify and correct the source of the problem. The one area we cannot control in the design and production of the instrument is dirt in the environment of use.

There is a recessed clear window inside the sample port. When the instrument is new, this window is so clear that it is almost invisible. You should always be able to see the sensor (a black square in the center) and the light emitting diodes (rectangular boxes inside the edge). Examine the sample port from the bottom of the instrument to see if there is visible dust or dirt. If your view is clouded, the instrument's measurements will be affected. To clean it, do not use commercial cleaning materials. Instead, apply a small amount of alcohol on a dry cotton swab and carefully clean the sample port surface.

Recalibrating your PANTONE Color Cue

If necessary, you may recalibrate using the white and black targets on the back of the battery door. To do this, press the **Menu** key until you see the display data screen:

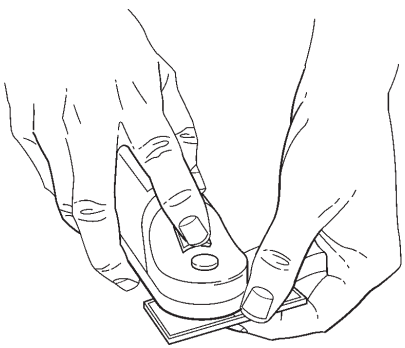
*Calibrate
Special Options

Press the **View and Measure** button and you will see the display data screen:

Measure White Calib.Target

Remove the battery door and make sure that the target is free of dust and dirt. If necessary, clean using distilled water only.
Note: Do not use abrasives or any commercial cleaning agents.

Press the white target against the sample port until you feel the proper contact between them.



Press the **View and Measure** button and the following display should appear:

Measure Black Calib.Target

Press the black target against the sample port and press the **View and Measure** button.

One of the two following displays should appear:

Either

Calibration Done

Or

Warning > 5% From Base

If the warning message appears, measure the white target several times recording the color picked. If the color picked is changing, then you should practice holding the white sample against the port until you can pick the same color repeatedly and then repeat the calibration process. If the color pick is repeatable and is a “near white” color (i.e., PANTONE 7541C), then the process is Okay. If you repeatedly pick a darker or more chromatic color, then consult the troubleshooting section on page 26.

SPECIAL OPTIONS

The Special Options submenu provides access to functions that are not normally user functions.

Cycle LEDS

The **Cycle LEDS** option will light each one of the light emitting diodes in order and then all at once. This process repeats until stopped by the **View and Measure** button. This function is used to check that the LEDs are functioning properly and to burn in the LEDs during instrument calibration.

Factory Reset

The **Factory Reset** option will reset user calibration.

It is used when performance after user calibration is poor.

Erase Flash

The **Erase Flash** option is used to blank the program memory of the instrument, making it inoperable. It is used when a new micro code is loaded at the factory.

Set Display

The **Set Display** submenu enables the display of instrument specific colorimetric data. The use of this data in not supported for stand-alone PANTONE Color Cue instruments.

• Display Lab On

This menu item enables the display of instrument specific D65 2 Deg uniform color space coordinates for the measured color. This data may be used in conjunction with services from Accuracy Microsensors for cross-referencing and custom color calculations.

• Display XYZ On

This menu item enables the display of instrument specific D65 2 Deg tristimulus for the measured color. This data may be used in conjunction with services from Accuracy Microsensors for cross-referencing and custom color calculations.

• Display dE On

This menu item enables the display of instrument specific D65 2 Deg uniform color difference for the measured color. Display of the color difference may help you understand the relation of your measured color to the Search list colors. Delta E is scaled so that a difference of 1.00 is the limit where the average person is most likely to decide that two colors are different.

• Display Name On

This menu item is normally on. Turning it off will suppress the display of the closest search list color name.

Radio and Television Interference

Change or modifications not expressly approved by the manufacturer may void the user's authority to operate this equipment. This equipment has been tested and found to comply within the limits for a digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the Colorimeter and the receiver.

Important

The PANTONE Color Cue is designed to be a color identification tool. It is programmed with the master color data for three PANTONE Solid Color Guides (coated, uncoated, matte).

Please note that measurement of a specific PANTONE Color from a PANTONE Publication with the PANTONE Color Cue may not produce an exact match as colors change over time due to colorant fading, aging, exposure to light, temperature and handling.
Note also that the results of the PANTONE Color Cue may not match the corresponding PANTONE Color and that some variation may occur. Variables that may affect the result provided by the PANTONE Color Cue include:

- The PANTONE Color Cue was improperly calibrated.
- Obstructions inside the PANTONE Color Cue measuring window.
- Component failure inside the PANTONE Color Cue.
- Incorrect measurement of the color, for example:
  - The unit was not perfectly flat on the sample measured.
  - Tha hposolog.3(aeas0.0hout bafay n ndow)41.3293 T -1.1528 -7 Tc0t41.7(7(x2(indow)41.841 T -1.1528 -1.1579 T13 Tc0 Tw(-T

Troubleshooting

1) Nothing in Display:
   - Press ON/OFF button and hold
   - Check Battery Installation
2) Dark Blocks in Display:
   - Cycle power; Check power
3) Bad Color Selection:
   - Check presentation
   - Block external light
   - Repeat calibration
   - Check/Clean sample port
   - Perform factory reset

Warranty

This instrument is licensed from, and calibrated by, Accuracy Microsensors, Inc., Pittsford, NY (www.accuracy.com). Accuracy Microsensors provides a one-year, return to factory warranty against defects in material or workmanship. Contact Pantone, Inc. to schedule warranty repairs.

Technical Specifications

Measurement time	Approx. 1/1000 second
Measurement per battery	Greater than 10,000
Stability under test conditions	Less than 0.1 in each component of Lab
LED Life in normal use	Greater than 10 years
Design Color Sensitivity	Greater than 10 million unique colors
Calibration period	Weeks to Months
Spectral Channels	Six
Weight (without battery)	3.4 oz
Length	6 in
Width	1 5/8 in
Height	1 1/2 in
Controls	5 buttons
Display	2 lines 16 characters LCD

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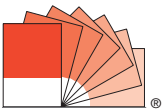
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